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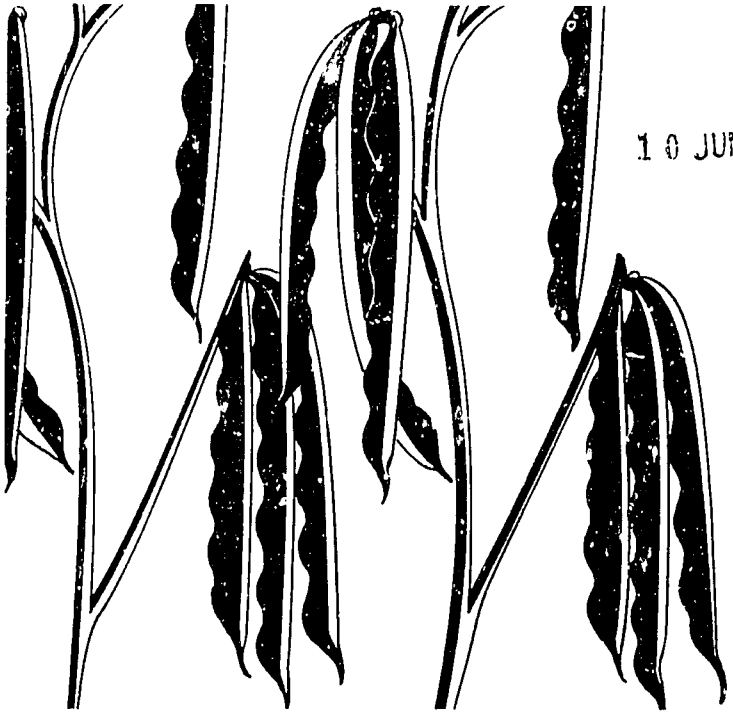

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ABSTRACTS ON FIELD BEANS

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Information and conclusions reported herein do not necessarily reflect the position of any of the aforementioned entities.

Abstracts on Field Beans
(*Phaseolus vulgaris* L.)

Vol. XI No. 1 April, 1986

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INTRODUCTION

This journal of analytical abstracts is designed to provide a specialized guide to the world's literature on field beans (*Phaseolus vulgaris* L.), disseminating research results and ongoing activities related to the crop.

The abstracts present condensed information from journal articles, booklets, reports, theses, manuals, and other conventional and nonconventional material, categorized into broad disciplinary fields. These are complemented with author and subject indexes to enable more comprehensive consultation.

When information is required on a specific topic, CIAT's Bean Information Center can carry out bibliographic searches of its entire document collection. As part of this service, users receive a set of abstracts of the articles related to the topic of their interest. The full text of these articles is available through the Photocopy Service of the Communication and Information Support Unit.

The Specialized Information Centers on cassava (*Manihot esculenta* Crantz) and on tropical pastures also publish abstract journals in their respective areas.

COMPONENTS OF AN ABSTRACT

Accession number (for photocopy requests) — Authors — Year of publication — Sequential number in the journal (for use of indices) — Original title — Additional notes — Author address — Source — Pages — Language of paper — Language of summary

[19421 ABATE, T.; NEGASI, A. 1981. 0118 Chemical control of American bollworm (Heliothis armigera) (Hubner) with ultra-low-volume sprays. Ethiopian Journal of Agricultural Science 3(1):49-55. Engl., Sum. Engl., 11 Refs. [Inst. of Agricultural Research, P.O. Box 2003, Addis Ababa, Ethiopia]

Descriptors

Phaseolus vulgaris. Injurious insects. Lepidoptera. Heliothis armigera. Insect control. Chemical control. Ethiopia.

Abstract

Expt. consisting of ultralow vol. formulations of endosulfan (500 and 750 g a.i./ha), cypermethrin (150 g a.i./ha), fenitrothion (960 g a.i./ha), profenofos (750 g a.i./ha), and an untreated check were conducted for 2 consecutive yr against Heliothis armigera on haricot beans at the Awassa and Nazareth Expt. Stations of the Institute of Agricultural Research (IAR), Ethiopia. The treatments were replicated 5 times in a randomized complete block design on 20 x 20 m plots. Of the insecticides used, single application of cypermethrin gave a more consistent and significant control than the check in both seasons at both stations. A new product, cypermethrin/profenofos 166^{R}, substituted for fenitrothion at Nazareth in the 1980 season, gave promising results to warrant further testing. Endosulfan, a recommended insecticide against the American bollworm in the past, was not as satisfactory as cypermethrin in its control of H. armigera on haricot beans. [AS]

Abstractor and/or translator

HOW TO USE THE INDEXES

The numbers listed under each entry in the author and subject indexes correspond to the abstract's sequential number, found above each abstract within the journal.

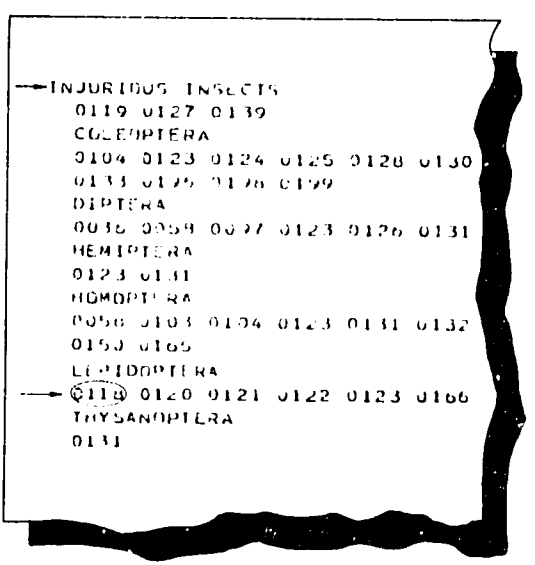
The last issue of the year contains cumulative author and subject indexes for the year.

Author Index

The Author Index can be used to find abstracts when the personal or corporate authors are known. The Author Index, which is alphabetically arranged, lists *all* author and co-author names cited in the publication.

Subject Index

The Subject Index presents an alphabetical list of descriptors used in beans research, many of which are combined with other descriptors, allowing the identification of more specific topics.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6. UNESCO coupons, available at UNESCO offices all over the world

A00 BOTANY, TAXONOMY AND GEOGRAPHICAL DISTRIBUTION

0001

24218 LEPIZ I., R.; NAVARRO S., F.J. 1983. Fríjol en el noroeste de México (Tecnología de producción). [Beans in northwestern Mexico (Production technology)]. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. Centro de Investigaciones Agrícolas del Pacífico Norte. 220p. Span., 206 Refs., Illus.

Phaseolus vulgaris. Taxonomy. Mycoses. Viroses. Injurious insects. Plant breeding. Irrigation. Water stress. Fertilizers. Harvesting. Mexico.

Different aspects concerning beans in northwestern Mexico are discussed; these include crop importance, origin and botanical description, genetic and var. improvement, production technology under irrigated and residual moisture conditions, fertilization, water use and management, bean insects and their control, fungal and viral diseases and their control, and harvest. Individual papers are recorded in this publication under the following consecutive no.: 0002, 0061, 0063, 0091, 0094, 0112, 0248, 0278, 0366, 0413. [CIAT]

0002

24220 LEPIZ I., R. 1983. Origen y descripción botánica. (Origin and botanical description). In _____., Navarro S., F.J. fríjol en el noroeste de México (Tecnología de producción). México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. Centro de Investigaciones Agrícolas del Pacífico Norte. pp.29-44. Span., 13 Refs., Illus.

Phaseolus vulgaris. Taxonomy. Roots. Stems. Leaves. Flowers. Seeds. Developmental stages. Plant geography. Mexico.

The origin, classification, taxonomy, morphology, and phenology of beans are presented. A map with the locations of the archaeological sites where remains of beans have been found in America and diagrams of bean structures are included. [CIAT]

0003

24264 ORDAZ S., L.; SANCHEZ G., J. 1984. Distribución y localización de especies silvestres y cultivadas del género Phaseolus en el Estado de Jalisco. (Distribution and localization of wild and cultivated species of the Phaseolus genus in the state of Jalisco). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.109-115. Span.

Phaseolus vulgaris. Plant geography. Phaseolus coccineus. Phaseolus acutifolius. Mexico.

An expedition was undertaken during 1983 in 19 municipalities of the state of Jalisco, Mexico, to collect wild and cultivated species of the Phaseolus genus. At the collection sites, data was taken on alt., predominant types of vegetation, species distribution, stage of the crop, soil color, and diseases and pests. The largest no. of collected specimens belonged to P. vulgaris (25), followed by P. coccineus (15), P. anisotrichus (3), P.

acutifolius (2), and 6 unidentified species. The state of Jalisco can be considered as a center of diversification of the Phaseolus genus. [CIAT]

BCO PLANT ANATOMY, MORPHOLOGY AND CYTOLOGY

0004

24263 LEPIZ I., R. 1984. Caracterización morfofenológica de variedades comerciales. (Morphophenological characterization of commercial varieties). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.103-108. Span.

Phaseolus vulgaris. Germplasm. Cultivars. Plant anatomy. Yield components. Mexico.

A morphophenological characterization of 57 bean genotypes was conducted under the conditions of Zapopán, Jalisco, Mexico. Twenty-five characteristics are presented for each material. This information will allow a catalog to be elaborated for the description of the improved bean var. released by the Instituto Nacional de Investigación Agropecuaria. [CIAT]

0005

25227 MANEN, J.F.; MIEGE, M.N. 1981. Localisation cellulaire de quelques protéines et des lectines des graines de Phaseolus vulgaris L. par fractionnement subcellulaire. (Cellular localization of some proteins and lectins of Phaseolus vulgaris seeds by subcellular fractionation). Physiologie Végetale 19(1):45-58. Fr., Sum. Fr., Engl., 20 Refs., Illus. [Dept. de Biologie Vegetale, Université de Geneve, 1, Chemin de l'Impératrice, CH-1292 Chambésy, Switzerland]

Phaseolus vulgaris. Proteins. Seed. Cell structure. Switzerland.

Cotyledonary meal of Phaseolus vulgaris was enriched with protein bodies by air-classification. The % of N of meal obtained by this way can reach 9.5%. This homogenized meal in 70% sucrose (wt./vol.) was directly fractionated on discontinuous density gradient. The protein body fraction (13% of N) represented 30% of the sample N. Small corpuscules (0.2 microns), never described before, surrounded the protein bodies. Protein body membranes were isolated. Lectins were localized with glycoprotein II in the protein body matrix. There was a certain independence between the 2 lectin subunits. None of the lectin subunits seemed to be a constitutive component of protein body membrane, but the legumin-like protein appeared to be associated with it. The apparent mol. wt., shown by SDS gel electrophoresis, of the protein body membrane constitutive polypeptides were 77,000, 40,000, 27,000, 22,000, and 16,000. [AS]

0006

24265 ORDAZ S., L. 1984. Estabilidad de caracteres morfológicos y agronómicos en los principales tipos de fríjol común. (Stability of morphological and agronomic characters in the main bean types). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.116-120. Span.

Phaseolus vulgaris. Germplasm. Cultivars. Plant habit. Yield components. Plant anatomy. Flowering. Mexico.

The stability of 11 morphological and agronomic characters of 200 bean materials from the germplasm bank of the Instituto Nacional de Investigación Agropecuaria was evaluated in 1983 in Zapopán, Jalisco, Mexico. A large variation was observed in the morphological characteristics studied; the largest variation occurred in all the growth habit components (no. of branches, no. and length of nodes). Information is given on 30 outstanding materials, with emphasis on yield components. [CIAT]

0007

23694 YAÑEZ J., P. 1977. Aborto de semillas de Phaseolus vulgaris L.: morfología y ensayo con reguladores de crecimiento. (Abortion of Phaseolus vulgaris seeds: morphology and trials with growth regulators). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. Escuela Nacional de Agricultura. 84p. Span., Sum. Span., 45 Refs., Illus.

Phaseolus vulgaris. Seeds. Growth. Plant growth substances. Pods. Mexico.

The structural development of seeds with retarded and normal growth was studied to explain possible structural influences on retarded growth. Likewise, the influence of exogeneous hormones on the possible roles of natural hormones in said phenomenon was investigated and finally it was considered pertinent to verify reports of a pause in seed growth under field conditions. Abortive seeds (which have stopped growing and finally die) and normal seeds of young and mature fruits were measured, and microscopic preparations of seminal primordia were done 2-8 days after anthesis. Plants were also sprayed with 5 growth regulators; these did not influence the high of seed abortion. Near the apex of the main stem a gradient was observed for the no. of fruits/node and no. of normal seeds/retained fruit. In mature fruits, a broad variation in the size of aborted seeds in the same fruit was observed so seeds were grouped in 3 main size groups: 0.9-1.4, 3.0-7.0, and 11.0-13.0 mm long (the last group is of normal seeds). This indicates that there are 2 stages of max. abortion during fruit development: (1) before and after flowering, and (2) during mid-fruit growth. Aborted seeds were found in all places of the fruit, most frequently in the extremes. Microscopic observations indicated various anatomic anomalies in the seeds, such as absence and necrosis of the embryo-sac, necrotic ovule, unfertilized seminal primordia, absence of embryos and endosperm, necrotic embryo and endosperm, small or hollow seeds with rudimentary embryo; however, the frequency of these anomalous seeds was less than that of abortion at the end of harvest. [AS (extract)-CIAT]

0008

21976 ZAGORCHEVA, I.; PORIAZOV, I. 1983. Meiosis disturbances and seed fertility in F_1 of Phaseolus vulgaris x Phaseolus coccineus. Bean Improvement Cooperative. Annual Report 26:61. Engl. [Maritsa Inst. of Vegetable Crops, Plovdiv, Bulgaria]

Phaseolus vulgaris. Phaseolus coccineus. Cell division. Pollen. Hybrids. Determinate cultivars. Indeterminate cultivars.

Meiosis was studied in 9 plants of interspecific hybrids divided into 2 groups: hybrids with pollen stainability below 20% and 1-12 seeds/plant (group I) and hybrids with about 30% pollen stainability and 12-21 seeds/plant (group II). The disturbances of meiosis in F_1 hybrids between Phaseolus vulgaris and P. coccineus show that the chromosomes of both species are partially homologous. Considering the hybrids with different

type of growth, the most unstable meiosis is found in those with semi-indeterminate habit. [CIAT]

See also 0036 0230 0231 0361

C00 PLANT PHYSIOLOGY

0009

25343 BIRO, R.L.; JAFFE, M.J. 1984. Thigmomorphogenesis: ethylene evolution and its role in the changes observed in mechanically perturbed bean plants. Physiologia Plantarum 62(3):289-296. Engl., Sum. Engl., 32 Refs., Illus. [Biology Dept., Wake Forest Univ., P.O. Box 7325 Reynolda Sta., Winston-Salem, NC 27109, USA]

Phaseolus vulgaris. Cotyledons. Ethylene production. Growth. USA.

Mechanical perturbations, either rubbing or wounding, caused ethylene evolution from Phaseolus vulgaris cv. Cherokee Wax internodes. Evolution began 45-60 min after perturbation and peaked ca. 2 h later. Greatest thigmomorphogenesis occurred if internodes were perturbed when they were equal to or less than 10 mm long. Greatest ethylene evolution, however, occurred in longer internodes. When one internode was perturbed, ethylene evolution was not observed from other internodes even though they responded thigmomorphogenetically by exhibiting decreased elongation. Ethylene evolution was apparently a result of increased 1-amino-cyclopropane-1-carboxylic acid (ACC) production after perturbation. Inhibitors of ACC and ethylene synthesis blocked increased radial growth but not reduced elongation. Ethylene might therefore be only one of several factors causing thigmomorphogenesis. [AS]

0010

24914 CANTU G., F.J. 1980. Determinación de la relación evapotranspiración/evaporación en cuatro cultivares: maíz NLVS-1 y NLVS-1E (Zea mays), girasol Tecmon 1 (Helianthus annuus), fríjol Delicias 71 (Phaseolus vulgaris) y sorgo Topaz (Sorghum vulgare). (Determination of the evapotranspiration:evaporation ratio in four cultivars: maize NLVS-1 and NLVS-1E, sunflower Tecmon 1, beans Delicias 71, and sorghum Topax). Tesis Ing.Agr. Nuevo León, México, Instituto Tecnológico y de Estudios Superiores de Monterrey. 70p. Span., Sum. Span., 23 Refs., Illus.

Phaseolus vulgaris. Evapotranspiration. Soil moisture. Yields. Transpiration. Water absorption. Water requirements. Mexico.

An expt. was conducted in the agricultural exptl. field and in the soils lab. of the Instituto Tecnológico y de Estudios Superiores de Monterrey (Nuevo León, Mexico) to determine total evapotranspiration (TE), daily evapotranspiration (DE), TE:DE ratio, production, production efficiency, and economic contribution of 3 cv.: maize NLVS-1 and NLVS-1E, sunflower Tecmon 1, beans Delicias 71, and sorghum Topaz. For the bean cv. results obtained were as follows: TE, 21.16 cm; DE, 0.214 cm/day; TE:DE ratio, 0.505; production, 0.768 t/ha; evapotranspiration efficiency, 3714 kg/cm/ha; and economic contribution, $389.99/cm/ha. [AS (extract)-CIAT]

0011

15401 HARRIS, G.C. 1977. Properties of ribulose-1,5-diphosphate carboxylase/oxygenase from Spinacea oleracea and Phaseolus vulgaris. Ph.D. Thesis. Amherst, University of Massachusetts. 109p. Engl., Sum. Engl., 29 Refs., Illus.

Phaseolus vulgaris. Enzymes. Biochemistry.

Purification of Phaseolus vulgaris ribulose-1,5-diphosphate carboxylase with ammonium sulphate precipitation, ion exchange chromatography, and gel filtration resulted in the complete loss of detectable oxygenase activity and the retention of a low velocity and a high K_m form of the carboxylase. Purification of the enzyme with polyethylene glycol-6000 precipitation and ion exchange chromatography resulted in the retention of a high velocity and a high K_m form of both the carboxylase and oxygenase. The enzymes prepared by the 2 procedures were electrophoretically different. Etiolated leaf tissue exhibited low rates of both carboxylase and oxygenase and similar developmental kinetics were observed for both activities during greening. [AS (extract)]

0012

25344 JAFFE, M.J.; TELEWSKI, F.W.; COOKE, P.W. 1984. Thigmomorphogenesis: on the mechanical properties of mechanically perturbed bean plants. Physiologia Plantarum 62(1):73-78. Engl., Sum. Engl., 17 Refs., Illus. [Dept. of Biology, Wake Forest Univ., Winston-Salem, NC 27109, USA]

Phaseolus vulgaris. Growth. Stems. USA.

Mechanical properties of control and mechanically perturbed stems of Phaseolus vulgaris cv. Cherokee Wax were compared. Rubbed plants were greatly hardened against mechanical rupture by previous mechanical perturbation. This hardening was due to a dramatic increase in stem flexibility, but not stiffness. Mechanically perturbed plants could bend over 90° without breaking, whereas control plants broke after slight bending. Comparison with other work revealed that different species have different tactics for achieving similar resistance to rupture due to mechanical stress. [AS]

0013

24879 PIERCE, M.L. 1981. Turgor dependence of biosynthesis and metabolism of abscisic acid. Ph.D. Thesis. East Lansing, Michigan State University. 193p. Engl., Sum. Engl., 147 Refs., Illus.

Phaseolus vulgaris. Leaves. Water stress. Stomata. Plant growth substances. USA.

Turgor rather than leaf water potential or osmotic pressure was the critical parameter of plant water relations which controlled ABA production in stressed leaves of Phaseolus vulgaris, Xanthium strumarium, and cotton. Loss of turgor in detached leaves of P. vulgaris was correlated with accumulation not only of ABA but also of its metabolites such as phaseic acid. On rehydration, ABA was converted to phaseic acid and not to conjugated ABA (the alternative metabolic route). [Dissertation Abstracts International]

See also 0099 0271 0272

0014

25230 ABD EL-HADI, A.R.; ALEXANDER, A.; DOERING, H.W. 1982. The effect of substrate salinity on dry matter production and phosphate uptake by bush beans. Egyptian Journal of Soil Science 22(1):31-40. Engl., Sum. Engl., Ar., 24 Refs., Illus. [Soil & Water Research Inst., Agric. Centre, Cairo, Egypt]

Phaseolus vulgaris. Nutrient solution. Nutrient uptake. Composition. P. Salinity. Dry matter. Fertilizers. Dwarf beans. Egypt.

The possible physiological interactions between chloride and phosphate were studied using bush beans var. Red Kidney grown in water culture and treated with K + Na total concn. of 60 meq as chloride and a K:Na ratio of 9:1 and 1:9. Two levels of PO_4^{3-}, 0.5 and 5.0 mM, were also supplied. K:Na supply and ratio significantly affected vegetative DM formation and leaf area development. Both Mg and Ca contents were reduced as a result of K + Na supply. The repressive effect on Mg content is associated with a significant decrease of chlorophyll a and b content in the treatment rich in K. P content of the single plant fractions remains substantially unaffected by the PO_4 concn. of the nutrient solution. A high chloride supply does not significantly influence the P content of the plants. Possible mechanisms of salinity effects on plant P content are discussed. [AS]

0015

25328 AGUI, I.; GOMEZ, M. 1984. Influencia de la aplicación de EDTA-Fe y arcilla en judía (Phaseolus vulgaris, L.). Efecto sobre la absorción y distribución de macronutrientes. (Influence of the application of iron EDTA and clay on beans. Effect on the absorption and distribution of macronutrients). Anales de Edatología y Agrobiología 42(11-12): 2203-2216. Span., Sum. Engl., Span., 14 Refs., Illus.

Phaseolus vulgaris. Nutrient solution. Fe. Nutrient uptake. Nutrient transport. N. P. K. Ca. Mg. Mineral content. Spain.

An expt. was carried out with bean plants, grown in hydroponics, to study the effect of different levels of Fe-EDTA and Fe-clay application on the absorption and distribution of macronutrients (N, P, K, Ca, and Mg). The application of Fe-clay had a negative effect on plant growth in comparison with the application of Fe-EDTA. The inhibition on the nutrient content was less evident. This was due to the low Fe availability in solutions and/or by retention of cation elements (Ca and Mg) by clay. [AS]

0016

25348 BIENFAIT, H.F.; VAN DER BRIEL, M.L.; MESLAND-MUL, N.T. 1984. Measurement of the extracellular mobilizable iron pool in roots. Journal of Plant Nutrition 7(1-5):659-665. Engl., Sum. Engl., 5 Refs., Illus. [Laboratory for Plant Physiology, Univ. of Amsterdam, Kruislaan 318, 1098 SM Amsterdam, The Netherlands]

Phaseolus vulgaris. Roots. Nutrient solution. Fe. Nutrient transport. Nutrient uptake. Leaves. Mineral content. Netherlands.

Roots of Phaseolus vulgaris, upon incubation with $Na_2S_2O_4$ and bipyridyl under N_2, release Fe in 2 phases, a rapid one of 1-2 min and a slow one of at least 30 min. In order to establish the contribution of cellular Fe to the released Fe, ferritin was chosen as an indicator. Fe-deficient plants

were given Fe, which resulted in strong uptake; after 3 days ferritin was extracted from the roots and after purification and immunoprecipitation with anti-ferritin on Sepharose beads its Fe content was 1440 atoms/mole ferritin. After 7 and 120 min treatment with $Na_2S_2O_4$/bipyridyl, ferritin Fe contents were 1410 and 780, resp. K^+ efflux starts after 10 min. Thus, Fe mobilized in the rapid phase is extracellular. The extracellular Fe pool is formed upon growth on Fe-EDTA, and is completely consumed by the plant when transferred to Fe-free medium after 1 acidification cycle. With Ferrioxamine as the Fe source this pool is not formed. [AS]

C017

25195 BRETELER, H.; SIEGERIST, M. 1984. Effect of ammonium on nitrate utilization by roots of dwarf bean. Plant Physiology 75(4):1099-1103. Engl., Sum. Engl., 28 Refs., Illus. [Research Inst. ITAL, P.O. Box 48, 6700 AA Wageningen, The Netherlands]

Phaseolus vulgaris. Ammonium nitrate. Nutrient uptake. Roots. Dwarf beans. N. Netherlands.

The effect of exogenous NH_4^+ on NO_3^- uptake and in vivo NO_3^- reductase activity (NRA) in roots of Phaseolus vulgaris cv. Witte Krombek was studied before, during, and after the apparent induction of root NRA and NO_3^- uptake. Pretreatment with NH_4Cl (0.15-50.00 mM) affected neither the time pattern nor the steady state rate of NO_3^- uptake. When NH_4^+ was given at the start of NO_3^- nutrition, the time pattern of NO_3^- uptake was the same as in plants receiving no NH_4^+. After 6 h, however, the NO_3^- uptake rate (NUR) and root NRA were inhibited by NH_4^+ to a max. of 45 and 60%, resp. The response of the NUR of NO_3^--induced plants depended on the NH_4Cl concn. Below 1 mM NH_4^+, the NUR declined immediately and some restoration occurred in the 2nd hour. In the 3rd hour, the NUR became constant. In contrast, NH_4^+ at 2 mM and above caused a rapid and transient stimulation of NO_3^- uptake, followed again by a decrease in the 1st, a recovery in the 2nd, and a steady state in the 3rd hour. Maximal inhibition of steady state NUR was 50%. With NO_3^--induced plants, root NRA responded less and more slowly to NH_4^+ than did NUR. Met. sulfoximine and azaserine, inhibitors of glutamine synthetase and glutamate synthase, resp., relieved the NH_4^+ inhibition of the NUR of NO_3^--induced plants. It was concluded that repression of the NUR by NH_4^+ depends on NH_4^+ assimilation. The repression by NH_4^+ was least at the lowest and highest NH_4^+ levels tested (0.04 and 25.00 mM). [AS]

0018

20672 GUPTA, U.C. 1983. Boron deficiency and toxicity symptoms for several crops as related to tissue boron levels. Journal of Plant Nutrition 6(5):387-395. Engl., Sum. Engl., 13 Refs. [Research Branch, Agriculture Canada, Charlottetown, P.E.I., Canada C1A 7M8]

Phaseolus vulgaris. Snap beans. B. Plant development. Mineral deficiencies. Toxicity. Fertilizers. Canada.

Greenhouse expt. were conducted to study B deficiency and toxicity symptoms related to B levels in the plants for several crops which included Phaseolus vulgaris (snap bean cv. Eastern Butterwax). A factorial randomized block design was used with 4 replicates and 4 B treatments (0, 1, 2, and 4 ppm B). B deficiency (with no added B) in beans appeared as yellowing of tops associated with slow flowering and pod formation; this deficiency was related to 12 ppm B in tops at prebloom and 13 ppm B in tops at harvest. B toxicity reduced growth and burned older leaves, especially on the edges, at 2 and 4 ppm B. Such toxicity was related to more than 125 ppm B in tops at bloom and to 265 ppm B in tops at harvest. [CIAT]

0019

25342 HARDIMAN, R.T.; JACOBY, B. 1984. Absorption and translocation of Cd in bush beans (Phaseolus vulgaris). Physiologia Plantarum 61(4): 670-674. Engl., Sum. Engl., 27 Refs., Illus. [International Crops Research Inst. for the Semi-Arid Tropics, Patanc'eru, Andhra Pradesh 502 324, India]

Phaseolus vulgaris. Nutrient uptake. Nutrient transport. Cd. Translocation. Roots. India.

Factors af ecting Cd absorption and translocation in young bean plants were studied. Absorption of Cd by roots was reduced in the presence of other cations of increasing valence or ionic radii. Reduced absorption also occurred in the presence of EDTA. Cd concn. in exudates from excised stems increased with increased passage of Cd solution and approached the concn. in the external medium (4.5 micromolar Cd). This was apparently associated with saturation of adsorption sites in the stems. The stem behaved as a cation exchange column resulting in a chromatographic distribution of Cd towards the top of the plant. These expt. indicate that Cd existed in the xylem fluid as a free or weakly complexed cation. Additional expt. showed that the total amount of Cd absorbed by bean plants was increased by inducing higher transpiration rates. The effect of water flux on Cd transport indicated apoplastic flow to the stele. [AS]

0020

25232 HERMAN-McKENTLY, A.; GARDNER, F.P.; SCHRODER, V.N. 1982. Effects of calcium, magnesium and potassium deficiencies on the growth and development of bean (Phaseolus vulgaris L.) in nutrient culture. Proceedings. Soil and Crop Science Society of Florida 41:139-144. Engl., Sum. Engl., 9 Refs., Illus. [Epcot Center, The Land, Lake Buena Vista, FL 32830, USA]

Phaseolus vulgaris. Plant development. Growth. Mineral deficiencies. Ca. Mg. K. Nutrient solution. Dwarf beans. USA.

Growth responses of bush bean cv. Sprite, subjected to Ca, Mg, and K stresses at 3 phenological stages (3rd-trifoliolate leaf expansion, flower initiation, and pod initiation), were determined. A Hoagland no. 2 nutrient solution was used in the greenhouse. Nutrient deficiencies were imposed on exptl. groups by replacing the complete solution with solutions deficient in either Ca, Mg, or K, at the 3 phenological stages. Whole plants were harvested at weekly intervals for dry wt. comparisons, and tissue analyses for Ca, Mg, and K. In comparison to control plants, Ca stress at 3rd-trifoliolate leaf expansion and flower initiation reduced growth approx. 80% and pod no. approx. 90%. Ca stress at pod initiation reduced growth by 66% and pod no. by 73%. Application of K stress reduced DM yield and pod no. less, at all stages of development, than Ca stress, with slight effect at pod initiation. The effect of Mg stress was intermediate. These observations confirm the mobility of the 3 ions, K greater than Mg greater than Ca, and the necessity of available and sufficient Ca in the root zone. The status of Ca, Mg, and K in plant tissues reflected the concn. of the 3 cations in the nutrient solutions. The Ca content of stressed plant tissue at 9 wk. was approx. 1/6 of the Ca content of control plant tissue (2%). The K content of stressed tissue was reduced to about 20% of the control (4%). The content of Mg in plant tissue at 9 wk. was reduced 90, 80, and 80% for removal of Mg from the nutrient solution at the 3rd-trifoliolate leaf expansion, flower initiation, and pod initiation stages, resp. The relationship of plant growth, yield, and mineral content to nutritional stress is useful for understanding and formulating plant nutrition management strategies. [AS]

0021

25349 KARHADKAR, A.D.; KANNAN, S. 1984. Transport patterns of foliar and root absorbed copper in bean seedlings. Journal of Plant Nutrition 7(10):1443-1452. Engl., Sum. Engl., 11 Refs., Illus. [Biology & Agriculture Division, Bhabha Atomic Research Centre, Bombay 400085, India]

Phaseolus vulgaris. Nutrient uptake. Cu. Translocation. Roots. Leaves. Nutrient transport. India.

Copper absorption by roots or leaves and transport to other parts were followed in 9-day-old seedlings of bean cv. Vaghya. Translocation was also measured in 4-cm segments of the stem. It was found that a larger amount of Cu was retained in the roots and that Cu was more mobile through the phloem than through the xylem, as indicated by the data on translocation from root and leaf. Bean plants were found to translocate more Cu to the stem than to other parts. Kinetic analysis of absorption by excised roots and stem segments revealed that the roots have a max. uptake capacity and high affinity for Cu. [AS]

0022

23288 OLIVEIRA, S.A. DE 1978. La influencia del boro en el crecimiento y nutrición mineral del Phaseolus vulgaris L. (Influence of boron on growth and mineral nutrition of Phaseolus vulgaris). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 153p. Span., Sum. Span., 118 Refs., Illus.

Phaseolus vulgaris. Nutrient solution. Nutrient uptake. B. Mineral content. Leaves. Stems. Roots. Pods. Growth. Mineral deficiencies. Mexico.

Two expt. were conducted under greenhouse conditions to study, using hydroponic culture, the effects of B on growth and mineral nutrition of bean var. Cacahuate. In the 1st expt., the most adequate solution for healthy crop development was selected among 4 nutritive solutions, based on DM production of the different organs (leaves, stems, roots, and pods) and the buffering potential of the solutions. Once the nutritive solution was selected, a 2nd expt. was established with 4 treatments: 0, 0.005, 0.050, and 0.500 ppm B. In both expt. the effects produced by the different B treatments were evaluated through microscopic, chemical, and vegetable growth analyses and by visual diagnosis during the different phenological stages. The Rabimi solution was the most adequate for normal bean development. Levels of B deficiency (0 and 0.005 ppm) restricted leaf area expansion and dry wt. in leaves, stems, and roots. Highest nutrient uptake by the aerial parts and roots were observed for treatments with 0.050 and 0.500 ppm B. B deficiency affected yield considerably; treatment with 0.005 ppm B yielded 15% less than the best treatment (0.050 ppm B). [AS (extract)-CIAT]

0023

24954 PRIMAVESI, O.M.A.S.P.R.B. 1983. Nutricao mineral de feijoeiro (Phaseolus vulgaris L.) em dois solos sujeitos a compactacao. (Mineral nutrition of common beans grown in two soils subject to compactation). Tese Mestrado. Piracicaba-SP, Brasil, Escola Superior de Agricultura Luiz de Queiroz, da Universidade de Sao Paulo. 151p. Port., Sum. Port., Engl., 133 Refs., Illus.

Phaseolus vulgaris. Plant nutrition. Nutrient uptake. Soils. Soil fertility. Brazil.

Expt. were conducted at Escola Superior de Agricultura Luiz de Queiroz (Piracicaba, SP, Brazil), in 1983, to study nutrient extraction by beans as affected by the reduction of the porosity of 2 soils (Orthic Haplacrox and Ochrultic Typustalf), with and without fertilizer application, and to search for the best porosity for the max. DM production. Trials were conducted in the greenhouse in bottom-sealed pots. Three compactation levels were uniformized to a penetration resistance of 0-8, 8-17, and 6 kg/cm². Fertilizers were applied to get 80% cation saturation, and to maintain the P level above 15 ppm. Bean cv. Aroana-80 and Rico-Pardo 896 were used in the trials. On the fertilized Orthic Haplacrox, the reduction of the porosity from 20.13 to 11.33% (best treatment) increased DM by 25.4%. On the Ochrultic Typustalf without fertilizer, the reduction of the porosity from 9.15 to 5.84 and to 3.34% decreased DM by 8.1 and 9.8%, resp. [AS (extract)]

See also 0001 0061 0069 0070 0071 0074 0122

C02 Plant Development

0024

23999 AL-RUBEAI, M.A.F.; GODWARD, M.B.E. 1982. Effects of acute gamma irradiation of dormant seeds on the growth and yield of 4 varieties of French beans (Phaseolus vulgaris L.). Genética Iberica 34(1-2):83-100. Engl., Sum. Engl., 25 Refs., Illus. [Dept. of Botany, Faculty of Science, Univ. of Garyounis, Benghazi, Libya]

Phaseolus vulgaris. Snap beans. Irradiation. Plant anatomy. Seed. Germination. Roots. Cultivars. Yields. Yield components. Lybia.

Dose response in the M_1 generation of 4 Phaseolus vulgaris var. (Cordon, Masterpiece, Swiss Blanc, and The Prince), after seed exposure to acute doses of gamma radiation, was assessed using morphological criteria. Lethal doses did not affect the onset of germination. LD_{50} values for survival were 8.5, 12.5, 12.5, and 9.0 kR for Cordon, Masterpiece, The Prince, and Swiss Blanc, resp. Decreases in the rate of root and shoot growth, fresh and dry wt., no. of leaves/plant, and a lengthening of time to flowering were observed. The no. of pods/plant was the most sensitive indicator among yield components. Other alterations included the homogeneity of the populations and changes in the no. of leaflets, accompanied mostly by changes in leaf shape. [AS]

0025

23347 BATCHELDER, A.R. 1982. Chlortetracycline and oxytetracycline effects on plant growth and development in soil systems. Journal of Environmental Quality 11(4):675-678. Engl., Sum. Engl., 12 Refs. [United States Dept. of Agriculture, Agricultural Research Station, Western Region, P.O. Box E, Fort Collins, CO 80522, USA]

Phaseolus vulgaris. Plant growth substances. Growth. Soils. USA.

A series of greenhouse expt. was conducted to determine the effects of 2 antibiotics, chlortetracycline and oxytetracycline, on plant growth and development of wheat, maize, radish, and pinto bean in different soils. Both antibiotics affected pinto beans. Bean yields, plant heights, top and root dry wt., and Ca, Mg, K, and N contents were all decreased by the antibiotics. Because only beans showed an adverse response in the Ascalon sandy loam, they were the only plants grown in the Nunn clay loam. There

were no antibiotic effects on the bean plants with either antibiotic in a concn. series of 0-160 ppm. The growth and development effects were related to soil characteristics and plant sensitivities. [AS]

0026

24892 BATES, E.M.; HENNESSEY JUNIOR, J.P. 1979. On the use of solar radiation and temperature models to estimate the snap bean maturity date in the Willamette Valley. Salt Lake City, UT., National Oceanic and Atmospheric Administration. Technical Memorandum NWS WR-145. 32p. Engl., Sum. Engl., 11 Refs., Illus.

Phaseolus vulgaris. Snap beans. Solar radiation. Temperature. Growth. Maturation. Phenology. Planting. Timing. Cultivars. Harvesting. USA.

Phenological and climatological data were used to evaluate some of the available models that explain the growth and development of snap bean plants. In order to insure that processors have an orderly flow of snap beans into the processing plants, planting dates must be established and scheduled so that there are successively maturing crops in the harvest season. Thus, if a method based on climatological variables is available to estimate the date of maturity, using the desired schedule of harvest dates, it is possible to determine dates needed to meet this harvest schedule. [CIAT]

0027

22189 BOSE, T.K.; MUKHOPADHYAY, T.P.; BASU, T.K. 1982. A note on the effect of ascorbic acid and IBA on rooting in cuttings. Indian Journal Plant Physiology 25(3):310-312. Engl., 8 Refs. [Bidhan Chandra Krishi Viswa Vidyalaya, Kalyani, Nadia, West Bengal, India]

Phaseolus vulgaris. Rooting. Plant growth substances. India.

Stock plants of Tagetes patula, Cosmos sulphureus, Corchorus olitorius, and Phaseolus vulgaris, or their cuttings, were treated with ascorbic acid alone or plus IBA at various concn. Good root formation, under both treatments, were obtained with ascorbic acid at 3×10^{-5} M + IBA at 1000 mg/l. [Field Crop Abstracts]

0028

24876 BREED, J. 1981. Studies of seed development and ripening in Phaseolus vulgaris. Ph.D. Thesis. Bath, England, University of Bath. 296p. Engl., Sum. Engl., 116 Refs., Illus.

Phaseolus vulgaris. Seeds. Pods. Germination. Maturation. Seedlings. Growth. United Kingdom.

Preliminary studies of the growth and development of Phaseolus vulgaris (cv. The Prince) pods and seeds were carried out to determine the sequence of change in DM and water content, germination ability, and desiccation tolerance (DT), and to establish the pattern of ultrastructural development in the cells of the embryonic primary leaf during seed growth and ripening. Subsequent work involved the artificial induction of ripening in immature seeds to further investigate the ripening process. Developing P. vulgaris seeds became capable of germination at approx. 27 days after anthesis and showed DT at approx. 40 days. Detached immature seeds developed DT progressively during 3-5 days incubation at high RH. Five days incubation enabled seeds as small as 0.1 g desiccated wt. (approx. 16% of full size) to be successfully dried and germinated. Incubation at lower humidities

enabled only older seed to develop DT so that 50% survived by 28.5-day-old seed at 75% RH, by 33.5-day-old seed at 32% RH, and by 36.0-day-old seed at 0% RH. Both natural and induced ripening, in addition to increasing DT, involved a loss of seed chlorophyll and reduced postdesiccation leakage of total electrolytes, K ions sugars, and amino acids during imbibition. Acquisition of the ability to retain solutes after desiccation was temp.-sensitive, being inhibited at 10°C and delayed at 15°C (Q_{10} from 15 to 25°C being approx. 2.5). Incubation under humidified N_2 inhibited acquisition of solute retention after desiccation, but the effect was reversible, even after 7 days. An ultrastructural study of the primary leaf tissues of immature seeds during induced acquisition of DT showed that a period of enhanced cellular activity, followed by organelle repression resembling normal maturation, took place although seed MC remained high. The development of DT may require active processes to initiate the orderly modification of membranes and organelles and the decline in cellular activity characteristic of ripening. [AS]

0029

23986 FERNANDEZ, F.; GEPTS, P. 1984. A scale of development stages of the bean plant Phaseolus vulgaris. A summary for consultation. Cali, Colombia, Centro Internacional de Agricultura Tropical. 7p. Engl., Illus. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Developmental stages. Determinate cultivars. Indeterminate cultivars. Growth. Colombia.

A scale of stages of development of the bean plant applicable to both determinate and indeterminate growth types is defined and described. It consists of 10 critical phenological steps comprised into 2 phases: one vegetative (V) and the other reproductive (R). The stages V 0 (germination), V 1 (emergence), V 2 (primary leaves), V 3 (1st trifoliate leaf), V 4 (3rd trifoliate leaf), R 5 (preflowering), R 6 (flowering), R 7 (pod development), R 8 (pod filling), and R 9 (maturity) are described. A phase or stage is superseded by the next as soon as the plant, when individually considered, or 50% of the plants of a plot or field, show the manifestation of the next stage. [CIAT]

0030

24410 LEMOS, B.C.C. 1982. Dinámica de floración y llenado de la vaina en cuatro variedades de frijol (Phaseolus vulgaris L.) sembradas en diferentes densidades de población. (Dynamics of flowering and pod fill in four bean varieties planted at different population densities). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 352p. Span., Sum. Span., 85 Refs., Illus.

Phaseolus vulgaris. Flowering. Cultivars. Agronomic characters. Podding. Leaf area. Yield components. Dry matter. Spacing. Planting. Mexico.

The behavior of morphological characteristics, flowering and pod fill dynamics, were studied for bean var. Canario 107 (determinate growth habit, bush type), Michoacán 12-A-4 (indeterminate growth habit, short vine), Negro 150 (indeterminate growth habit, long vine), and Flor de Mayo X-16441 (indeterminate growth habit, long vine), at different population densities in 2 cropping cycles, 1980 and 1981, in the exptl. field of Chapingo, Mexico. Parameters evaluated were dry wt. of stem, petiole, leaf blade, and pod; leaf area; LAI; no. of nodes and raceres in the main stem and on branches; no. of pods and branches; total DM production; yield components, and pod fill. DM distribution in the aerial organs of the plant showed different degrees of plasticity. Flowering period, no. of flowers, and

destiny of the ovules varied depending on density. Earliness in the anthesis was more important for pod fill than the density effect. [CIAT]

0031

22949 LINARES N., R.R. 1977. Evaluación de los fitoreguladores ácido giberélico y el Che-8728 en el crecimiento y producción del fríjol Phaseolus vulgaris L. (Evaluation of the plant regulators gibberellic acid and Che-8728 on bean growth and production). Tesis Ing.Agr. Hermosillo, México, Universidad de Sonora. 40p. Span., Sum. Span., 29 Refs.

Phaseolus vulgaris. Gibberellins. Growth. Yields. Yield components. Mexico.

At the exptl. station of the Escuela de Agricultura y Ganadería of the U. de Sonora, Mexico, plant growth regulators GA and Che-8728 [tributyl chloride (5-chloro-2-thienyl) methyl phosphonium] were evaluated on bean var. Delicias-71. Treatments used in addition to the check were as follows: doses of 0, 5, 10, 20, and 50 ppm GA; doses of 100, 150, and 200 g Che-8728/ha. Products were sprayed on foliage after 10% flowering. The most acceptable dose was 5 ppm GA with which an increase of 201.25 kg/ha was obtained compared with the control. Plant height increase due to GA was statistically significant. The greatest no. of pods was obtained with the application of 10 ppm GA; however, it was not statistically different from the other treatments. Grain wt. was greater at 20 and 50 ppm GA, this difference being statistically significant. [AS (extract)-CIAT]

0032

23379 LOPEZ P., M.G.G. 1976. Estudio sobre el desarrollo de citocultivos de Phaseolus vulgaris y Lycopersicon esculentum en medios suplementados con agua miel y agua de coco. (Study on the development of Phaseolus vulgaris and Lycopersicon esculentum cell cultures in media supplemented with honey water and coconut water). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. Escuela Nacional de Agricultura. 102p. Span., Sum. Span., 22 Refs., Illus.

Phaseolus vulgaris. Tissue culture. Culture media. Growth. Mexico.

Development characteristics are presented of 2 cell cultures in 4 culture media (MBS-2, Cresswell and Nitsch, Smith, and TMS) supplemented with honey water and coconut water under 2 physical conditions for incubation: with and without light. In the TSM medium, cell cultures established from bean leaves developed abundant radicle tissue in response to the presence of honey water; this response was not observed in the medium supplemented with coconut water and in that without supplement. In the Cresswell and Nitsch medium, bean as well as tomato plant development was induced directly from stem apical meristems grown in the presence of light. The process followed to isolate protoplasts was effective in both cases since a low frequency of spontaneous fusion is obtained; this enables protoplasts to be used to obtain somatic hybrids, particularly since the observation of cell ultrastructure presents certain morphological differences that could serve as a criterion to detect cell fusion. [AS (extract)-CIAT]

0033

20840 MANGAT, P.S. 1982. Influence of soil and air temperature on I. nucleotide metabolism and growth of Phaseolus vulgaris L. Journal of Experimental Botany 33(133):269-278. Engl., Sum. Engl., 29 Refs., Illus. [Dept. of Biology, Loyola Campus, Concordia Univ., Montreal, Canada]

Phaseolus vulgaris. Temperature. Soil temperature. Growth. Metabolism. Seedlings. Protein content. Canada.

Eight-day-old greenhouse grown Phaseolus vulgaris seedlings were exposed to 3 different temp. regimes. The concn. of the total free nucleotides, nucleoside triphosphates, RNA, and protein was much more pronounced in seedlings exposed to the interactive day/night temp. of 28°C (soil) and 15°C (air) of regime I. Seedlings treated to a low soil/air, day/night temp. of 15°C (regime II) had the lowest content of total free nucleotides, nucleoside triphosphates, RNA, and protein. The nucleoside triphosphate content and energy charge value of seedlings treated to a high soil/air, day/night temp. of 28°C (regime III) declined much earlier than in the seedlings exposed to temp. regimes I and II. The fresh and dry wt. of seedlings exposed to temp. regime I was significantly higher than those seedlings exposed to the other 2 temp. regimes. The slowest growth was observed in seedlings exposed to temp. regime II. The noticeably higher concn. of ATP, pyridine nucleotides, and root nodulation in seedlings exposed to temp. regime I suggests that higher soil and low air temp. enhances N metabolism in P. vulgaris seedlings. [AS]

0034

21304 PEREZ T., S.; LABRADA, A.; GONZALEZ, M. 1983. Dosis semiletal de irradiación gamma para diferentes variedades de frijoles cultivadas en Cuba. (Semilethal dose of gamma irradiation for different bean varieties cultivated in Cuba). Ciencias de la Agricultura 15:127-128. Span., 2 Refs., Illus. [Inst. de Investigaciones Fundamentales en Agricultura Tropical Alejandro de Humboldt, de la Academia de Ciencias de Cuba]

Phaseolus vulgaris. Seed. Irradiation. Cultivars. Seed color. Cuba.

Seeds of different bean var. (black- and red-seeded types) were irradiated with 5-40 krads using a Co-60 gamma source. After irradiation, seeds were germinated under lab. conditions and plant height was measured 7 days afterwards. This parameter was used as a radiosensitivity criterion. Results indicate that the semilethal dose ranged between 11-13 and 17-20 krads for black- and red-seeded types, resp. [CIAT]

0035

25225 RAAFAT, A.; STÜR, J.; SIPOS, M.; MAFFE, S. 1976. Some aspects of oxidative-reductive changes in chloroplast suspensions during the process of ageing. Acta Biochimica et Biophysica Academiae Scientiarum Hungaricae 5(3):265-272. Engl., Sum. Engl., 15 Refs., Illus.

Phaseolus vulgaris. Aging. Leaves. Illumination. Photosynthesis. Chloroplasts. Chlorophyll. Hungary.

The changes in the oxidation-reduction potential (redox potential, RP) due to periodic illumination of chloroplast suspensions of primary bean leaves show characteristic differences, depending on the age of the leaf. These changes seem to be related to the chlorophyll concn. in the chloroplasts and with some of the photochemical activities (Hill-reaction, measured by the reduction of dichlorophenolindophenol. The RP of samples of different age starts from nearly the same value (O_h = 385 mV ± 10 mV), increases during the period of illumination, and decreases in the dark. These changes are less regular in the case of chloroplasts of young leaves. The overall trend of the curves is characterized by a decrease of RP with successive illumination periods. This may be attributed to the exhaustion

of the redox poising capacity of the system, which is more obvious in young leaves than in old ones. [AS]

0036

23919 SANTOS V., J.C. 1984. Efecto de cortes de ejotes y remoción de flores en un fríjol (Phaseolus vulgaris L.) ejotero de hábito determinado. (Effect of pod cutting and flower removal on a determinate snap bean cultivar). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 117p. Span., Sum. Span., 60 Refs., Illus.

Phaseolus vulgaris. Snap beans. Nutrient solution. Abscission. Flowers. Pods. Yields. Dry matter. Leaf area. Growth. Mexico.

An expt. was carried out with plants of snap bean cv. Black Valentine of determinate habit, cultivated in hydroponic solution with substrate under greenhouse conditions to determine the effect of cutting green and dry pods on vegetative growth and pod production. Treatments consisted in the removal or not of pods during the 1st 3, 5, and 7 days after flowering. The plants whose pods were cut green presented a redistribution of DM by producing new vegetative organs (branches, leaves, and roots). The highest ratio of accumulated dry wt. (including fallen organs) occurred in the vegetative structures (8.3), while in plants whose dry pods had been harvested, the accumulated dry wt. was directed toward the pods (65%). The no. of normal pods was statistically the same. However, dry wt. of cut green pods was 1/3 that of harvested dry pods. In flower removal treatments performed in plants whose pods were harvested dry, the highest flower removal levels produced an increase in the no. and dry wt. of the vegetative structures, principally of the leaves. However, the no. and dry wt. of harvested normal pods were not affected significantly. Flower removal in plants whose pod were cut green had no significative effect on branches, leaves, and roots, nor on the no. and dry wt. of the pods cut green. [AS (extract)-CIAT]

See also 0007 0020 0022 0044 0045 0046 0048 0050 0052 0054 0060 0062 0064 0067 0077 0082 0084 0132 0149 0266 0431

C03 Chemical Composition, Methodology and Analyses

0037

25224 APOSTOLATOS, G. 1984. A survey on protein and methionine content of edible dry bean (Phaseolus vulgaris L.). Genetica Agraria 38(1): 91-99. Engl., Sum. Engl., Ital., 13 Refs., Illus. [Vegetable Research Inst., Gastouni Ilias, Greece]

Phaseolus vulgaris. Protein content. Methionine. Cultivars. Greece.

Eighty-two improved edible dry bean cv. and breeding lines were analyzed for their protein and met. content. Av. anhydrous met. content was found to be 1.4% on protein basis while protein averaged 24.6% on dry meal basis. Frequency distribution was highest for 22.0% protein and 1.4% met. Variations in protein and met. content due to environmental conditions and growth factors were investigated by growing 15 cv. for 2 yr in a randomized complete block design. Heritability values for both protein and met. content were high. Results indicate the possibility of improving the nutritional value of edible dry beans by genetic manipulation of the chemical composition. [Genetic Abstracts]

0038

18759 EVANS, R.C.; TINGEY, D.T.; GUMPERTZ, M.L.; BURNS, W.F. 1982. Estimates of isoprene and monoterpene emission rates in plants. Botanical Gazette 143(3):304-310. Engl., Sum. Engl., 23 Refs.

Phaseolus vulgaris. Light. Plant physiological processes. Plant physiology. USA.

Isoprene emission by 54 plant species was studied in greenhouse trials at 30°C and 350 microE/m²/s light intensity. High rates (10-33 micrograms C/g) were emitted by only 6 species; medium rates (1-10 micrograms C/g) by 14 species, including Pueraria lobata and Arachis glabrata; low rates (0.01-1.10 micrograms C/g) by 17 species including Phaseolus vulgaris, pea, Vigna unguiculata, soybean, Lathyrus latifolius, Lupinus albicanlis, lucerne, red clover, Lotus pedunculatus and L. corniculatus, groundnut, maize, and wheat. Seventeen species did not emit isoprene, including Beta vulgaris, Vicia faba, and V. pannonica, Gossypium hirsutum, tobacco, potato, and sorghum. Monoterpenes were detected in 6 species. [Field Crop Abstracts]

0039

21785 SCHULER, M.A.; DOYLE, J.J.; BEACHY, R.N. 1983. Nucleotide homologies between the glycosylated seed storage proteins of Glycine max and Phaseolus vulgaris. Plant Molecular Biology 2(3):119-127. Engl., Sum. Engl., 26 Refs., Illus. [Plant Biology Program, Dept. Biology, Washington Univ., St. Louis, MO 63130, USA]

Phaseolus vulgaris. Proteins. Seed. Genes. Amino acids. Phaseollin. Analysis. USA.

The partial nucleotide and derived amino acid sequences of a phaseollin seed storage protein gene of Phaseolus vulgaris were compared with those of a conglycinin storage protein gene of soybean. Despite the lack of antigenic relatedness and the large difference in apparent mol. wt. between the 2 protein subunits, 73% of the nucleotide portions of the 2 genes studied (28% of the soybean gene and 38% of the P. vulgaris gene) were identical. Both genes were interrupted by a no. of small intervening sequences, the positions of which were identical in the 2 genes. This provides compelling evidence that these genes diverged from a single ancestral gene. As well as single nucleotide differences between the 2 genes, 6 insertions or deletions, ranging from 3-27 nucleotides in length, occurred in the gene portions studied and these were partially responsible for the mol. wt. differences between the 2 subunits. [AS]

See also 0005 0014 0015 0045 0054 0055 0068 0078 0166 0270 0277 0311 0394 0398

D00 AGRONOMY

0040

20806 FAIGUENBAUM M., H. 1983. Principales aspectos en la siembra del frejol. (Main aspects of bean cultivation). Chile Agrícola 8(84): 240-242. Span. [Facultad de Ciencias Agrarias, Veterinarias y Forestales, Univ. de Chile, Santiago, Chile]

Phaseolus vulgaris. Soil requirements. Cultivars. Planting. Spacing. Delia platura. Insect control. Fertilizers. Chile.

The main aspects of bean cultivation in Chile are briefly discussed. These include soil preparation, selection of var., planting, planting density, seed quality, fertilization, and insect and disease control. A list of the bean var. cultivated in Chile is included. [CIAT]

0041

24889 MINNAAR, J.J. 1970? The production of bean seed in South Africa. South Africa, Division of Plant and Seed Control. 4p. Engl.

Phaseolus vulgaris. Climatic requirements. Planting. Timing. Production. Threshing. Diseases and pathogens. Injurious insects. South Africa.

General information on bean seed production in South Africa is presented. The reviewed topics include climate, soil preparation and fertilization, planting methods, time of planting, areas of seed production, threshing methods, seed cleaning and handling, and important diseases (bacterial blight, anthracnose, rust, and Fusarium). [CIAT]

0042

20876 WELLS, P.D. 1982. Green bean. Zimbabwe Agricultural Journal 79(3): 91-95. Engl., 7 Refs.

Phaseolus vulgaris. Snap beans. Climatic requirements. Soil requirements. Nutritional requirements. Cultivars. Planting. Irrigation. Harvesting. Yields. Marketing. Storage. Diseases and pathogens. Resistance. Zimbabwe.

General aspects of the cultivation and storage of snap beans are presented, with specific recommendations for Zimbabwe. These include climate, soils, fertilizer requirements, cv., planting, management, irrigation, harvest, yields, marketing, and storage. A list of 17 cv. with information on yield, quality, harvest period, seed color, pods, use, and diseases is given. [CIAT]

0043

17828 ZAMUDIO, E. 1980. Siembra de poroto. (Bean planting). Avance Agro-industrial 1(4):25-26. Span., Illus.

Phaseolus vulgaris. Planting. Land preparation. Timing. Inoculation. Rhizobium. Spacing. Cuba.

Recommendations for bean cultivation in Argentina are presented. Aspects on soil preparation, planting dates for white and black beans, var. (white bean cv. Selección Cerrillos INTA and local and introduced heterogeneous black bean populations), seed quality and disinfection, artificial Rhizobium inoculation, and planting density, distances, and depth are briefly discussed. [CIAT]

See also 0001 0374

D01 Soil, Water, Climate and Fertilization

0044

22239 AGUILAR, P.J.; AMADOR W., M.; GUTIERREZ M., W. 1983. Determinación del requerimiento de agua del frijol común cultivar Revolución-79, por evapotranspirómetro. (Determination of water requirements of common

bean cultivar Revolución-79 by evaporimeter). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. p.122. Span.

Phaseolus vulgaris. Cultivars. Water requirements. Nicaragua.

A field trial was set up at Campos Azules (Masatepe, Nicaragua) to study the water requirements of bean cv. Revolución-79. The accumulative water requirements during the entire vegetative cycle were 361.8 mm. Grain yield was 1317 kg/ha. [CIAT]

0045

23371 ALCANTAR G., E.G. 1978. Estudio del efecto de diferentes dosis de nitrógeno en dos fuentes, sobre los procesos de nodulación, fijación de N_2 y rendimiento en fríjol (Phaseolus vulgaris). (Study of the effect of different N doses from two sources on nodulation and N_2 fixation processes, and yield in beans). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. Escuela Nacional de Agricultura. 130p. Span., Sum. Span., 87 Refs., Illus.

Phaseolus vulgaris. Fertilizers. N. Nodulation. Nitrogen fixation. Yields. Yield components. Growth. Mineral content. Roots. Leaves. Flowers. Mexico.

Under lab. and greenhouse conditions, the effect of different levels of NH_4^+ and NO_3^- on nodulation, efficiency of N fixation, and yield was studied for bean var. Jamapa inoculated with a Rhizobium phaseoli strain isolated from another expt. and whose efficiency in N fixation had been previously verified. In the greenhouse 80 pots with 3 plants each were used with soil from the exptl. fields of Chapingo (Mexico). During the entire cultivation cycle, field capacity moisture conditions were maintained. Fertilization treatments were applied at planting and included 5 levels of $(NH_4)_2SO_4$ and 5 of $Ca(NO_3)_2 \cdot H_2O$, equivalent to 0, 15, 30, 45, and 60 ppm N, both applied in solution. During the study 10 soil samplings were performed at weekly intervals. Five plant samplings were also carried out (one every 14 days) to evaluate wt. and N content of the different organs (roots, aerial part, and generative organs), as well as nodule wt. and no./plant, and their leghemoglobin content. A similar tendency was found for the 2 sources of N studied to reduce their concn. in the soil over time. Plant growth curves showed a clearer response, due to the dose effect, when the N source was nitrate. In the same way, the levels of N extraction indicate greater differences between nitrate doses. Nodule wt. and no. were repressed during the initial stages of formation and growth by the higher levels of N (45 and 60 ppm); a differential action was detected between the 2 sources studied, such a repression being more evident for nitrates. It was observed that the greater levels of N, along with the 15 ppm dose, stimulated synthesis of nodular leghemoglobin, especially in the case of nitrates. Max. yield value was achieved with the 15 ppm N treatment; but, although yield was greater for nitrates, there was no significative difference when compared with ammonium. [AS (extract)-CIAT]

0046

24953 ALFARO F., R. 1976. Evaluación del método de germinación en condiciones hipertónicas y pH de variedades de maíz (Zea mays L.) y fríjol (Phaseolus vulgaris) con resistencia a sequía, acidez y alcalinidad y posible diferenciación de variedades bajo condiciones de laboratorio. (Evaluation of the germination method under hypertonic conditions and pH of maize and bean varieties with resistance to

drought, acidity and alkalinity, and possible varietal differentiation under laboratory conditions). Tesis Ing.Agr. Nuevo León, México, Instituto Tecnológico y de Estudios Superiores de Monterrey. 39p. Span., Sum. Span., 36 Refs., Illus.

Phaseolus vulgaris. Cultivars. Drought. pH. Resistance. Germination. Mexico.

A lab. trial was conducted at the Instituto Tecnológico y de Estudios Superiores de Monterrey, Nuevo León, Mexico, to evaluate the germination capacity and possible differentiation of 6 maize var. (NLH-1, NLH-2, NLH-3, H-508, H-509, and Tuxpeño) and 3 bean var. (Flor de Mayo, Querétaro, and Jamapa), by germinating seeds under diverse pH and polarity conditions. Bean var. Querétaro performed the best under drought and pH conditions. [AS]

0047

25202 ARRUDA, F.B.; TUBELIS, A.; NASCIMENTO, F.J.I. DO 1983. Efeito da diferenca entre a precipitacao e a evapotranspiracao potencial na produtividade do feijoeiro. (Effect of the difference between precipitation and potential evapotranspiration on bean yields). Revista do Centro de Ciencias Rurais 13(2-3):151-161. Port., Sum. Port., Engl., 13 Refs., Illus. [Secao de Irrigacao e Drenagem, Inst. Agronomico, 13.100 Campinas-SP, Brasil]

Phaseolus vulgaris. Rainfall. Evapotranspiration. Yields. Brazil.

The effect of the difference between precipitation and potential evapotranspiration (P-PE) on seed yield of Phaseolus vulgaris var. Rico 23 was studied at Vicosa (Brazil) during 1961-63. Final seed yield was correlated linearly with totals of (P-PE), accumulated over several periods of the crop cycle or over the whole cycle. The best period for yield estimate was 50-60 days after sowing. The increase in yield for each 1 mm increase in (P-PE) in each of 10-day-periods, varied throughout the crop cycle, the highest values being equal to 51.5 kg/ha in the period 20-70 days after planting. The yield threshold, in terms of (P-PE), was a negative value (-165 mm for the whole crop cycle) that decreased with increased duration of the period. [AS (extract)]

0048

25302 BITE, A.A. 1983. Physiological and yield responses of snap beans (Phaseolus vulgaris) to water availability. Ph.D. Thesis. Corvallis, Oregon State University. 238p. Engl., Sum. Engl., 199 Refs., Illus.

Phaseolus vulgaris. Water stress. Irrigation. Growth. Leaves. Photosynthesis. Yields. Yield components. Snap beans. USA.

In field trials in Oregon, USA, in 1980 and 1981 with Phaseolus vulgaris cv. Oregon 1604 grown on a silty clay loam, plant water balance was monitored throughout the growing season in severely, moderately, and unstressed water treatments. While the plants were able to adjust osmotically to maintain turgor under severe water stress, pod no./plant was reduced by 50% and yields were reduced from 11.58 (unstressed) to 8.28 t pods/ha (severely stressed). [Horticultural Abstracts]

0049

23393 CHAGAS, J.M.; PEREIRA FILHO, I.A.; VIEIRA, C. 1983. Efeitos da leucena e da adubacao NPK sobre a cultura do feijao no cerrado.

(Effects of Leucaena and NPK fertilizer on growth of beans in the Cerrado). Revista Ceres 30(172):481-485. Port., Sum. Engl., 2 Refs., illus. [Empresa de Pesquisa Agropecuária do Estado de Minas Gerais, Caixa Postal 216, 36.570 Vicosa-MG, Brasil]

Phaseolus vulgaris. Green manures. Fertilizers. N. P. K. Yields. Brazil.

An expt. was carried out in a poor cerrado soil at Patrocínio, MG, Brazil, to determine the effect of Leucaena leucocephala, as a green manure, and chemical fertilization on bean yield. Treatments included leucaena plus a 2 x 2 x 2 factorial, as levels of 0 and 40 kg N (as ammonium sulfate), 0 and 70 kg P (as ordinary superphosphate), and 0 and 60 kg K (as potassium chloride)/ha. Additional treatments were 0-0-0 and 40-70-60 kg NPK/ha, both without the green manure. Green manuring and NPK fertilization had the same effect, increasing bean yields from 83 to 350 kg/ha. With Leucaena, superphosphate had the greatest effect, followed by N fertilizer. Complete chemical fertilization associated with green manuring gave the highest yield (900 kg/ha). [AS]

0050

25206 CHAIB, S.L.; BULISARI, E.A.; CASTRO, L.H.S.M. 1984. Crescimento e producao do feijoeiro em resposta a profundidade de aplicacao de adubo fosfatado. (Bean growth and production in response to application depth of phosphated fertilizer). Pesquisa Agropecuária Brasileira 19(7): 817-822. Port., Sum. Port., Engl., 12 Refs. [Inst. Agronomico de Campinas, Caixa Postal 28, 13.100 Campinas-SP, Brasil]

Phaseolus vulgaris. Roots. Rooting. Fertilizers. P. Yields. Soils. Brazil.

Several depths (0, 5, 10, 15, 20, 25, and 30 cm) of P fertilizer application were studied to observe the growth and development of roots and aerial parts of bean plants in a clayey texture Red Latosol (Haplortox) at the Centro Exptl. de Campinas (SP, Brazil). Aerial parts were enhanced by fertilizer placed from 10 to 25 cm of depth. Grain yield, however, was equal in all of the treatments, due to an adequate water supply even in the dry season. Root growth, which was evaluated in the greenhouse in PVC tubes with openings each 5 cm up to 30 cm, increased with fertilizer application. [AS]

0051

24253 CHUELA B., M. 1984. Determinación de la dosis óptima económica de nitrógeno, fósforo y densidad de población en el cultivo del fríjol. (Determination of the optimum economical dose of nitrogen and phosphorus, and the optimum population density in bean crops). In Centro de Investigaciones Agrícolas de El Bajío, México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.48-53. Span.

Phaseolus vulgaris. Fertilizers. N. P. Spacing. Planting. Yields. Mexico.

Results are presented of the expt. carried out in El Carmen and Lomas de Tejeda (Jalisco, Mexico) under rainfed conditions to determine the economical optimum dose of N and P and the optimum population density of beans. The treatments used were 15, 30, 45, and 60 kg of N and of P/ha; and 80, 110, 140, and 170 thousand plants/ha. Highly significant differences were observed between treatments for both of the localities studied. In El Carmen, the best alternative with unlimited capital was the

treatment with 45-30-0 NPK, and with limited capital, 30-30-0, both at 140 thousand plants/ha. In Lomas de Tejeda, the best alternative with both unlimited and limited capital was the treatment with 30-45-0 NPK, also at 140 thousand plants/ha. In this same locality higher av. yields were obtained than in El Carmen (av. 2345 vs. 1177 kg/ha). [CIAT]

0052

25301 FLORES-LUI, L.F. 1982. Flowering, pod-set, yield and dry matter partitioning of beans (Phaseolus vulgaris L.) in response to water stress and flower and leaf removal. Ph.D. Thesis. Davis, University of California. 119p. Engl., Sum. Engl., 94 Refs., Illus.

Phaseolus vulgaris. Water stress. Flowering. Podding. Evapotranspiration. Yields. Dry matter. USA.

In greenhouse studies with Phaseolus vulgaris, the imposition of water stress resulting in leaf water potentials as much as 11 bar below control plant levels caused some increase in flower drop but increased pod retention so that the % of pods set at harvest was unaffected or increased. Even abrupt onset of water stress during flowering had little effect on the % of flowers retained as pods at maturity. Since seed wt. was constant over a wide range of water stress levels, seed no. were controlled relative to assimilate supply. [Field Crop Abstracts]

0053

25353 GHADERI, A.; SMUCKER, A.J.M.; ADAMS, M.W. 1984. Expected correlated responses in selecting dry beans for tolerance to soil compaction. Euphytica 33(2):377-385. Engl., Sum. Engl., 18 Refs., Illus. [Dept. of Crop & Soil Sciences, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Soils. Cultivars. Yields. Yield components. Resistance. Soil physicochemical properties. USA.

Parents and F_1 progenies of an 8 x 8 diallel cross of Phaseolus vulgaris were grown under noncompacted and compacted soil conditions. Soil compaction reduced yield, pods/plant, and seeds/pod; however, an increase in seed wt. and no effect for pod length were observed. With the exception of pods/plant, the remaining traits had larger genetic variance under noncompacted soil conditions. Phenotypic correlations involving yield and related traits were similar under the 2 conditions. Tolerance to soil compaction and mean performance over the 2 soil conditions were defined. Genetic correlations, in terms of the ratio of genetic variances under stress and nonstress conditions and of the correlation between performance under the 2 conditions, were calculated and discussed. [AS]

0054

24411 GUADRON, O.B. 1985. Efecto de la época de aplicación de fósforo en los rendimientos de cuatro cultivares de frijol común (Phaseolus vulgaris L.). (Effect of the application time of phosphorus on the yields of four bean cultivars). Tesis Mag.Sc. Bogotá, Colombia, Universidad Nacional. 112p. Span., Sum. Span., Engl., 37 Refs., Illus.

Phaseolus vulgaris. Fertilizers. P. Cultivars. Timing. Leaf area. Dry matter. Nutrient uptake. Yield components. Yields. Flowering. Translocation. Colombia.

Two field trials were conducted at the CIAT-Quilichao Expt. Station (Cauca, Colombia) to study the effect of the time of application of P on yield, yield components, and phenological characteristics of 4 bean cv. (G-4000, G-3353, BAT-47, and Carioca) under conditions of low and high availability of P in the soil (4.3 and 25.5 ppm of P, resp.). P was applied entirely at planting time, 20 days after emergence, or at flowering at rates of 131 kg/ha, or in split applications: 50% of the dose at 20 and 30 days, 33% of the dose at 20, 30, and 40 days, 25% of the dose at 20, 30, 40, and 50 days, and 20% of the dose at 20, 30, 40, 50, and 60 days after emergence. A check plot without P application was established for each replication. DM accumulation and P absorption were evaluated in roots, stems, petioles, leaves, pods, and grain 20 days after emergence, at flowering, and at physiological maturity for each cv. in each treatment. LAI was measured 20 days after emergence and at flowering. Likewise, days to flowering and days to physiological maturity were recorded. The no. of pods/plant and grain yield at 14% moisture were recorded and analyzed for each cv. P applied at planting had a significant effect on the no. of pods/plant, DM, and grain yield in soils with both low and high available P; the effect was more noticeable in soils with low available P. The time to physiological maturity was not affected by either the initial availability of P in the soil or by the time of application. Days to flowering in the 4 cv. were reduced when P was applied at planting as compared with later applications or no applications of P in both types of soils; again, this effect was more noticeable in soils with low available P. When P was supplied at planting, LAI was increased 17% in soils with low P and 48% in soils with high P as compared with the control. LAI, yield, DM, and pod no./plant decreased when P was applied after planting, whether the dose was split or not, or when it was not applied at all. Also, days to flowering increased noticeably, particularly in soils with low available P. The different parts of the plant absorbed more P when this element was applied at planting; this uptake was significantly lower when P was not applied or when it was applied after planting, whether it was the whole or a split dose. Carioca showed the highest yields when P was applied at planting in both soils. Furthermore, this cv. shows high rates of absorption and translocation of P from the roots to the vegetative and reproductive parts of the plant under both conditions of low and high available P. BAT-47 gave the lowest yields in both soils. One way of increasing the efficiency of the use of P in beans when soluble sources such as triple superphosphate are used is band application at planting. [AS (extract)]

0055

25345 GUPTA, U.C.; CUTCLIFFE, J.A. 1984. Effects of applied and residual boron on the nutrition of cabbage and field beans. Canadian Journal of Soil Science 64(4):571-576. Engl., Sum. Engl., Fr., 11 Refs. [Research Branch, Research Station, Agriculture Canada, Charlottetown, Prince Edward Island C1A 7M8, Canada]

Phaseolus vulgaris. B. Fertilizers. Toxicity. Yields. Mineral content. Leaves. Canada.

Field expt. were conducted at 4 locations in Prince Edward Island (Canada) to determine the effect of applied B on leaf tissue B and yields of beans and cabbage in the year of application of B and again the following year. Application rates of 8.8 kg B/ha reduced bean seed yields at all locations and the 4.4 kg B/ha rate reduced yields at 2 locations in the 1st yr. Leaf tissue B levels above 107 micrograms/g are clearly toxic for beans and seriously reduced bean yields. Furthermore, the yield and visual symptom data strongly suggest that tissue B levels even as low as 60 micrograms/g are toxic for this crop. No significant reductions in bean yields were noted in the 2nd yr crop, even at the 8.8 kg B/ha rate. Added B did not

increase yield of either beans or cabbage. Even though leaf tissue B levels as low as 16 micrograms/g in cabbage and 26 micrograms/g in beans occurred, no B deficiency was found. After the 1st and 2nd yr of beans the hot water-soluble B in the soil ranged 1.4-1.9 and 0.8-1.2 micrograms/g, resp., where B had been applied at 3.8 kg/ha. [AS (extract)]

0056

22215 HERRERA, M.; SANCHEZ, R. 1983. Determinación de los niveles óptimos de nitrógeno y fósforo en fríjol común negro cultivar Pijao. (Determination of the optimum levels of nitrogen and phosphorus in black bean cultivar Pijao). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.54-55. Span.

Phaseolus vulgaris. Fertilizers. N. P. Yields. Nicaragua.

Three field trials were set up in the León zone of Nicaragua (Santa Marta and Casimiro Sotelo farms) to determine the optimum levels of N and P fertilizers on black bean cv. Pijao. Thirteen treatments with increasing levels of N (0-57 kg/ha) and P (0-104 kg/ha) were evaluated. Variance analysis on grain yield did not show significant differences between treatments in the 3 trials. However, it is possible to obtain higher economical benefits by applying 13 and 78 kg N and P/ha, resp. [CIAT]

0057

25333 HOSTALACIO, S.; VALIO, I.F.M. 1984. Desenvolvimento dos frutos de feijao em diferentes regimes de irrigacao. (Pod development in beans under different irrigation regimes). Pesquisa Agropecuária Brasileira 19(1 :53-57. Port., Sum. Port., Engl., 13 Refs., Illus. [Depto. de Biologia, Escola Superior de Agricultura de Lavras, Caixa Postal 37, 37.200 Lavras-MG, Brasil]

Phaseolus vulgaris. Irrigation. Pods. Dry matter. Water stress. Brazil.

Changes in vol. and DM of pods was monitered 5-40 days after anthesis in pot-grown Phaseolus vulgaris cv. Goiano Precoce irrigated daily, once, or twice a week. The relationships between these measurements and age were represented by a 1st- and 2nd-grade polynomial function. Pod vol. was always greater in plants grown without water stress than in those subjected to stress. [Soils and Fertilizers]

0058

23321 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1976. Phaseolus vulgaris: haricots. (Phaseolus vulgaris beans). In _____. Rapport de la Mission d'Evaluation du Projet Service des Semences Selectionnées au Rwanda, Mars 1976. Rubona. pp.6-10. Fr.

Phaseolus vulgaris. Climatic requirements. Cultivars. Rwanda.

The characteristics of 3 bean growing zones (low and high alt., and central) in Rwanda during 1976 are presented. In the low alt. zone, var. 1/2 was grown with av. yields of 800 kg/ha; problems of seed availability occur and for 1981 it was expected to have at least 9600 ha planted. In the high alt. zone, var. Bataaf and Cajamarca were grown with av. yields of 800 kg/ha. Only 0.5 t of Bataaf and 4.0 t of Cajamarca were available;

therefore, it was recommended to buy seeds from the Netherlands and Peru. Area planted in 1980 was expected to be 10,200 ha. In the central zone, if var. Saxa was not locally accepted, it could be replaced by Melange Rouge or Melange Kabale; the expected diffusion was 60,000 ha. Appraisal trials with Saxa were planned. [CIAT]

0059

23315 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1974. Activite 1974. (Activities during 1974). Rubona. 5p. Fr., Illus.

Phaseolus vulgaris. Research. Technology. Rwanda.

Location and physical-climatological data of the research stations and centers of the Institut des Sciences Agronomiques du Rwanda in Rubona, Karama, and Rwerere are presented, and some photographs related to research on food crops are included, among them one with mutant seeds of var. Wulma, which is of great agronomic interest but rejected because of its black-colored seed. Climbing bean cultivation allows production to be increased by 30%. [CIAT]

0060

18740 JUNQUEIRA NETO, A.; ABREU, A. DE F.B. 1982. Adubacao do feijoeiro. (Bean fertilization). Informe Agropecuário 8(90):7-8. Port., 13 Refs.

Phaseolus vulgaris. Fertilizers. N. P. K. Mo. Co. Zn. B. Plant development. Brazil.

Recent research conducted on bean fertilization in Minas Gerais, Brazil, is briefly reviewed. No significant differences have been found between bean yields in response to various N sources (ammonium sulfate, urea, ammonium nitrate), but responses to low application rates have been found; high N rates affect nodulation. FYM could substitute the use of mineral N. The use of triple superphosphate/phosphate rock could be an economical alternative to the use of triple superphosphate. A relationship between Mo/P and K status in the plant has been found. A close relationship between P and Mo/Co has also been found; Co in the presence of Mo has a favorable effect on seed germination and vigor and in the presence of P affects germination; Mo + P favors seed vigor. Yield increases have been observed in response to applications of Mo, Zn, B, and Co. [CIAT]

0061

24224 LEAL A., O. 1983. Fertilización. (Fertilization). In Lepiz I., R.; Navarro S., F.J. Fríjol en el noroeste de México (Tecnología de producción). México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. Centro de Investigaciones Agrícolas del Pacífico Norte. pp.99-116. Span., 13 Refs., Illus.

Phaseolus vulgaris. Plant nutrition. Minerals and nutrients. Nutritional requirements. Fertilizers. Mineral deficiencies. Mexico.

The role of the nutrients N, P, K, Ca, S, Mg, Zn, Fe, Mn, Cu, B, Mo, and Cl in the bean plant, methods to determine nutritional requirements, the use of fertilizers, and plant response to their application are briefly described. The sources of the most commonly used fertilizers in bean crops are listed and optimum fertilizer doses, application methods and times are also given. [CIAT]

0062

20690 MACK, H.J. 1981. Effects of stress on bean production. Proceedings of the Oregon Horticultural Society 72:198-199. Engl. [Dept. of Horticulture, Oregon State Univ., Corvallis, OR 97331, USA]

Phaseolus vulgaris. Water stress. Flowering. Podding. Dwarf beans. Temperature. Cultivars. USA.

In trials carried out at Oregon State U. (USA) during 1979 and 1980 on several var., the effects of moisture stress before and during bloom and early pod development reduced the no. of pods/plant by 15-34% for plants not irrigated for 22 days (just before and during the major blooming period). Oregon 1604 was most affected and Red Kidney was least affected by the stress treatments. High max. temp. above 35°C usually cause flower and pod abscission in bush beans. When bean plants were exposed to av. temp. of 33°C during 5 days (compared with 27°C for each check), pod production/plant was reduced 19%. [CIAT]

0063

24225 MANJARREZ S., J.R.; LOPEZ L., J.M. 1983. Uso y manejo del agua. (Water use and management). In Lepiz I., R.; Navarro S., F.J. Fríjol en el noroeste de México (Tecnología de producción). México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. Centro de Investigaciones Agrícolas del Pacífico Norte. pp.117-135. Span., 15 Refs., Illus.

Phaseolus vulgaris. Irrigation. Mexico.

Irrigation methods used in northwestern Mexico for bean crops are described. The optimum surface and overhead irrigation schedules for beans planted during the fall-winter and spring-summer cycles are included. [CIAT]

0064

23199 MARTINEZ A., R.S. 1982. Ensayo preliminar en tres variedades de fríjol (Phaseolus vulgaris L.) de distinto hábito de crecimiento, en su respuesta al sombreado artificial. (Preliminary trial with three bean varieties of different growth habit on their response to artificial shading). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. Escuela Nacional de Agricultura. 143p. Span., Sum. Span., 53 Refs., Illus.

Phaseolus vulgaris. Cultivars. Dwarf beans. Climbing beans. Determinate cultivars. Indeterminate cultivars. Shading. Yields. Yield components. Mexico.

A preliminary field trial was conducted with 3 bean var. (Canario 107, Michoacán 12-A-3, and Flor de Mayo) of different growth habits to determine their response to artificial shading (79, 59, and 0%) applied before, at the beginning, and during mid-flowering. Seed yield, no. of normal seeds, empty pods, and dry wt. of pericarp/plant in var. Canario 107 (determinate bush) were reduced as the shading intensity increased. Due to the effect of the development period at the moment of applying the shade, the no. of seeds/pod and the modified HI were reduced during mid-flowering. For var. Michoacán 12-A-3 (indeterminate bush) it was found that the no. of normal seeds, normal pods, aborted seeds, acervulum of ovules at harvest, dry wt. of leaves and stems, and total accumulated DM were reduced when the shading intensity increased; the modified HI also increased. Stability in seed yield/plant was observed. In var. Flor de Mayo (indeterminate, climbing,

and long vine), the no. of normal seeds decreased with increasing shade. Seed size increased with shading, especially with 59% shade. Seed yield, total accumulated DM, and modified HI were not affected by the shade applied. It is concluded that the effect of artificial shading on beans depends on the growth habit of the var. cultivated. [AS (extract)-CIAT]

0065

22213 MENDOZA R., J. 1983. Evaluación de la eficiencia de variedades de fríjol común y Phaseolus acutifolius en suelos con niveles bajos de fósforo y respuestas a la aplicación. (Evaluation of efficiency of common bean varieties and Phaseolus acutifolius in soils with low P levels and response to P applications). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.47-49. Span., Illus.

Phaseolus vulgaris. Cultivars. Fertilizers. P. Soil requirements. Yields. Phaseolus acutifolius. Nicaragua.

Nine Phaseolus vulgaris and 1 P. acutifolius bean var. were planted in the 2nd planting season of 1981 at Campos Azules (Masatepe, Nicaragua) to evaluate their efficiency in soils with low levels of P, and their response to the applications of 6 levels of P. Var. Rojo Nacional, Revolución-81, Upala Rojo, Revolución-79, and El Salvador were efficient in soils with low P; var. Revolución-79, El Salvador-67, Orgulloso 1 and 2, Revolución-82, and Dulce showed a positive response to the application of P fertilizers. [CIAT]

0066

24252 MIER C., R. 1984. Determinación de la fertilización óptima en fríjol de temporal. (Determination of optimum fertilization in rainfed beans). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.38-47. Span.

Phaseolus vulgaris. Fertilizers. N. P. K. Mexico.

Results are presented of the trials carr d out in Los Altos de Jalisco, Mexico, in 1983 to determine the optimum fertilization of rainfed beans. The best response to N application was achieved with 30 kg/ha. When there is enough capital available, a good response is obtained by applying 60 kg P/ha; however, with limited capital, the best alternative is 30 kg P/ha. There was response to K with doses up to 50 kg/ha. The best bean population densities were 130,000 and 160,000 plants/ha. [CIAT]

0067

23657 MORENO D., L. 1979. Obtención de una función de producción de fríjol en base a regímenes variables de humedad del suelo. (Obtainment of a bean production function based on varying soil moisture regimes). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. Escuela Nacional de Agricultura. 133p. Span., Sum. Span., 40 Refs., Illus.

Phaseolus vulgaris. Soil moisture. Yields. Mexico.

During 1978 in fields in Chapingo, Mexico, an expt. was carried out with bean var. Canario 107 to evaluate a methodology to obtain a bean production

function based on different soil moisture regimes and considering 3 phenological stages of the crop. Fifteen different ways of expressing the soil moisture regime (independent variables) as a function of the dependent variable (grain yield at 10% moisture) were analyzed. The soil moisture regime is a variable difficult to control; therefore, methodologies must be found that measure it with precision. The best model to relate yield and soil moisture regime was the square root. [AS (extract)-CIAT]

0068

25315 OPAZO A., J.D.; CARRASCO R., M.A.; PAROLI A., P.E. 1980. Efecto de enmiendas orgánicas sobre algunas propiedades de un suelo aluvial de la zona central de Chile y su relación con el cultivo del frejol (Phaseolus vulgaris L.). (The effect of organic amendments on some properties of an alluvial soil of the Chilean Central Zone and its relation to bean cultivation). In Simposio Nacional de la Ciencia del Suelo, Santiago, Chile, 1980. Trabajos presentados. Santiago, Universidad de Chile. Facultad de Ciencias Agrarias, Veterinarias y Forestales. pp.408-424. Span., Sum. Engl., 5 Refs., Illus.

Phaseolus vulgaris. Dung. Soil amendments. pH. N. P. K. Soil fertility. Mineral content. Yields. Chile.

In a field expt. in Antumapu (Chile), organic amendments were applied to an alluvial soil of the Santiago series to study their effects on soil properties, growth, and NPK contents of bean cv. Red Kidney. Three treatments were used, namely, without amendment, FYM (20 t/ha), and wheat straw (10 t/ha). The amendments did not influence soil pH, electric conductivity, and OM content; FYM increased the inorganic N content and the straw produced N immobilization, but both effects disappeared 6 mo. later. FYM increased total N and available P, and decreased the C:N ratio. Although the straw did not modify these properties, it increased the available K. The amendments had no effect on plant DM yield or on N and K contents; FYM increased P content. [AS]

0069

27152 OREJUELA M., L.M. 1955. Experimento con cal y sustancias nutritivas en Phaseolus vulgaris L. en un suelo del Valle del Cauca. Correlación de experimento en el invernadero y en el campo. (Experiment with lime and nutritive substances in Phaseolus vulgaris in a soil of Valle del Cauca. Correlation of greenhouse and field experiments). Tesis Ing.Agr. Cali, Colombia, Universidad del Valle. 29p. Span., 19 Refs.

Phaseolus vulgaris. Agricultural lime. Fertilizers. N. P. K. Yields. Dry matter. Colombia.

Comparative biological expt. were carried in the greenhouse and in the field using Buitrera loam soil (Palmira, Colombia) and Phaseolus vulgaris var. Uribe Kedondo as indicator plant. Nine treatments were applied from an initial formula of 3-12-12 at 300 kg/ha, with or without lime, in single doses. In double doses 600 kg/ha were applied with 9 t lime. In the field only single doses of nutrients and lime were applied. Greenhouse expt. with 1 and 6 plants corresponded to the treatments with the highest DM production compared with the check. These treatments were 3-24-24, 6-24-24, and 6-48-48. A response to fertilizer application was observed in both greenhouse and field expt.; however, their most productive treatments differed. In the field the treatments 6-12-12 and 3-12-24 without lime gave the highest yields. [AS]

0070

23290 PEÑA P., J.C. 1978. Eficiencia en extracción de P de siete genotipos de frijol (Phaseolus vulgaris L.) en cuatro suelos con diferente capacidad de fijación de P. (P extraction efficiency of seven bean genotypes in four soils with different P fixation capacity). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 120p. Span., Sum. Span., 85 Refs., Illus.

Phaseolus vulgaris. Genotypes. Nutrient uptake. P. Leaf area. Mineral content. Ca. Fe. Mexico.

Two expt. were carried out under semicontrolled conditions in Mexico to evaluate the P extraction efficiency of 7 bean genotypes (Chiapas 243, Jamapa, Japonés Blanco, Pinto Nacional, Negro 66, Flor de Mayo, and Bayo 107) in soils with different fixation levels, as well as to determine possible correlations between P extraction by different plant organs and yield. In the 1st expt. leaf area, dry wt., and the extraction of P, Ca, and Fe by the different organs were determined. In the 2nd expt. 2 inoculation levels (15 days after planting) with bacteria isolated from manure were also used. Yield/pot, no. of pods, organ wt., and P extraction by the different organs were determined. Genotypes Negro 66, Flor de Mayo, Jamapa, and Chiapas 243 had the highest P absorption capacity. Inoculation had a positive effect on yield. P extraction by the different plant organs is highly correlated with yield. [CIAT]

0071

19774 QUINTANA, L.O.; CACERES, V.H. 1983. Suelos y fertilización del frijol Phaseolus vulgaris L. en las zonas de producción de Nicaragua. (Soils and fertilization of beans in bean producing zones of Nicaragua). In Tapia B., H.; García A., J.E., eds. Manual de producción de frijol común. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. pp.126-139. Span., 14 Refs.

Phaseolus vulgaris. Climatic requirements. Temperature. Soil requirements. Soil fertility. Nutritional requirements. Fertilizers. pH. Nicaragua.

Climatic and edaphic requirements of beans grown in Nicaragua are described. Bean var. used in this country are adapted to temp. between 17-24°C but tolerant to temp. up to 27°C. Beans are affected by compacted soils, salinity, excess water and OM, and weeds. Different aspects of plant nutrition, fertilization, soil fertility and reactions (pH) are presented. [CIAT]

0072

22214 QUINTANA B., O. 1983. Determinación de la respuesta del frijol común Phaseolus vulgaris a las aplicaciones NPK. (Determination of the response of common beans to NPK applications). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del frijol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.50-54. Span.

Phaseolus vulgaris. Cultivars. Fertilizers. N. P. K. Yields. Nicaragua.

Several bean var. were planted in different localities of Nicaragua to evaluate their response to variable levels of applied N, P, and K (0-80, 0-120, and 0-80 kg/ha, resp.). There was no response of local var. to NPK in soils with high K and P contents. In soils with low levels of K and P

there was only response to NP among the introduced var. Results indicated that the improved introductions should be fertilized with no more than 75 and 45 kg N and P/ha, resp., while for the local var. these figures should be no more than 52 and 48 kg N and P/ha, resp. [CIAT]

0073

23374 RAMIREZ, E.E. 1977. Determinación de los niveles óptimos de humedad y fertilización en el fríjol, en Zacatepec, Morelos. (Determination of optimum levels of moisture and fertilization in beans in Zacatepec, Morelos). Tesis Ing.Agr. Chapingo, México, Colegio de Postgraduados. Escuela Nacional de Agricultura. 73p. Span., Sum. Span., 28 Refs., Illus.

Phaseolus vulgaris. Fertilizers. N. P. K. Soil moisture. Yields. Mexico.

Economically optimum fertilization treatments and moisture availability regime were determined in bean var. Cacahuate at the Zacatepec exptl. field (Morelos, Mexico). Iwelve fertilization treatments were evaluated under 4 levels of available moisture. Yield increased with increasing available soil moisture, being 45% the max. level of available moisture. Yield also increased when the P dose was increased, the 48.50 kg/ha treatment resulting in max. physiological yield. The economically optimum P treatment was 37.95 kg/ha. Max. yield was obtained at 0 kg N/ha. [AS (extract)-CIAT]

0074

22635 REYES S., J.M. 1980. El efecto de la impermeabilización y la pendiente del suelo, para la captación del agua de lluvia en el cultivo del fríjol en un suelo semidesértico. (Effect of soil impermeability and slope on rainfall absorption by beans in a semi-desert soil). Tesis Ing.Agr. Monterrey, México, Universidad Autónoma de Nuevo León. 35p. Span., Sum. Span., 7 Refs., Illus.

Phaseolus vulgaris. Water absorption. Yields. Soil requirements. Soil physicochemical properties. Mexico.

An expt. was conducted in the San José exptl. field of the College of Agronomy, U. Autónoma de Nuevo León, Mexico, to study the vol. of water absorbed by the combined effect of 3 slope levels (3, 5, and 8%) with 3 impermeability treatments, to obtain a higher production of bean var. Pinto-Americano in semi-desert zones. Impermeability treatments were soda ash (Na_2CO_3) and paraffin, applied at doses of 0.040 and 1117 kg/m^2, resp., and by compacting the soil with a roller. The factors slope and impermeability treatment did not influence yield in the different treatments. However, a slight tendency to increase bean yields was observed in the treatment with soda ash. In the area where soda ash was applied, weed population was lower. [CIAT]

0075

24211 ROMAN V., A. 1984. Avances en el cultivo del fríjol. (Advances in bean cultivation). In Seminario de Actualización en Tecnología Agrícola, Medellín, Colombia, 1984. Resúmenes. Antioquia, Instituto Colombiano Agropecuario. pp.65-66. Span. [Instituto Colombiano Agropecuario, Programa Leguminosas de Grano, La Selva, Rionegro, Medellín, Colombia]

Phaseolus vulgaris. Planting. Spacing. Fertilizers. Cultivars. Colombia.

Brief information is given on planting density, fertilization, diseases and insects (mainly Ascochyta, anthracnose, and Lampoasca kraemeri), and recommended bean var. according to alt. [CIAT]

0076

21085 SALADIN G., F. 1981. El cultivo de la habichuela. 2. parte. (Snap bean cultivation. Part 2). Agro (República Dominicana) 10(86):7-9. Span., Illus.

Phaseolus vulgaris. Snap beans. Soil requirements. Land preparation. Fertilizers. Dominican Republic.

General aspects on snap bean cultivation are presented regarding adequate soils, soil preparation, and fertilization (N, N fixation, P, and K). Recommended fertilizer formulations and time of application are given and the use of foliar fertilizers is mentioned. [CIAT]

0077

25304 SIADAT, H. 1980. Root water absorption and growth following a dry period and moisture extraction by partially wetted root systems. Ph.D. Thesis. Davis, University of California. 118p. Engl., Sum. Engl., 118 Refs., Illus.

Phaseolus vulgaris. Plant vascular system. Water absorption. Water stress. Footing. USA.

In field trials on a Yolo clay loam and in greenhouse trials with roots divided between nutrient solution and a sandy loam soil, tomato cv. UC 82, dark red kidney bean, and sunflower were grown under different soil moisture regimes. After a long dry period the upper part of the root systems responded quickly to rewetting by developing new roots, and in plants dried but not wilted water absorption was similar to that of nonwilted plants. There was longitudinal root resistance to water movement in tomato and kidney bean. A one-time wetted part of a root system extracted soil moisture until water potential values were several bars lower than in a frequently wetted part. Lateral transfer of water in the plants compensated for nonuniform water distribution in the root zone. The maintenance of transpiration rate did not require 100% contact between root surface and the moisture reservoir in the medium. [Field Crop Abstracts]

0078

23895 SINGH, R.; SINGH, D.V. 1983. Effect of lime applied as calcitic limestone in acid soils of Kumaon Hills in Uttar Pradesh. Journal of the Indian Society of Soil Science 31(1):148-151. Engl., 8 Refs. [Horticultural Experiment & Training Centre, Chaubattia, Almora, Uttar Pradesh, India]

Phaseolus vulgaris. Agricultural lime. Soils. Snap beans. Yields. Dry matter. N. P. K. Ca. Mg. Mineral content. India.

In a pot expt. the effect of varying doses of lime as calcitic limestone (0, 25, 50, 75, and 100% of the lime requirement) on properties of 4 acid soils of Kumaon Hills in Uttar Pradesh, India, was studied, and the optimum lime level for French beans was determined. In the clayey soil from Reoni there was a significant increase in DM yield and % of N, P, K, Ca, and Mg with 75% lime requirement dose, and the highest benefit was obtained with the 100% dose. In Falakhet soil, the DM yield was significantly enhanced with all the doses of lime, but the highest yield was obtained with 75%

required dose. In Genthia soil, lime applied at the rate of 50% lime requirement proved to be the optimum, increasing DM yield 37.4% over the control. In Fanaliehhina soil, 75% lime requirement dose produced the max. DM to the extent of 46.8% over the control. Liming in increasing doses progressively improved all the soils regarding pH, Ca and base saturation %, exchange acidity, and exchangeable Al. The rate of lime requirement for improving the soil as well as crop bean production was the highest for Feoni followed by soils of Fanaliehhina, Falakhet, and Genthia. Lime requirement of these soils largely depends upon the Ca saturation, exchange acidity, and clay content. [CIAT]

0079

J3886 SIRRY, A.E.; SALEM, F.H.; GEWAILY, F.M.; HOBANY, M.R. 1982. Effect of fertilization on the severity of bacterial blight disease of bean plants infected with Pseudomonas aeruginosa in Egypt. 1. Phosphate fertilization. Egyptian Journal of Microbiology 17(1-2):49-63. Engl., Sum. Engl., Ar., 18 refs. [Botany Dept., Faculty of Agriculture, Zagazig Univ., Zagazig, Egypt]

Phaseolus vulgaris. Fertilizers. P. Pseudomonas aeruginosa. Carbohydrate content. Mineral content. N. P. Disease control. Egypt.

The effect of superphosphate fertilization on bean plants (var. Mont Calm and Giza 3) infected with Pseudomonas aeruginosa showing blight disease was studied in the greenhouse, regarding wt., total carbohydrate, N, P, and K values. P. aeruginosa had a deleterious effect on plant wt. and chemical constituents. Superphosphate fertilization increased the values resulting in vigorous plants that eventually became resistant to pathogen invasion. The optimum level of superphosphate application was 225 kg/feddan (1 feddan = 0.42 ha), with more vigorous plants and high values of the major chemical constituents. [AS]

0080

J3428 SOLANO R., V.D. 1979. Recomendaciones sobre prácticas de producción de maíz y frijol en la Sierra de Chihuahua. Utilización del método CP para la definición de agrosistemas. (Recommendations on maize and bean production practices in Sierra de Chihuahua. Use of the CP method in defining agrosystems). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 276p. Span., Sum. Span., 65 Refs., Illus.

Phaseolus vulgaris. Yields. Climatic requirements. Soil requirements. Fertilizers. N. P. Planting. Spacing. Mexico.

Between 1973-76, a series of expt. were carried out in the region of Sierra de Chihuahua, Mexico, to generate recommendations on maize and bean production practices that allow farmers to increase the unit yields of these crops as well as their net incomes. Expt. were established on farmers' fields under different ecological conditions and information was collected on non-controllable production factors to stratify climate, soil, and management conditions in order to define the cultural practices for the agrosystems defined within the study area. Max. yields, optimal economic doses of N and P, and optimal population density obtained in the maize and bean expt. were analysed. The most favorable conditions for a high bean production level are found in soils with more than 50% sand. Optimal economic doses of N related significatively only with the previous crop factor, P doses related only with native P content in the soil, and optimal population densities did not relate significatively with any of the production factors under study. Four agrosystems were defined for bean production: planting after beans in soils with more or with less than 24 kg

available P/ha; planting after maize or oats in soils with more or with less than 24 kg available P/ha. [AS (extract)-CIAT]

0081

23894 SSALI, H.; KEYA, S.O. 1982. Effect of nitrogen fertilizer on yield of beans inoculated with Rhizobium phaseoli. Kenya Journal of Science and Technology 3(2):87-89. Engl., 2 Refs. [Dept. of Soil Science, Univ. of Nairobi, P.O. Box 30197, Nairobi, Kenya]

Phaseolus vulgaris. Cultivars. Fertilizers. N. Rhizobium phaseoli. Inoculation. Yields. Kenya.

The effect of 0, 20, and 100 kg N/ha on the yield of common bean cv. Canadian Wonder (NB 26), Rosecoco (GLP 2), and Mwezi Moja (GLP 10), when seeds were inoculated with Rhizobium phaseoli, was evaluated. Applying 20 kg N/ha had little effect on nodulation, but 100 kg N/ha depressed nodulation in all cv. The application of 20 kg N/ha increased seed yield by 1.0-13.4%, but the dose of 100 kg N/ha did not always result in increased seed yield (range 8.6-21.1%) and, in one case, seed yield decreased by 12.6%. The small but consistent increase in seed yield and the relatively small effect of the low dose of N on nodulation indicates that a starter dose might be beneficial. [CIAT]

0082

23429 VILLARREAL M., A.G. 1981. Resistencia a la sequía. 5. Condicionamiento a la sequía en fríjol (Phaseolus vulgaris L.); ajustes morfológicos y osmóticos. (Resistance to drought. 5. Conditioning to drought in beans; morphological and osmotic adjustments). Chapingo, México, Colegio de Postgraduados. 151p. Span., Sum. Span., 98 Refs., Illus.

Phaseolus vulgaris. Cultivars. Adaptation. Drought. Yields. Growth. Yield components. Resistance. Mexico.

Three expt. were conducted to analyze the efficiency of some morphological and physiological adaptations to drought in 2 bean cv.: Cacahuate (determinate bush) and Michoacán 12-A-3 (indeterminate bush). The 1st expt. studied the capacity of adaptation to drought, the 2nd studied the efficiency of plants adapted to drought to withstand future drought, and the 3rd studied the presence of osmotic adjustment as a physiological mechanism of adaptation to drought. The 1st 2 expt. basically analyzed morphological and physiological characteristics. Cv. Cacahuate showed no seed yield reduction during 2 dry periods of -1.5 MPa, and no effect of adaptation to drought was observed. Cv. Michoacán 12-A-3 showed a positive effect, presenting adaptation to 2 dry periods. This was influenced by the reduction in leaf area, longer plant cycle, and indeterminate growth habit of the cv. An osmotic adjustment of 0.15 MPa was detected in cv. Cacahuate and of 0.33 MPa in cv. Michoacán 12-A-3, when plants were subjected to slow drought until reaching a plant water potential of -1.2 MPa. [AS-CIAT]

See also 0010 0018 0023 0025 0088 0104 0109 0110 0112 0116 0118 0121 0122 0124 0131 0135 0139 0141 0142 0144 0146 0150 0173 0207 0290 0300 0322 0327 0329 0377 0397 0399

0083

24254 ALEMAN R., P. 1984. Evaluación de mezclas herbicidas en postemergencia en fríjol de temporal. (Evaluation of postemergence herbicide mixtures in rainfed beans). In Centro de Investigaciones Agrícolas de El Bajío, México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos, Instituto Nacional de Investigaciones Agrícolas. pp.55-61. Span.

Phaseolus vulgaris. Herbicides. Toxicity. Mexico.

Two expt. were conducted in Los Altos de Jalisco, Mexico, to evaluate postemergence herbicide mixtures for weed control in beans and to determine their selectivity. The mixtures evaluated were fluazifop-butyl + acifluorfen-sodium, fluazifop-butyl + bentazon, diclofop metyl + acifluorfen-sodium, and diclofop metyl + bentazon at different concn. and applied 16 days after the emergence of beans. The mixtures based on fluazifop-butyl and diclofop metyl + acifluorfen-sodium affected beans severely, while less damage was caused by the mixtures of fluazifop-butyl and diclofop metyl + bentazon. An antagonistic effect was observed with the mixtures with bentazon, which showed low toxicity for beans but low control of the broadleaf/narrow leaf/perennial weed complex. The mixtures with acifluorfen-sodium showed a good control of broadleaf weeds but were highly toxic for beans. [CIAT]

0084

25197 AÑEZ R., B.; TAVIRA D., E. 1983. Efectos de las distancias de siembra sobre los rendimientos en grano y sus componentes en caraota (Phaseolus vulgaris L.). (Effects of planting distances on yield and yield components of black beans). Revista de la Facultad de Agronomía (Venezuela) 6(2):682-689. Span., Sum. Span., Engl., 17 Refs., Illus. [Inst. de Investigaciones Agropecuarias, Facultad de Ciencias Forestales, Apartado 220, Univ de Los Andes, Mérida, Venezuela]

Phaseolus vulgaris. Planting. Spacing. Germination. Flowering. Yields. Yield components. Venezuela.

The effects of planting distance on the seed yield and other agronomic characteristics of black beans were assessed at San Juan de Lagunillas in the state of Mérida, Venezuela. Six interrow spacings (80, 60, 50, 40, 30, and 20 cm) and 4 intrarow plant spacings (20, 15, 10, and 5 cm) were used in a split plot arrangement in a randomized complete block design, with 3 replications. Seed yield was affected by interrow spacings, but not by intrarow plant spacings nor by the interaction between interrow and intrarow spacings. The highest yield (3987.76 kg/ha at 15.73% moisture) was obtained with 40 x 10 cm spacings. The no. of pods/plant decreased as interrow and intrarow spacings decreased. The no. of seeds/pod was not affected by planting distance, but by the interaction between the interrow and intrarow spacings due to the remarkable value 8.13 obtained with 40 x 10 cm spacings. Plant height at flowering and seed wt. did not differ significantly for interrow and intrarow spacings. The greatest % of loss was due to germination which decreased with reduced intrarow spacings. The plant mortality after seed germination did not show significant variations with the planting distances used. [AS]

0085

24403 BULLON F., O. 1979. Control químico de malezas en fríjol. (Chemical weed control in beans). Avances en Investigación 9(1-2):59-63. Span., 3 Refs.

Phaseolus vulgaris. Weeds. Herbicides. Toxicity. Peru.

Studies were conducted at La Molina, Peru, to evaluate the use, activity, and toxicity of preemergence herbicides. Bean var. Canario Divex 8130 was planted and herbicides were applied 1 day after planting. Nine treatments were used (6 herbicides and 3 checks) in 6 completely randomized blocks. Data on herbicide effectivity, damage to bean plants, wt./100 seeds, and yields are tabulated. The predominant weed species occurring during the expt. are listed. [CIAT]

0086

24241 CARDONA C., H. 1983. Evaluación de los sistemas de labranza: manual, tracción animal, micro-tracción mecanizada y cero, en fríjol ejotero (Phaseolus vulgaris L.) en pequeñas extensiones. (Evaluation of tillage systems: manual, animal traction, mechanized microtraction, and zero tillage in beans grown in small plots). Tesis Ing.Agr. Guatemala, Universidad de San Carlos de Guatemala. 57p. Span., Sum. Span., 14 Refs.

Phaseolus vulgaris. Weeding. Mechanization. Yields. Costs. Income. Guatemala.

At the Instituto Técnico de Agricultura in Barcena (Villa Nueva, Guatemala), 4 tillage systems (manual, animal traction, mechanized microtraction, and zero tillage) were compared for bean crops to determine which is more favorable for the small farmers from the technical and economic point of view. Variables measured were yield/unit area, production cost, and profitability. The zero tillage system had the lowest production cost (1434.21 quetzals/ha) and proved to be the most profitable (90.37%); the highest yield was obtained with the manual tillage system (13.62 MT/ha). A highly significative difference ($P \leq 0.01$) was found in relation to production cost for zero tillage compared with the rest of the treatments. There was no significant difference ($P \leq 0.05$) regarding yields between the manual and zero tillage systems, which gave the highest yields. No significant difference ($P \leq 0.05$) was found between profitability generated by the zero tillage system (the most profitable) and the manual tillage system which generated the same statistical profitability. The zero tillage system is recommended since according to existing information it has several technical advantages, and according to results, it showed the highest profitability. [AS (extract)-CIAT]

0087

23151 CARTER, P.R.; DOERSCH, R.E.; WYMAN, J.A.; PETERSON, L.; BUNDY, L.G.; GRAU, C.R. 1983. Commercial navy and red kidney bean production. Madison, University of Wisconsin. Cooperative Extension Programs. Publication no.A2349. 4p. Engl.

Phaseolus vulgaris. Land preparation. Planting. Timing. Seed treatment. Weeding. Pest control. Harvesting. USA.

General aspects of commercial navy and red kidney bean production in Wisconsin, USA, are presented. Recommendations are given on adaption, soil type, crop rotation, seedbed preparation, fertilization, cv., seed quality and treatment, planting time, rate and depth, weed control (cultural practices and herbicides), insect and disease control. [CIAT]

0088

23284 CERDA I., E. 1979. 16 alternativas de producción de fríjol (Phaseolus vulgaris) en ciclo tardío, en la Unidad de Riego La Victoria, Municipio de Pesquería, N.L. (Sixteen bean production alternatives in the second cropping cycle in La Victoria Irrigation Unit, municipality of Pesquería, N.L.). Tesis Ing.Agr. Monterrey, México, Universidad Autónoma de Nuevo León. 80p. Span., Sum. Span., 24 Refs., Illus.

Phaseolus vulgaris. Cultivars. Spacing. Planting. N. P. Yields. Fertilizers. Mexico.

An expt. was carried out in La Victoria Irrigation Unit, located in the municipality of Pesquería (Nuevo León, Mexico), to evaluate 16 bean production alternatives in relation to yield. Factors evaluated were as follows: var. (Ciateño and Delicias), densities (120,000 and 150,000 plants/ha), N (0 and 50 kg/ha), and P (0 and 50 kg/ha). It was observed that flower color, growth habit, and duration of growth cycle of both var. did not vary with respect to other regions of the country and that the flowering period was short due to the prevalent moderate temp. The best treatment was that of high planting density and high N doses; it was also observed that when interaction occurred between density and N dose, var. Ciateño gave higher yields. [AS (extract)-CIAT]

0089

19771 COREA M., M. 1983. Malezas en el fríjol común y su control. (Weeds and their control in bean crops). In Tapia B., H.; García A., J.E., eds. Manual de producción de fríjol común. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. pp.69-78. Span., 10 Refs.

Phaseolus vulgaris. Weeds. Weeding. Herbicides. Nicaragua.

A list of the predominant weed species in bean crops in Nicaragua is presented. Other important aspects are included such as mechanical, biological, and chemical weed control, weed competition, herbicide classification, herbicide application time and methods. [CIAT]

0090

18727 COULTAS, J. 1981. Herbicide symptoms in dry edible beans. Minneapolis, University of Minnesota. Crop Pest Management Series. Extension Publication no.158 2p. Engl., Illus.

Phaseolus vulgaris. Herbicides. Toxicity. USA.

Injury symptoms on beans caused by excessive rates of herbicide application are described. These symptoms are representative of a herbicide or group of herbicides, but they may vary considerably, depending on the stage of crop development or growing conditions when the injury occurred. Color photographs are included. [CIAT]

0091

24223 DIAZ M., J. 1983. Tecnología de producción en cultivo de humedad residual. (Production technology under residual moisture conditions). In Lepiz I., R.; Navarro S., F.J. Fríjol en el noroeste de México (Tecnología de producción). México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. Centro de Investigaciones Agrícolas del Pacífico Norte. pp.83-98. Span., 14 Refs., Illus.

Phaseolus vulgaris. Cultivation. Water requirements. Mexico.

Recommendations are given for bean crops under residual moisture conditions after the seasonal summer rains in southern Sinaloa and the state of Nayaret, Mexico, regarding land preparation, var. selection, planting method, density, time, and date, and cultural practices. [CIAT]

0092

25221 DURANTI, A.; LANZA, M.R. 1979. La raccolta meccanica del fagiolo nano mangiatutto, 6. Diserbo chimico e tolleranza varietale. (Mechanical harvesting of edible bush beans. 6. Chemical weed control and varietal tolerance). Annali della Facolta di Scienze Agrarie della Universita degli Studi di Napoli 13(1):39-48. Ital., Sum. Ital., Engl., 33 Refs.

Phaseolus vulgaris. Snap beans. Cultivars. Weeding. Herbicides. Toxicity. Italy.

Results are reported and examined of a field trial carried out during 1978 in the Sele river plain (Salerno, Italy) to study the behavior of 3 snap bean var. (Bush Blue Lake 274, Cascade, Stretch) with respect to 6 selective herbicides (benfluralin, bentazon, dinitramine, diphenamid, EPTC, isopropalin). Benfluralin, diphenamid, and isopropalin exhibited both excellent effectiveness if evaluated on the basis of phytotoxicity and yield of green beans. Dinitramine was slightly less effective in weed control. EPTC gave lower control of weeds and caused some crop injury resulting in yield reduction. Bentazon was the most phytotoxic. Var. showed differential tolerance to herbicides; in particular, the yield of cv. Cascade was greatly affected by bentazon. [AS]

0093

24288 GONZALEZ, A.R.; SISTRUNK, W.A.; MARX, D.B.; MORFLOCK, T.E. 1983. Comparative study of three snap bean mechanical harvesters. Arkansas Farm Research 32(4):4. Engl.

Phaseolus vulgaris. Harvesting. Mechanization. Snap beans. Agricultural equipment. USA.

Three harvesters (FMC model CB-110, Chisholm-Ryder Multi-Density, and 2-row Chisholm-Ryder Hi-Boy) were compared in 2 expt. as to their efficiency in harvesting snap bean cv. Gallatin Valley 50 at 472,000 and 212,503 plants/ha. The 3 harvesters provided similar harvest efficiency (75.0, 81.9, and 63.3%, resp.) and quality of snap beans. The stage of pod maturity may significantly affect the performance of the harvesters and the quality of raw product. An important advantage of the 1st 2 harvesters is that under the same field conditions they could harvest 2.6 times faster than the latter harvester. [CIAT]

0094

24228 GONZALEZ R., C. 1983. Cosecha. (Harvesting). In Lepiz I., R.; Navarro S., F.J. Fríjol en el noroeste de México (Tecnología de producción). México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. Centro de Investigaciones Agrícolas del Pacífico Norte. pp.195-207. Span., 13 Refs., illus.

Phaseolus vulgaris. Harvesting. Mechanization. Processing. Agricultural equipment. Mexico.

A brief description is given of harvesting and threshing practices in beans, and of the components and operation of a grain combine harvester.

The basic problems caused by these harvesters (grain losses, and dirty and broken seeds) are discussed. [CIAT]

0095

22218 HERRERA, M.; SANCHEZ, R. 1983. Efecto de seis densidades de población y dos distancias entre surcos en el rendimiento de grano de fríjol común negro cultivar Pijao. (Effect of six population densities and two distances between furrows on yield of black bean cultivar Pijao). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.61-62. Span.

Phaseolus vulgaris. Cultivars. Planting. Spacing. Yields. Nicaragua.

Two field trials were conducted in Santa Marta (León, Nicaragua) to evaluate the effect of 6 population densities (147,150, 164,280, 184,290, 185,710, 221,430, and 227,140 plants/ha) and 2 distances between furrows (71 and 81 cm) on the yield of black bean cv. Pijao. There were no statistical differences in yield for all planting densities at 71 cm between furrows. However, a significant variation was observed with beans planted at 81 cm. It is indicated that planting bean cv. Pijao at 147,150 plants/ha, at either 71 or 81 cm between furrows, offers the best technical and ecological advantages. [CIAT]

0096

22206 HERRERA, M.; LLANO G., A. 1983. Evaluación de variedades de fríjol común negro bajo condiciones de riego. (Evaluation of black bean varieties under irrigated conditions). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.24-25. Span.

Phaseolus vulgaris. Cultivars. Yields. Selection. Adaptation. Nicaragua.

Four trials were conducted under irrigated conditions at León and Rivas (Nicaragua) on 4 different planting dates to evaluate the performance of 17 black bean var. Variance analysis of seed yield did not show significant differences between var. for the different planting dates. Bat-7 and Bat-58 were outstanding with yields over 1230 kg/ha. [CIAT]

0097

22210 HERRERA, M.; LLANO G., A 1983. Introducción y evaluación de 83 líneas promisorias de fríjol común del CIAT, en la postrera del 81 en Carazo. (Introduction and evaluation of 83 promising bean lines from CIAT in the second planting season of 1981 in Carazo). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. p.41. Span.

Phaseolus vulgaris. Cultivars. Selection. Yields. Adaptation. Nicaragua.

The performance of 83 promising bean selections from CIAT was evaluated in Carazo (Nicaragua) for their future use in seed production programs. Among the several promising lines, FB6448-4-3-1 F_5 was outstanding. It is indicated that the majority of the selected var. were resistant to Xanthomonas phaseoli. [CIAT]

0098

24461 KAYUKU, V. 1961. Quelques considérations sur la culture du haricot au Rwanda. (Some considerations on the bean cultivation in Rwanda). Bulletin d'Information de l'INEAC 10(6):333-347. Fr.

Phaseolus vulgaris. Cultivars. Climbing beans. Dwarf beans. Cultivation. Varietal mixtures. Rwanda.

In Rwanda, beans occupy 40% of the total cultivated area in the favorable regions and 10-20% in regions which are less suited to its cultivation. Two different var. are grown, a climbing one and a dwarf, creeping var. with smaller yields than the former. The cultivation practices of the African growers are described. The research station at Rubona is engaged in the improvement of the crop. Of various var., those with black seeds yielding 1300 kg/ha or more were selected. Improved cultivation methods developed at this station are discussed, such as the growing of var. mixtures. [Royal Tropical Institute]

0099

23996 KEULS, M.; MARTAKIS, G.F.P.; MAGID, A.H.A. 1984. The relationship between pod yield and specific leaf area in snapbeans: an example of stepwise multivariate analysis of variance. Scientia Horticulturae 23(3):231-246. Engl., Sum. Engl., 13 Refs., Illus. [Dept. of Mathematics, Agricultural Univ., P.O. Box 30, Wageningen, Netherlands]

Phaseolus vulgaris. Snap beans. Statistical analysis. Leaf area. Yields. Netherlands.

After a detailed (univariate) analysis of variance, stepwise multivariate analysis of variance (stepwise MANOVA) was used on the exptl. data obtained from an investigation with snap beans carried out in the arid regions of Shambat (Sudan). The relationship between pod yield and specific leaf area (SLA) for 3 snap bean cv. (Giza 3, Daria, and Slankette) and 4 sowing dates was examined. Four variables over plots were considered, namely, yield earliness, total yield, SLA earliness, and av. SLA. From a stepwise MANOVA, it appeared that the cv. effect was primarily expressed by yield earliness and total yield. SLA earliness and av. SLA provided no additional cv. effect. Furthermore, the sowing date effect could be expressed mainly by SLA earliness and yield earliness. Finally, the interaction effect played a minor part compared with the sowing date and cv. effect. [AS]

0100

19018 LeBARON, M.; DEAN, L.L.; PORTMAN, R. 1971. Bean production in Idaho. Moscow, University of Idaho. College of Agriculture. Agricultural Experiment Station. Bulletin no. 282. 30p. Engl., Illus.

Phaseolus vulgaris. Irrigation. Cultivars. Seed production. Fertilizers. Land preparation. Weeding. Planting. Timing. Spacing. Harvesting. Symptomatology. Epidemiology. Disease control. Pseudomonas phaseolicola. Xanthomonas phaseoli. Corynebacterium flaccumfaciens. Pseudomonas syringae. Bean common mosaic virus. Bean yellow mosaic virus. Curly top virus. Injurious insects. Plant injuries. Insect control. Chemical control. USA.

General information is presented on bean production problems in the state of Idaho, USA, under irrigated conditions. Principal var. planted of bean types Pinto, Great Northern, Red Mexican, and California Pink are listed and sources of seed, crop rotation, fertilization, inoculation, land preparation, weed control, planting times and spacing, irrigation schedule,

and harvesting are discussed. The symptomatology, dissemination, and control measures of the diseases halo blight, common blight, bacterial wilt, bacterial brown spot, root rots, white mold (Sclerotinia), Pythium wilt, BCMV, BYMV, curly top virus, and other nonpathogenic damages to the plant (heat injury, sunscald, and alkali injury) are described. The form of attack, damage caused, and control measures are described for the pests Circulifer tenellus, Lygus elisus, L. hesperus, and L. desertus, Epilachna varivestis, Hylemya platura, Tetranychus urticae, Loxagrotis albicosta, Limonius californicus, and other minor pests which include thrips, Etiella zinckenella, Heliothis zea, Agrotis ipsilon, and Polyphylla decimlineata. Recommendations for insecticide use are included. [CIAT]

0101

22969 LEDESMA G., L.A. 1977. Estudio de fechas de siembra para fríjol en Tecamachalco, Pue. (Study on planting dates for beans in Tecamachalco, Pue.). Tesis Ing.Agr. Jalisco, México, Universidad de Guadalajara. 47p. Span., Sum. Span., 27 Refs., Illus.

Phaseolus vulgaris. Planting. Timing. Yields. Cultivars. Mexico.

The food legume program of the exptl. agricultural field of Tecamachalco (Puebla, Mexico) conducted research during 1975-76 to determine the adequate planting periods for beans to obtain good yields, and to detect highest pest and disease incidence and their effect on the crop. The best planting dates were March 18 and 28, and the highest pest incidence occurred during Aug. Different factors affecting yield were precipitation, temp., and photoperiod. Var. Hidalgo-77, Veracruz-146, and Negro Puebla are recommended for the 1st planting dates. [AS (extract)-CIAT]

0102

24874 LIEBENBERG, A.J. 1982. Die invloed van uitdun op verskillende groeistadiums op die bron-stoor verhoudings van droëbone. (The influence of thinning at different growth stages on the source-sink relationships of dry beans). Crop Production 11:175-177. Germ., Sum. Germ., Engl., 6 Refs., Illus. [Inst. vir Graangewasse, Potchefstroom 2500, South Africa]

Phaseolus vulgaris. Planting. Spacing. Flowering. Podding. Yield components. Harvesting. Thinning. South Africa.

Dry bean cv. Teebus was grown at 6, 9, 12, or 18 plants/m^2 in field trials during 1970-80 and plants were thinned (a) after emergence, (b) at flower initiation, (c) during flowering, (d) during seed filling. Av. DM, no. of pods, and seed wt./plant at harvest decreased with increasing delay in thinning. Plants responded to thinning intensity by increased DM, pod and seed production with decreasing effect as thinning was delayed and no effect at (d). Thinning level had no effect on no. of seeds/pod, seed wt., or HI. Thinning at (b) resulted in more seeds/pod, larger seeds, and higher HI than at (c). The effect of population stress on yield was greater at the vegetative stage and least during seed filling. [CIAT]

0103

19874 LIMA, P.R. DE A.; MENDES, M.C. 1981. Estudo de épocas de semeadura de feijao safra das aguas em dois municípios da Grande Dourados em 1980/81. (Study on bean planting dates during the rainy season at two sites of Grande Dourados in 1980-81). Dourados-MS, Brasil, Empresa

Brasileira de Pesquisa Agropecuária. Unidade de Execucao de Pesquisa de Ambito Estadual de Dourados. Pesquisa em Andamento no.11. 5p. Port.

Phaseolus vulgaris. Planting. Timing. Cultivars. Yields. Yield components. Brazil.

To determine the best planting date for beans in Fatima do Sul and Dourados, Brazil, 5 cv. were tested at different planting dates during the 1980-81 rainy season. Five planting dates were used at Fatima do Sul (Aug. 5, Sept. 1 and 17, Oct. 3, and Nov. 31, 1980) but not bean yield was obtained from these plantings since adverse climatic conditions and diseases, especially Xanthomonas phaseoli, affected production. Three planting dates were tested at Dourados (Oct. 7, Nov. 6, and Dec. 6). No bean production was reached at the latter 2 planting dates due to adverse climatic conditions and X. phaseoli incidence. However, when beans were planted on Oct. 7, cv. Carioca gave the highest yields (804 kg/ha), followed by Rio Tibagi and Cuva 168-N (624 kg/ha each), Rico 23 (611 kg/ha), IPA 7419 (319 kg/ha), and Ricobaio 1014 (173 kg/ha). X. phaseoli infected all cv. ranging between 15% affected leaf area for Carioca and 25% for Ricobaio 1014 and IPA 7419. [CIAT]

0104

23069 LOPEZ G., A.; LOAIZA V., J.M.; MORUA L., J.G.; ORTEGA M., P.F.; ROMO R., C.; TORRES R., E. 1983. Fríjol. (Beans). In _____. Guía para los cultivos agrícolas en los ríos Sonora y San Miguel. Hermosillo, Sonora, México, Instituto Nacional de Investigaciones Agrícolas. Secretaría de Agricultura y Recursos Hidráulicos. Folleto para Productores no.6. pp.15-22. Span., Illus.

Phaseolus vulgaris. Cultivars. Planting. Fertilizers. Weeding. Disease control. Harvesting. Mexico.

General aspects on bean cultivation in the region of the Sonora and San Miguel rivers, Mexico, are presented. Recommended var. are local Criolla (susceptible to Uromyces phaseoli) and Luna, which should be planted the 3rd wk. of Aug. spaced 60 cm interrow, 16 seeds/m, and 4-6 cm deep (80 kg seed/ha). Applications of 40 kg N + 30 kg P/ha are recommended. Mechanical-manual and chemical (2 l trifluralin/ha) weed control measures are given. Important insect pests in the region are Bemisia tabaci and Empoasca sp. Seed dressings (250 g thiram/100 kg seed) are recommended against seed/seedling rots. Crop rotations, except after potato, should be practiced to avoid root and stem rots. U. phaseoli can be controlled using resistant var. (e.g., Luna), S dustings (25-30 kg/ha), chlorothalonil or Parzate (2.5-3.0 kg/ha). A brief description of the harvesting procedure is given. [CIAT]

0105

22977 MOMA M., C.A. 1981. Evaluación por rendimiento y otras características agronómicas en 25 cultivares de fríjoles negros (Phaseolus vulgaris L.) para la Costa Central. (Evaluation of yield and other agronomic characteristics of 25 black bean cultivars for the Central Coast). Tesis Ing.Agr. Lima, Perú, Universidad Nacional Agraria La Molina. 102p. Span., Sum. Span., 55 Refs., Illus.

Phaseolus vulgaris. Germplasm. Cultivars. Yields. Planting. Timing. Resistance. Uromyces phaseoli. Bean common mosaic virus. Peru.

Two expt. were carried out (May-Sept. 1979 and Jan.-April 1980) in the localities of La Molina, Huaral, and Chincha Baja (Peru) to evaluate the

yield, and preliminarily rust and BCMV, in 49 bean var. Twenty-five var. were selected for their tolerance to rust. Var. x period interaction was highly significant. According to the ratio of genotypic and phenotypic variance, the % of heredit&bility in yield is 17%. The following var. showed tolerance and resistance to rust and BCMV simultaneously: Caraota Venezolano, P-512, CIAT-1-70, Caraota Brasileño, Venezuela-32, and B.C.-4. [AS (extract)-CIAT]

0106

22216 MORALES R., C. 1983. Determinación de la densidad óptima de siembras en frijol común Phaseolus vulgaris L. (Determination of optimum plant densities in common beans). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del frijol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.50-57. Span., illus.

Phaseolus vulgaris. Cultivars. Planting. Spacing. Yields. Nicaragua.

Four bean var. (Revolución-81, Revolución-82, Rojo Nacional, and Orgulloso) were planted in 1982 in Carazo and Estelí, Nicaragua, to evaluate the effect of 3 planting densities (120,000, 160,000, and 250,000 plants/ha) on seed yield. There was no interaction between var. and planting densities. Var. Revolución-81 gave the highest yields in both zones at 120,000 plants/ha. [CIAT]

0107

22219 MORALES R., C. 1983. Determinación del período crítico de competencia entre el frijol común y las malezas. (Determination of the critical period of competition between beans and weeds). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del frijol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.63-66. Span.

Phaseolus vulgaris. Cultivars. Weeds. Weeding. Nicaragua.

Field trials were carried out in Carazo, Nicaragua, during 1982 to determine the critical period of weed competition in bean cv. Revolución-81. Twelve treatments were used: plots were weeded (6) or left unweeded (0) for 10, 20, 30, 40, 50 days, and during the entire planting cycle. The most competitive weed species were Melampodium divaricatum, Bidens pilosa, Eleusine indica, Digitaria sanguinalis, Heptochloa filiformis, Cenchrus brownii and C. echinatus, Baltimora recta, and Euphorbia heterophylla. The critical period of weed competition is between 32-50 days after seedling emergence. [CIAT]

0108

22690 NITSCHE M., L.; CAFATI F., C. 1983. Incidencia del daño mecánico en la calidad de la semilla del poroto. (Effect of mechanical damage on bean seed quality). Investigación y Progreso Agropecuario La Platina (Chile) no.19:18-20. Span., illus.

Phaseolus vulgaris. Mechanical damage. Seed. Processing. Mechanization. Chile.

Mechanical damage to bean seeds is normally caused by the processes of threshing, selection, and transportation, mainly when seeds are processed

at MC of less than 12%. The different mechanical problems occurring during these 3 processes are described and some useful recommendations to avoid them are presented. [CIAT]

0109

23194 PEÑALOZA C., J. 1983. Efecto de la variedad, densidad, forma y fecha de siembra en el cultivo de poroto verde (Phaseolus vulgaris L.) bajo invernaderos fríos en época de verano a otoño. (Effect of variety and planting, density, form and date on snap beans grown in cold greenhouses during the winter to autumn season). Tesis Ing.Agr. Quillota, Chile, Universidad Católica de Valparaíso. 99p. Span., Sum. Span., 28 Refs., Illus.

Phaseolus vulgaris. Cultivars. Spacing. Planting. Timing. Fertilizers. N. Snap beans. Chile.

The agronomic and economic feasibility of cultivating snap bean var. Apolo (bush) and Enriqueta (climbing) was studied under cold greenhouse conditions during the summer-autumn season at the La Palma Expt. Station of the Agronomy College, U. Católica de Valparaíso, Chile. The study included 2 planting dates (Feb. 24 and March 24), 2 fertilization levels (medium and high), and the following densities and planting systems: 312,000 and 110,000 plants/ha in double rows, and 156,000 and 55,000 plants/ha in single rows. Snap beans would be a feasible and profitable alternative under cold greenhouse conditions in the summer-autumn season to obtain 2 harvests/yr. Rotation of snap beans/tomato has the best expectations. Var. Enriqueta presented better pod quality, size, and wt., and also produced the best yields. Regardless of N levels, best yields of both var. were obtained at higher planting densities in double rows. [AS (extract)-CIAT]

0110

24244 RIPOLL N., R.A. 1983. Efectos del uso de túnel y mulch plástico sobre rendimiento y calidad de melón (Cucumis melo) y poroto verde (Phaseolus vulgaris L.) en cultivo temprano. (Effects of the use of plastic tunnels and mulch on yield and quality of melon and green beans in early plantings). Tesis Ing.Agr. Santiago, Chile, Pontificia Universidad Católica de Chile. 83p. Span., Sum. Span., Engl., 18 Refs.

Phaseolus vulgaris. Snap beans. Cultivars. Cultivation. Planting. Temperature. Yields. Chile.

The effect and use of plastic tunnels for early growing of snap bean var. Apolo and Green Crop were evaluated in the Curacaví zone (Chile) in 1982. Bean var. were compared under plastic tunnel conditions and in the open. Beans grown under the plastic tunnels yielded 50% more than those grown in the open. Var. Apolo yielded 23.5 and 13.5 t/ha under plastic tunnels and in the open, resp. Var. Green Crop yielded 21.3 and 14.6 t/ha, resp. [CIAT]

0111

24151 ROCHA Q., J. 1984. Efecto de la densidad de población sobre el rendimiento y sus componentes en fríjol (Phaseolus vulgaris L.) variedad Flor de Mayo X-16441. (Effect of population density on yield and yield components for bean variety Flor de Mayo X-16441). Tesis Ing.Agr. Chapingo, México, Universidad Autónoma Chapingo. 138p. Span., Sum. Span., 59 Refs., Illus.

Phaseolus vulgaris. Spacing. Planting. Yields. Yield components. Leaf area. Dry matter. Mexico.

In Chapingo, Mexico, the effect of 3 planting densities (1, 2, and 3 plants/m²) on yield and yield components was determined for the bean var. Flor de Mayo (indeterminate climbing habit) during the 1981 spring-summer cycle. The performance of yield and yield components was observed along the height of the canopy in 0.5-m strata. Data on yield components were registered at 63, 89, 128, and 155 days after planting. Av. yield was 460 g/m². Population density did not affect yield and yield components, DM distribution in the aerial part of the plant, or total production and distribution of reproductive organs in the different plant strata. [AS (extract)-CIAT]

0112

24222 RODRIGUEZ C., F.G. 1983. Tecnología de producción en cultivo de riego. (Production technology in irrigated crops). In Lepiz I., R.; Navarro S., F.J. Fríjol en el noroeste de México (Tecnología de producción). México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. Centro de Investigaciones Agrícolas del Pacífico Norte. pp.71-81. Span., 5 Refs., Illus.

Phaseolus vulgaris. Cultivation. Irrigation. Mexico.

Recommendations are given for bean crops under irrigated conditions in northwestern Mexico regarding land selection and preparation, var. selection, planting method, density, time, and date, and cultural practices. [CIAT]

0113

21086 SALADIN G., F. 1981. El cultivo de la habichuela. 3. parte. (Snap bean cultivation. Part 3). Agro(República Dominicana) 10(89):22-26. Span., 16 Refs., Illus.

Phaseolus vulgaris. Snap beans. Planting. Spacing. Mechanization. Intercropping. Weeding. Herbicides. Dominican Republic.

General information on snap bean cultivation practices is presented. It includes recommended planting densities, cultivation systems, mechanized planting, and weed control. A list of the major weed species in Dominican Republic is presented. [CIAT]

0114

22230 SANCHEZ, R. 1983. Recolecta mecanizada del fríjol común negro. (Mechanized harvest of black beans). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.89-90. Span.

Phaseolus vulgaris. Harvesting. Threshing. Agricultural equipment. Mechanization. Nicaragua.

Plants of black bean cv. Pijao were hand harvested, left in the field for predrying, and later threshed with a John Deere 955-S combine. Grain losses caused by the combine operation were not significant. It can be effectively used for threshing but some mechanical adjustments should be made before operation in the field. [CIAT]

0115

20634 SILVA, J.G. DA; FONSECA, J.R.; CONTO, A.J. DE 1983. A colheita mecanizada do feijao no Brasil. (Mechanized bean harvesting in Brazil). Informe Agropecuário 9(103):40-42. Port., 3 Refs. [Centro Nacional de Pesquisa de Arroz e Feijao, Caixa Postal 179, 74.000 Goiania-GO, Brasil]

Phaseolus vulgaris. Harvesting. Mechanization. Brazil.

General aspects on mechanical bean harvesting in Brazil, regarding available equipment, evaluation of grain losses, and on-going research, are discussed. Mechanical harvesting is possible only in monocropped beans. For an adequate use of harvesting equipment, the area should be flat, with the no. of bean rows being a multiple of the harvesting equipment; the harvesting devices should be adjustable to different planting spacings. Cutting should be conducted during early morning hours or during the night when the pods are humid; threshing with any device (harvester-thresher, stationary thresher, or others) should be done preferably in the afternoon when pods are dry. Data on bean losses and damage with 5 different machines are given. [CIAT]

0116

22672 SILVA, J.J.S.E. 1983. Avaliacao de resultados de pesquisa em macroparcela: espacamento e adubacao em feijoeiro (Phaseolus vulgaris, L.). (Evaluation of research results in macroplots: bean spacings and fertilization). Salvador-BA, Brasil, Empresa de Pesquisa Agropecuária da Bahia. Comunicado Técnico no.05. 8p. Port., 10 Refs. [Empresa de Pesquisa Agropecuária da Bahía, Unidade de Execucao de Pesquisa de Ambito Estadual de Barreiras, Caixa Postal 24, 47.800 Barreiras-BA, Brasil]

Phaseolus vulgaris. Irrigation. Planting. Spacing. Fertilizers. Nutritional requirements. Transfer of technology. Technology evaluation. Brazil.

In irrigated bean cv. IPA 74-19 macroplots of 1 ha, managed by farmers, traditional bean production technology was compared with improved technology. Improved technology (350,000 plants/ha, 70 kg seed/ha, 80 cm interrow spacing with 2 rows/ridge, 80 kg P + 50 kg N/ha) increased bean production 42% compared with traditional technology (undefined plant density, 50-70 kg seed/ha, 60-70 cm interrow spacing, 100 kg 5-25-12 NPK/ha + foliar urea). Production costs for the improved technology trial increased 28% compared with traditional technology, especially because of the increased use of inputs (urea and triple superphosphate) However, gross income increased 166% for improved technology. Economic and physical indicators are provided. [CIAT]

0117

22220 SOLIS M., F.; PAREDES, H. 1983. Control de malezas en fríjol común negro. (Weed control in black beans). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.65-67. Span.

Phaseolus vulgaris. Herbicides. Toxicity. Yields. Nicaragua.

A comparative trial with bean var. ICA-Pijao was conducted in 1981 in western Nicaragua to evaluate the effectiveness of 3 herbicides: EPTC plus R-25788 (2, 3, and 4 kg/ha); perfluidone (1.5, 2.0, and 2.5 kg/ha); and bentazon (2.0, 2.5, and 3.0 kg/ha). All herbicide treatments were 90% effective in controlling the most prevalent weeds; however, grain yields were low possibly due to herbicide toxicity. [CIAT]

0118

23287 VERASTEGUI C., J. 1980. Fertilización en dos variedades de fríjol (Phaseolus vulgaris L.), a dos densidades de población, en General Terán, N.L. 1978. (Fertilization of two bean varieties at two population densities in General Terán, N.L. 1978). Tesis Ing.Agr. Monterrey, México, Universidad Autónoma de Nuevo León. 45p. Span., Sum. Span., 19 Refs., Illus.

Phaseolus vulgaris. Cultivars. Planting. Spacing. Fertilizers. P. N. Yields. Mexico.

During the late cycle of 1978, an expt. was carried out in La Purísima field, municipality of General Terán (Nuevo León, Mexico) to determine the best combination of the factors: bean var. (Ciateño and Delicias), density (120 and 150 thousand plants/ha), and the fertilizers P (0 and 50 kg/ha) and N (0 and 50 kg/ha). Leafhoppers (Empoasca spp.), Mexican bean beetles (Epilachna varivestis), and bean pod weevils (Apion godmani) were observed. A highly significant difference was obtained among levels of all factors, the best being var. Ciateño planted at a density of 150,000 plants/ha and fertilized with 50-50 kg NP/ha. In 1st order interaction, significance was only found at the 0.01 level for the factors var. x density and at the 0.05 level for the factors var. x N. [AS (extract)-CIAT]

0119

24255 ZEPEDA A., S. 1984. Evaluación de herbicidas en fríjol solo. (Evaluation of herbicides in monocropped beans). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México. Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.62-68. Span.

Phaseolus vulgaris. Herbicides. Toxicity. Mexico.

Expt. were conducted in Zapopán (Jalisco, Mexico) to evaluate the effectivity of several herbicide mixtures applied at different doses in postemergence for the control of weeds in beans. The mixtures used were metolachlor + prometryn, metolachlor + linuron, and metolachlor + oxadiazon. The mixture metolachlor + prometryn, applied at 2.50 + 0.75 and 2.51 + 1.00 kg/ha, resp., gave the best control and uniform performance, as well as the highest yields (1.97 and 2.07 t/ha). The mixtures with oxadiazon showed less residual effect. As of the 6th wk. of the application none of the evaluated treatments were effective. [CIAT]

0120

24278 ZOEBL, D. 1984. Labour requirements in bean production; with special reference to Central Province, Kenya. Thika, Kenya, National Horticultural Research Station. Grain Legume Project. Technical Bulletin no.2. 39p. Engl., Sum. Engl., 26 Refs., Illus. [Grain Legume Project, National Horticultural Research Station. P.O. Box 220, Thika, Kenya]

Phaseolus vulgaris. Planting. Weeding. Harvesting. Fertilizers. N. P. K. Kenya.

Traditional methods of planting, weeding, and harvesting beans in Kenya, especially in the Central Province, are described and analyzed. General

conclusions and considerations on crop productivity are presented. Recommended methods for bean planting and fertilization are included. [CIAT]

See also 0026 0030 0051 0075 0080 0121 0123 0124 0127 0130 0131 0135 0139 0142 0144 0148 0150 0152 0204 0206 0221 0280 0322 0332 0346 0350 0361 0416

D03 Cultivation Systems: Intercropping, Rotational Crops

0121

23292 AGUILAR F., P. 1978. Formulación de recomendaciones para el cultivo de asociación maíz-fríjol en el área del Plan Puebla; definición de una metodología para la optimización de insumos de producción en el sistema maíz-fríjol. (Formulation of recommendations for maize/bean association in the area of Plan Puebla; definition of a methodology for the optimization of production inputs in the maize/bean system). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. Secretaría de Agricultura y Recursos Hidráulicos. 76p. Span., Sum. Span., 55 Refs., Illus.

Phaseolus vulgaris. Intercropping. Zea mays. Fertilizers. N. P. Dung. Spacing. Planting. Mexico.

Research was carried out to (1) recommend production practices for the maize/bean association, considering main production constraints in each of the agrosystems where this planting system is practiced in the Plan Puebla area (Mexico); (2) determine and describe a procedure to obtain the optimum economic treatment for the association. Exptl. and analytic methodologies used are described in detail. Recommendations are presented for the factors N, P, FYM, and plant density for beans and maize in association for one same procedure and different levels of capital investment. A better land use efficiency was observed in the maize/bean association since an av. of 1.22 ha would have to be planted with maize and beans in monocrop to equal the yield of 1 ha of the bean/maize association. [CIAT]

0122

23390 ALVARADO M., J.J. 1976. Dinámica de la extracción de N P y K y de algunos parámetros fisiológicos en asociaciones de Simsia amplexicaulis (Cav.) Pers. y Amaranthus spp. en dos densidades de población con fríjol (Phaseolus vulgaris L.). (Dynamics of N, P, and K uptake and of some physiological parameters in associations of Simsia amplexicaulis and Amaranthus spp. at two population densities with beans). Tesis Mag. Sc. Chapingo, México, Colegio de Postgraduados. Escuela Nacional de Agricultura. 108p. Span., Sum. Span., 25 Refs., Illus.

Phaseolus vulgaris. Intercropping. Weeds. Nutrient uptake. N. P. K. Leaf area. Fertilizers. Mexico.

The dynamics of N, P, and K uptake and of some physiological parameters (plant height, leaf area, and dry wt.) of 2 weeds (Simsia amplexicaulis and Amaranthus spp.) and of the bean crop were studied in 1975 at the expt. station of the Escuela Nacional de Agricultura (Chapingo, Mexico). Population density for beans was 15 plants/m². Data was collected on plant height, leaf area, dry wt., and N, P, and K uptake 25, 40, 55, and 90 days after bean emergence. Weeds flowered at 90 days and beans at 55 days. Simsia and Amaranthus dominated the bean crop, reducing its leaf area, dry

wt., and N, P, K uptake with respect to beans in monoculture. Reductions in bean yield in association are caused by the competition for N, P, and K and for other factors such as light and water. [AS (extract)-CIAT]

0123

24830 BRIOSO DE LEON, I.A.; NICOLAS A., A.; BRIOSO P., O. 1985. Rendimiento del fríjol (Phaseolus vulgaris L.) asociado con maíz (Zea mays L.) bajo diferentes arreglos espaciales y cronológicos en San Juan de la Maguana, República Dominicana. (Yield of beans associated with maize at different spatial and chronological arrangements in San Juan de la Maguana, Dominican Republic). Investigación 9(1):13-23,25-28. Span., Sum. Span., 11 Refs.

Phaseolus vulgaris. Intercropping. Zea mays. Planting. Yields. Timing. Dominican Republic.

An expt. was carried out in San Juan de la Maguana, Dominican Republic, using different planting periods and arrangements in the maize/bean association to determine with which spatial arrangement beans gave a better yield response, the optimum planting period for maize in order to enhance bean yields, and the equivalent land use. No statistically significative differences were found for bean yields for the variables planting period and arrangement. However, when yields of the bean/maize association were statistically analyzed in relation to prices, no significative differences were found for the planting period, but significative differences were observed for the spatial arrangement treatments, the best being the arrangement of 1 row of beans between 2 of maize. This arrangement allowed a better land use, presenting an index of 2.38 in relation to 1.10 presented by the arrangement of 7 rows of beans between 2 rows of maize. [AS (extract)-CIAT]

0124

24274 CHUELA B., M. 1984. Determinación de la dosis óptima económica de nitrógeno, fósforo y densidad de población en la asociación maíz-fríjol. (Determination of the optimum economic dose of nitrogen, phosphorus, and population density in the maize-bean association). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.160-165. Span.

Phaseolus vulgaris. Intercropping. Zea mays. Fertilizers. N. P. K. Spacing. Planting. Yields. Mexico.

An expt. with bean var. Garbancillo Zarco y Jal-13-B was carried out in El Carmen and Lomas de Tejeda (Jalisco, Mexico) to determine the optimum economical dose of N and P, and the optimum population density of beans in association with maize. N was applied at 0, 40, 80, or 120 kg/ha, P at 0, 20, 40, or 60 kg/ha, and beans were planted at 20, 30, 40, and 50 thousand plants/ha. Considered as a whole, the highest maize and bean yields were obtained in Lomas de Tejeda. For El Carmen, the best alternative with unlimited capital was the treatment with 80-20-0 NPK and 30 thousand bean plants/ha. In Lomas de Tejeda, the best option was 80-40-0 NPK and 50 thousand bean plants/ha. At both localities the best alternative with limited capital was 0-20-0 with 30 thousand bean plants/ha. [CIAT]

0125

24272 CHUELA B., M. 1984. Ensayo uniforme de fríjol voluble de la zona templada húmeda de México. (Uniform climbing bean trial in the humid

temperate zone of Mexico). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.145-150. Span.

Phaseolus vulgaris. Climbing beans. Germplasm. Cultivars. Intercropping. Zea mays. Yields. Mexico.

In 1983, 31 climbing bean materials were evaluated in association with maize in Zapopán (Jalisco, Mexico) to select germplasm suitable for the humid temperate zone of the country. The best materials for the association with maize were Cejita, Rosa de Castilla, Garbancillo Zarco, Michoacán 152, Cacahuate Chico, G-2268, and Jal-13-B with yields of 881, 836, 561, 884, 829, 937, and 953 kg/ha, resp. [CIAT]

0126

24275 DE LA PAZ, G.S. 1984. Evaluación de daños causados a la asociación maíz-fríjol por el complejo de insectos que la atacan y su dinámica poblacional en Los Altos de Jalisco. (Evaluation of the damage caused by the insect complex attacking the maize/bean association and their population dynamics in Los Altos de Jalisco). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.167-176. Span.

Phaseolus vulgaris. Intercropping. Zea mays. Diabrotica. Empoasca. Trialeurodes vaporariorum. Mexico.

The production potential of the association maize/beans without insect damage, the losses caused by the complex of soil insects and foliage pests, and the seasonal dynamics of the insect populations were determined in 1983 in Los Altos de Jalisco, Mexico. Also, the insect species attacking the crop were identified. The most severe pests in beans were Diabrotica spp., Empoasca spp., and Trialeurodes vaporariorum; Epilachna varivestis, Apion godmani, and Epicauta sp. were observed to a lesser extent. Highly significant differences for beans in monoculture were observed between treatments for yield. The most outstanding treatments were those with total chemical protection (1878 kg/ha) and chemical protection to the soil and foliage (1679 kg/ha). [CIAT]

0127

25329 DIAZ A., C.; RIOS B., M.J.; RIVERA, J.A. 1983. Evaluación de diferentes arreglos en el sistema de siembra maíz-fríjol en el oriente antioqueño. (Evaluation of different arrangements in maize-bean planting systems in eastern Antioquia). Revista ICA 18(4):251-259. Span., Sum. Span., Engl., 11 Refs., Illus. [Inst. Colombiano Agropecuario, Programa Maíz y Sorgo, Apartado Aéreo 51764, Medellín, Colombia]

Phaseolus vulgaris. Dwarf beans. Climbing beans. Intercropping. Zea mays. Yields. Income. Spacing. Planting. Relay crops. Colombia.

Maize, dwarf beans, and climbing beans were grown alone or in various arrangements of intercropping, associate cropping, or relay cropping to a total of 11 different treatments in Rionegro (Antioquia, Colombia). Grain yields and production economics were determined. The following arrangements were found sufficiently promising to warrant further studies: maize relayed by climbing beans; maize intercropped with dwarf beans and

relayed by climbing beans intercropped with dwarf beans; climbing beans grown as a sole crop; maize associated with and relayed by climbing beans; and maize intercropped with dwarf beans and relayed by climbing beans. It was found not recommendable to use the max. amount of harvests/yr in the maize-bean cropping system because of low net returns and the problems of crop management including pest and disease control. [Abstracts on Tropical Agriculture]

0128

23648 EDJE, O.T. 1982. Agroforestry: preliminary results of interplanting Gmelina with beans, maize or groundnuts. LUSO: Journal of Science and Technology 3(1):29-32. Engl., 11 Refs. [Crop Production Dept., Bunda College of Agriculture, P.O. Box 219, Lilongwe, Malawi]

Phaseolus vulgaris. Intercropping. Gmelina arborea. Yields. Agroforestry. Malawi.

In 1980 a trial was planted at Bunda College of Agriculture (Lilongwe, Malawi) to determine the possibility of growing Gmelina arborea trees in association with beans (cv. Nasaka), maize, or groundnut. Beans were planted at 5 cm between plants and 45 cm between rows, and trees at 3 m between plants and between rows. Bean yields were 1024 and 1292 kg/ha in monoculture and in association, resp. Results indicate that in the 1st year growing the 3 crops and Gmelina trees in association had no adverse effect on crop yield and tree growth. [CIAT]

0129

15285 EDJE, O.T.; KAO, Y.P.; MUGHOGHO, L.K. 1979. Seed, energy and protein yield in maize and bean association. Bean Improvement Cooperative. Annual Report 22:28-30. Engl.

Phaseolus vulgaris. Zea mays. Intercropping. Food energy. Proteins. Yields. Malawi.

Expt. were carried out at Bvumbwe Agricultural Research Station (Malawi) during the rainy season (Nov. 1976-April 1977) to compare the seed, energy, and protein yields of maize (cv. SR.52) and beans (cv. 336), both in monoculture and in association. The combined seed yield of both crops was 5790 kg/ha, which represents a 35% increase over monoculture. The mixed cropping system produced 37% more gross return than the mean of monocrops. Energy and protein yields from the association were 20,842 Mcal/ha and 625 kg/ha, resp. [CIAT]

0130

24944 ESCAMILLA H., L.G. 1979. Evaluación de la influencia del maíz (Zea mays L.) sobre el fríjol (Phaseolus vulgaris L.) en surcos apareados y de la combinación óptima de siembra en Apodaca, N.L. durante el ciclo verano-otoño de 1978. (Evaluation of the maize influence on beans in paired furrows and optimum combination of spacings in Apodaca, N.L., during the summer-autumn cycle of 1978). Tesis Ing.Agr. Nuevo León, México, Instituto Tecnológico y de Estudios Superiores de Monterrey. 52p. Span., Sum. Span., 38 Refs., Illus.

Phaseolus vulgaris. Intercropping. Planting. Spacing. Yields. Mexico.

During 1978 in the agricultural exptl. field and in the improved seed multiplication field of the Instituto Tecnológico y de Estudios Superiores de Monterrey (Nuevo León, Mexico), expt. were conducted to determine which

alternate planting combination of maize and beans produces the highest benefits from the economic point of view; the competition between maize (var. NLVS-1) and beans (var. Delicias 71) was also evaluated. No significative differences were found between the 2 fields, but a significative difference was found in the exptl. field and one highly significative in the multiplication field for the bean treatments. The best treatments were 5 furrows of maize and 1 of beans and 3 furrows of maize and 3 of beans. [AS (extract)-CIAT]

0131

23373 ESQUIVEL A., C. 1978. Respuesta de la asociación maíz-fríjol a ocho factores de la producción en las zonas I y II del Plan Puebla. (Response of the maize/bean association to eight production factors in zones I and II of Plan Puebla). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. Escuela Nacional de Agricultura. 310p. Span., Sum. Span., 35 Refs., Illus.

Phaseolus vulgaris. Intercropping. Zea mays. Planting. Spacing. Fertilizers. Timing. N. P. K. Dung. Plant habit. Mexico.

Seven expt. were carried out in the target area of Plan Puebla, Mexico, to generate production technology for the maize/bean association through a multifactorial research approach. Parameters evaluated were as follows: different doses of N, P, K, and dung; maize var.; bean growth habit; time of fertilizer application; bean population density; and the maize/bean association system. Vined bean var. yielded significantly higher than semivined var. Negro 150 at all exptl. sites. Bean population density showed little effect on yields and on the lodging of maize. In 6 expt. higher yields were obtained at higher bean population densities. Beans planted at 1/3 the distance between maize plants yielded higher and had lower maize lodging coefficients. Dung affected bean yields in 2 expt. only. Application of fertilizer in the 1st field operation of the bean crop resulted in higher yields in 4 expt. [AS (extract)-CIAT]

0132

25219 FUENTES S., D.E. 1983. Evaluación del sistema tradicional de producción maíz-fríjol asociado, utilizando tres genotipos de maíz (Zea mays L.), tres genotipos de fríjol voluble (Phaseolus vulgaris L.) y un genotipo de fríjol voluble (Phaseolus coccineus) en seis municipios de Chimaltenango. (Evaluation of traditional intercropped maize/bean production systems using three maize genotypes, three Phaseolus vulgaris climbing bean genotypes, and one Phaseolus coccineus climbing bean genotype in six municipalities of Chimaltenango). Tesis Ing.Agr. Guatemala, Universidad de San Carlos de Guatemala. 96p. Span., Sum. Span., 20 Refs., Illus.

Phaseolus vulgaris. Intercropping. Zea mays. Climbing beans. Genotypes. Yields. Growth. Guatemala.

During 1982 an on-farm survey was conducted in 6 municipalities in the western part of the Dept. of Chimaltenango, Guatemala, to evaluate 3 maize genotypes (2 improved and 1 native) as props for 4 improved climbing bean genotypes (1 of Phaseolus coccineus and 3 of P. vulgaris) under the traditional maize/bean intercropping agroecosystem and in terms of its yield, equivalent wt. of the system referred to maize, and gross income. Correlation analysis applied to maize and bean yields and to other characteristics showed a trend of complementarity between the intercropped species. Treatments with P. vulgaris genotypes did not present statistically significative differences among themselves; therefore it was

concluded that there are, effectively, new technological alternatives that offer better economic perspectives for the farmers of the area, whether they wish to use P. coccineus or P. vulgaris, and the new maize var. released by the Instituto de Ciencia y Tecnología Agrícolas. [AS (extract)-CIAT]

0133

24913 GARCIA G., F. DE J. 1978. Evaluación de la asociación de dos variedades de maíz (Zea mays L.) y dos de frijol (Phaseolus vulgaris L.) en Apodaca, N.L. durante la primavera de 1978. (Evaluation of the association of two maize and two bean varieties in Apodaca, N.L., during the spring of 1978). Tesis Ing.Agr. Nuevo León, México, Instituto Tecnológico y de Estudios Superiores de Monterrey. 69p. Span., Sum. Span., 40 Refs., Illus.

Phaseolus vulgaris. Intercropping. Zea mays. Yields. Yield components. Mexico.

During 1978, an expt. was conducted in the agricultural exptl. field of the Instituto Tecnológico y de Estudios Superiores de Monterrey (Nuevo León, Mexico) to compare maize (NLVS-1 normal and bush) and bean (Delicias 71 and Negro 66) yields in sole cropping and in association (in alternate furrows and intercropped in the same furrow) and to estimate which association produced greater economic benefits. The no. of pods/plant, no. of grains/pod, and bean yield were evaluated. Yield obtained from the normal maize/Delicias 71 bean association was the same as that obtained when planting normal maize in monocrop. The association affected bean and maize yields; this effect was accentuated in beans, regardless of the size of the maize plant with which it was associated. Regarding the shading effect of maize on beans, no difference was found that indicated that one of the maize var. produced a greater negative effect than the other. [AS (extract)-CIAT]

0134

24987 GERALDI, I.O. 1983. Método de análise estatística para combinacao de cultivares em consorcio. (Method of statistical analysis to combine cultivars in intercropping). Tese Doutor Agr. Piracicaba-SP, Brasil, Escola Superior de Agricultura Luiz de Queiroz da Universidade de Sao Paulo. 129p. Port., Sum. Port., Engl., 80 Refs.

Phaseolus vulgaris. Intercropping. Zea mays. Statistical analysis. Brazil.

An exptl. statistical methodology was developed to evaluate the performance of maize and bean cv. when grown alone or in intercropping systems. Yield trials were carried out in 1979-80 at Sete Lagoas, MG, Brazil, and comprised 6 bean cv. of different types and 6 maize cv. differing for plant height and genetic variability, totalizing 36 intercropping combinations. These were evaluated in 6 x 6 duplicated simple lattice design (4 replications) while the corresponding monocrops were evaluated in a completely randomized block design with 4 replications. The methodology proved to be highly effective in explaining the performance of the intercropped maize and bean cv. in relation to monocrops, as well as in identifying some characters which are favored by the intercropping system. The comparison of this methodology with the conventional ones showed that, among other aspects, the general effect of intercropping (c_{ij}) is more efficient than the LER for comparing the biological efficiency of different combinations. The best combinations of maize and bean under intercropping were those where a high complementation between the cv. (high general effect of intercropping) had occurred, on the contrary of the poorer combinations. In general, the most favorable combinations involved cv.

with high general competition ability and vice versa. Some exceptions occurred because of the magnitude of specific competition ability. Among the characteristics indicative of good performance of bean cv. under intercropping that were detected are high yield in monocrops, low yield reduction under intercropping, low interference with maize (low aggressivity), and earliness. Such characteristics should be taken as selection criteria in breeding programs for intercrops. [AS (extract)]

0135

23289 GODINEZ A., J.G. 1978. Influencia de las dosis de nitrógeno, fósforo y densidades de población de fríjol, en la asociación maíz-fríjol en parte de la zona IV del Plan Puebla. (Influence of nitrogen and phosphorus doses and bean population densities on the maize/bean association in areas of zone IV of Plan Puebla). Tesis Ing.Agr. Monterrey, México, Universidad Autónoma de Nuevo León. 118p. Span., Sum. Span., 20 Refs., Illus.

Phaseolus vulgaris. Intercropping. Zea mays. Fertilizers. N. P. Planting. Spacing. Mexico.

Three expt. were established in San Andrés Azumiatla, San Juan Tzicatlacoyatl, and La Libertad Tecola--sites of zone IV of the Plan Puebla area (Mexico)--to determine doses of N and P and bean population densities in association with maize which would permit increased unit yields and therefore, net income. Treatments used were as follows: 30, 60, 90, and 120 kg N/ha; 0, 30, and 60 kg P/ha; 20, 40, and 60 thousand bean plants with 40 thousand maize plants/ha. Highest bean and maize yields were found in San Andrés Azumiatla. At the 3 exptl. sites, yield responses were observed up to 90 and 60 kg N and P/ha for maize and beans, resp. Overall, bean populations affected maize yields. [AS (extract)-CIAT]

0136

23928 HANSEN, M.K. 1983. Interactions among natural enemies, herbivores, and yield in monocultures and polycultures of corn, bean, and squash. Ph.D. Thesis. Ann Arbor, University of Michigan. 299p. Engl., 477 Refs., Illus.

Phaseolus vulgaris. Intercropping. Zea mays. Biological control. Predators and parasites. Yields. Pests. Vegetable crops. Costa Rica.

The effect of intercropping on the population dynamics and interactions of natural enemies and herbivores, and their effect on plant yields were investigated. Cases of biological control were reviewed. Monocultures and polycultures of maize, beans, and squash were planted in Costa Rica. Total natural enemies, predators and parasitoids, behaved very differently. Parasitoid abundance was significantly higher in the most diverse system than in any other system, while predator abundance showed no consistent treatment effect. Predator abundance was most tightly linked to changes in herbivore abundance, while both vegetative (bean biomass) and floral (maize flowers) habitat space variables were of secondary importance. Differences in vegetative habitat space variables (but especially bean biomass) accounted for most of the variation in parasitoid abundance between plots, while herbivore abundance failed to correlate significantly with parasitoid abundance. The diversifying agricultural systems via intercropping might serve to help control pest populations and further minimize pesticide use. [CIAT]

0137

24209 INSTITUT DES SCIENCES AGRONOMIQUES DU BURUNDI. 1973. Cultures vivrieres. (Food crops). In _____. Rapport Annuel 1973. Bujumbura. pp.136-137. Fr.

Phaseolus vulgaris. Rotational crops. Cultivars. Yields. Dung. Burundi.

Data for 1973 are presented on food crops in the Murongwe Station, Burundi, Expt. with intensive rotational crops continued in 7 plots thanks to fertilization with manure of confined cattle. Bean var. Colorado yielded 961 kg/ha and suffered rust attack, which was controlled by spraying with Cuprexol. In another plot, bean var. 34 SB/44/I yielded 837 kg/ha. [CIAT]

0138

23326 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1966. Haricots. (Beans). In _____. Rapport Annuel 1966. Rubona. pp.D30-D31. Fr.

Phaseolus vulgaris. Rotational crops. Yields. Cultivars. Rwanda.

A trial was carried out with beans in rotation with other crops in Karama, Rwanda, during 1966. Var. Mixed Mexico yielded 1928 kg/ha in tropical black clayey soils (2nd season). When var. Wulma and Mixed Mexico were planted in the 7th place of the rotation, yields were 1584 and 1808 kg/ha, resp. In the 2nd planting season and occupying the 7th or 8th place in the crop rotation, var. Bayo, Wulma, and Mixed Mexico yielded 1467, 1376, and 2152 kg/ha, resp. It is concluded that after the 6th place in the crop rotation, bean yields are lower. It is recommended to leave the field to lie fallow or apply mineral fertilization. [CIAT]

0139

23388 LARIOS R., J.; TAH IUIT, J.F. 1983. Respuesta del sistema asociado maíz-fríjol a varios factores controlables de la producción, en el municipio de Coatepec, Estado de México. (Response of maize/beans in association to several controllable factors of production in the municipality of Coatepec, state of Mexico). Chapingo 8(40):70-76. Span., Sum. Span., Engl., 5 Refs.

Phaseolus vulgaris. Intercropping. Zea mays. Spacing. Planting. Fertilizers. N. P. Yields. Mexico.

An expt. was carried out in the municipality of Coatepec, state of Mexico, to develop a maize/bean associated cropping production technique. The response to the following 5 controllable factors of production was studied: N (84, 108, 120, 132, and 156 kg/ha); P (3, 21, 30, 39, and 57 kg/ha); maize population density (22, 34, 40, 46, and 58 thousand plants/ha); bean population density (33, 51, 60, 69, and 87 thousand plants/ha); bean var. (local and hybrid Negro 150). A split plot design was used with 4 replications and treatments were established according to a mixed matrix to optimize the factors of production. A differential response to fertilization was observed for each plant species. Bean var. Negro 150 gave a crop combination that yielded higher for both maize and beans. The best combination of plant densities was 60 and 40 thousand bean and maize plants/ha, resp., with 120 and 30 kg N and P, resp. With different growth habits of beans, the response to associated cropping differs. Increasing bean or maize plant densities adversely affects the companion crop. [AS-CIAT]

0140

24271 LEDESMA G., L.A. 1984. Ensayo uniforme de fríjol voluble. (Uniform climbing bean trial). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.141-144. Span.

Phaseolus vulgaris. Climbing beans. Germplasm. Cultivars. Intercropping. Zea mays. Selection. Yields. Mexico.

Eleven climbing bean materials were evaluated in association with maize in a uniform trial in 1983 to select material suitable for the humid temperate zone of Mexico. Selections G-2268 and P-503 were outstanding because of their yields: 1416 and 1138 kg/ha, resp. High precipitation favored bean growth and maize lodging. Disease incidence was low since, in general, all the materials were tolerant to Colletotrichum lindemuthianum and bacteriose. [CIAT]

0141

22546 McGILL JUNIOR, J.A. 1983. Dry bean production in Brazil. Michigan Dry Bean Digest 7(3):10-12. Engl., Illus.

Phaseolus vulgaris. Production. Cultivation systems. Intercropping. Relay crops. Fertilizers. Diseases and pathogens. Nitrogen fixation. Rhizobium. Brazil.

Four different aspects of bean research in Brazil are discussed. The 1st involves the production of beans in association with maize; the bean research program on multiple cropping systems at Centro Nacional de Pesquisa de Arroz e Feijao (CNPAF) is oriented toward the development of new technologies for intercropping and relay cropping systems. The 2nd deals with agronomy research on the management of fertilizers in order to increase their efficiency and the 3rd covers the objectives of the bean pathology program at CNPAF which are oriented toward the study of bean diseases of economic importance and the improvement of techniques for the development of multiple disease resistance in Phaseolus vulgaris. A last aspect of bean research in Brazil involves the increase of bean production through N fixation with emphasis on the reevaluation of common bean var. for their efficiency to fix N, the isolation of suitable Rhizobium phaseoli strains, and the exploration of various cropping systems and their relationship with nodulation. [CIAT]

0142

23378 MALDONADO A., M.A. 1980. Evaluación agroeconómica y energética de la capacidad de sustitución de diferentes métodos de laboreo a distintos niveles de fertilización nitrogenada en sistemas de maíz y fríjol. (Agroeconomic and energetic evaluation of the capacity of substituting different tillage methods at different levels of nitrogen fertilization in maize and beans). Tesis Mag.Sc. Turrialba, Universidad de Costa Rica. Centro Agronómico Tropical de Investigación y Enseñanza. 127p. Span., Sum. Span., Engl., 58 Refs., Illus.

Phaseolus vulgaris. Intercropping. Zea mays. Weeding. Herbicides. Costa Rica.

An expt. was carried out in Turrialba, Costa Rica, to determine the possibility of substituting zero tillage for conventional tillage. Three soil and vegetation management methods were used: chemical tillage,

burning, and plowing (conventional), at 4 N levels (0, 75, 150, and 225 kg/ha). Two zero tillage methods were also included, manual and chemical weeding, only with 150 kg N/ha. Evaluations were made on 3 consecutive cropping cycles: maize (rainy season), maize + beans (dry season), and maize (rainy season). Soil management practices were repeated during the 3 growing cycles; however, N was not applied during the 3rd cycle to evaluate the possible effect of residual N and its interaction with management practices. During the 2nd cycle, bean yields were higher under conventional tillage, probably because of excessive compaction of the soil and lack of proper O_2 supply in the sides of the planting hole in the unplowed plots. However, zero tillage managements were more profitable, less sensitive to price and cost fluctuations, and more efficient than plowing from the economic and energetics points of view. In general, zero tillage managements at low levels of N provided better results than conventional tillage at higher levels, which indicates possibilities for substitution. [AS (extract)]

0143

13210 MATTOS, P.L.P. DE; DANTAS, J.I.L. 1981. Utilizacao do cultivo da mandioca consorciada com feijao. (Use of cassava/bean intercropping). Cruz das Almas-BA, Brasil, Empresa Brasileira de Pesquisa Agropecuária. Centro Nacional de Pesquisa de Mandioca e Fruticultura. Circular Técnica no.02. 24p. Port., 13 Refs., Illus.

Also in Lavoura Set-Oct. 1982. pp.10-16.

Phaseolus vulgaris. Intercropping. Manihot esculenta. Zea mays. Planting. Spacing. Yields. Brazil.

Major characteristics of cassava/bean and cassava/maize/bean intercropping in the NE region of Brazil are described. Tables are included on the production of the federal units; major cultivation problems; effect of intercropping on cassava and bean yields; cassava production in association with beans, maize, rice, groundnut, soybean, and sorghum, and the results of research on various rows of beans planted between double rows of cassava. [CIAT]

0144

24273 MIER C., R. 1984. Fertilización de maíz asociado con fríjol de temporal con abonos orgánicos y químicos. (Fertilization with organic manures and chemicals of maize associated with rainfed beans). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.152-159. Span.

Phaseolus vulgaris. Intercropping. Zea mays. Fertilizers. N. P. Dung. Planting. Spacing. Yields. Brazil.

An expt. was carried out in Los Altos de Jalisco, Mexico, with bean var. Urbancillo Zarco and maize var. Amarillo Zamorano, to determine the optimum economical dose of N, P, and chicken manure, and the optimum population density in the association maize/beans. The optimum economical treatment with unlimited capital consisted of 40-30-0 NPK with 1 t of chicken manure, and 40,000 maize and bean plants/ha, resp., for a bean production of 797 kg/ha. The best alternative for the optimum economical treatment with limited capital consisted of 40-30-0 NPK with 40,000 and 25,000 maize and bean plants/ha, resp., for a bean production of 729 kg/ha. The application of 50 and 100 kg N/ha was not significant. [CIAT]

0145

23389 MONTES R., R. 1979. Incidencia de enfermedades en frijol (Phaseolus vulgaris L.) sembrado solo y asociado con maíz. (Disease incidence in beans planted alone and in association with maize). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 95p. Span., Sum. Span., 90 Refs., Illus.

Phaseolus vulgaris. Intercropping. Zea mays. Fromyces phaseoli. Colletotrichum lindemuthianum. Pseudomonas phaseolicola. Xanthomonas phaseoli. Plant injuries. Yields. Yield components. Mexico.

During the 1978 agricultural cycle, an expt. was conducted in Chapingo, Mexico, to study the influence of 4 production systems (beans in monoculture with and without trellises, beans in association with early maturing maize Zacatecas-58 and with late maturing maize Mexico 208) on the development of diseases caused by Fromyces phaseoli var. typica, Colletotrichum lindemuthianum, Pseudomonas phaseolicola, and Xanthomonas phaseoli. Bean var. used were Pinto Nacional, Flor de Mayo, and Bayo-164. Rust caused more severe damage to var. Flor de Mayo than to the other 2 var., Bayo-164 being the most tolerant. Infection by rust and halo blight was more severe in bean monocrop systems than in bean/maize associations. Common blight and anthracnose presented very slight symptoms, which were rarely detected in intercropping systems and more easily in monocrops. In all var. pod and seed no. and seed wt./plant were higher in associations with maize Zacatecas-58 than when grown alone. Lowest yields were obtained in associations with Mexico-208. A positive correlation was found between pods, seeds, and yield/plant, as well as between wt. and vol. of 100 seeds. [AS (extract)-CIAT]

0146

24061 MORENO, R.A. 1979. Algunos sistemas de producción de cultivos anuales de pequeños agricultores en el Istmo Centroamericano. (Some small farmer production systems of annual crops in the Central American Isthmus). In Curso sobre Control Integrado de Plagas en Sistemas de Producción para Pequeños Agricultores, Turrialba, Costa Rica, 1979. Documento presentado. Turrialba, Centro Agronómico Tropical de Investigación y Enseñanza. Programa de Cultivos Anuales. pp.35-65. Span., 5 Refs., Illus.

Phaseolus vulgaris. Relay crops. Cultivation systems. Precipitation. Cultivation. Central America.

The broad production range of annual crops existing among small farmers in the Central American Isthmus is analyzed, using rainfall as the determinant variable and with examples organized according to rainfall pattern in: (1) humids tropics-without dry season, with lightly pronounced dry season, and with marked dry season; (2) dry humid tropics-lightly pronounced interestival dog days and pronounced interestival dog days (1500 and less than 1000 mm total annual rainfall). In the humid tropics with marked dry season maize and beans are planted, with risky harvesting; rice and covered beans are sown mainly in the 2nd planting to take advantage of the dry season for harvesting. For the dry tropics with lightly pronounced interestival dog days, with approx. 1500 mm annual precipitation, the maize and bean relay production system is analyzed. [CIAT]

0147

19723 PEREIRA FILHO, I.A. 1981. Estudo do consórcio de feijao com milho de diferentes arquiteturas. (Study on intercropping beans with maize of different architectures). Maceió-AL, Brasil, Empresa de Pesquisa

Agropecuária do Estado de Alagoas. Pesquisa em Andamento no.03. 2p. Port.

Phaseolus vulgaris. Intercropping. Zea mays. Yields. Brazil.

Bean cv. Rim de Porco was intercropped with maize (cv. Centralmex of normal size, Pirañao short type and Erecta of normal size and erect leaves) at Santana do Ipanema, Brazil, to identify the most productive maize cv. that affects bean yields the least. While the highest bean yield in association (562 kg/ha) was obtained from intercropping with Erecta (3387 kg/ha), the other 2 maize var. yielded more whether alone or in association. The LER was also higher for Erecta (1.56) than for Centralmex (1.41) and Pirañao (1.37). Rim de Porc alone yielded 887 kg/ha. [CIAT]

0148

20619 RAMALHO, M.A P. 1983. Mecanizacao do cultivo consorciado de milho e feijao. (Mechanization of beans/maize in association). Informe Agropecuário 9(103):36-40. Port., 6 Refs., Illus. [Centro Nacional de Pesquisa de Milho e Sorgo, Caixa Postal 151, 35.700 Sete Lagoas-MG, Brasil]

Phaseolus vulgaris. Intercropping. Zea mays. Mechanization. Planting. Weeding. Agricultural equipment. Brazil.

The efficiency, construction, and adaptation of hand-operated or animal-pulled mechanical aids for simultaneously planted bean/maize associations, especially for small farmers in Minas Gerais, Brazil, are discussed. These include a planter, a cultivator, herbicide and fertilizer applicators, and a device for applying granulated or liquid insecticides which can be attached to the planter. [CIAT]

0149

24152 SALINAS G., C.F. 1982. Comportamiento de variedades de fríjol (Phaseolus vulgaris L.) en cultivo y en asociación con maíz (Zea mays L.). (Performance of bean varieties in monoculture and in association with maize). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 159p. Span., Sum. Span., 101 Refs., Illus.

Phaseolus vulgaris. Cultivars. Intercropping. Determinate cultivars. Indeterminate cultivars. Dwarf beans. Climbing beans. Fertilizers. N. P. Growth. Yields. Yield components. Mexico.

At the Xaltepa exptl. agricultural field of the U. Autónoma de Chapingo, Mexico, the effect of beans in monoculture and in association with maize on the establishment of different growth types was determined. Bean var. Canario 107 (determinate growth and bush type), Pinto Nacional (indeterminate growth and short semivining type), and Michoacán-150 (indeterminate growth and climbing long vine type), and maize var. Zacatecas-58 (early maturing and short) and Mexico-208 (late maturing and tall) were used. In addition, 2 levels of fertilization (0-0-0 and 100-100-0) were included. Parameters considered were days to beginning and end of flowering, length of main vine, no. of pods/plant, no. of seeds/pod, wt. of 100 seeds, yield/plant and per ha. Beans of determinate growth habit bush type adapt better to the association with maize, while the other 2 can be planted in monoculture or in association. Fertilization had a significant effect on bean yield/plant only when it was planted in monoculture. [AS (extract)-CIAT]

0150

23144 SANCHEZ G., M.A.; MATA V., H.; URIBE V., G.; AGUILAR C., G.; RODRIGUEZ R., R. 1984. Guía para producir maíz asociado con fríjol IB y calabaza en el sistema roza-tumba-quema de Yucatán. (Handbook to produce maize in association with IB beans and pumpkin in the slash/burn system in Yucatán). Mérida, Yucatán, México, Instituto Nacional de Investigaciones Agrícolas. Secretaría de Agricultura y Recursos Hidráulicos. Folleto para Productores no.5. 16p. Span., Illus. [Campo Agrícola Exptl. de Uxmal, Apartado Postal 50 Suc. D, Mérida, Yucatán, México]

Phaseolus vulgaris. Zea mays. Intercropping. Land preparation. Cultivars. Planting. Fertilizers. Weeding. Insect control. Mexico.

Recommendations are given on cultural practices to increase yields in the slash/burn system used in Yucatán, Mexico, to produce bean/maize/pumpkins in association. Cultural practices for beans focus on land preparation, water collector construction, planting date and system, sowing rates, fertilization, weed control, and harvesting. Red mottled bean var. are recommended. [CIAT]

0151

19789 SERPA, J.F.S.; BARRETO, A.C. 1983. Avaliacao de cultivares de sorgo granífero, no consórcio com o feijao (Phaseolus vulgaris L.) e com o algodao herbáceo na Microrregiao Homogenea 130 do Estado de Sergipe. (Evaluation of grain sorghum in association with beans and herbaceous cotton in Microrregiao Homogenea 130 of the state of Sergipe). Aracaju-SE, Brasil, Empresa Brasileira de Pesquisa Agropecuária. Pesquisa em Andamento no.13. 3p. Port.

Phaseolus vulgaris. Intercropping. Sorghum. Yields. Gossypium hirsutum. Brazil.

Two trials were conducted at Poco Verde and Peco Redondo (SE, Brazil), to test 5 grain sorghum cv. in association with bean cv. IPA 74-19 and with beans + cotton at the resp. sites. At Poco Verde a 1:3 spatial arrangement was used (1 row sorghum:3 rows beans, equivalent to plant densities of 100,000 and 150,000/ha, resp.) and at Poco Redondo, a 1:2:1 spatial arrangement was used with 100,000, 100,000, and 25,000 sorghum, bean, and cotton plants/ha, resp. In the bean/maize association, bean yields ranged between 798-907 kg/ha, while in the bean/sorghum/cotton association, they ranged between 646-736 kg/ha. [CIAT]

0152

22138 SERPA, J.F.S.; BARRETO, A.C. 1982. Avaliacao de cultivares de algodao herbáceo e de arranjos espaciais na consorciacao com o milho e o feijao, na Microregiao Homogenea 130 do Estado de Sergipe. (Evaluation of herbaceous cotton cultivars and of spatial arrangements in association with maize and beans in the Microrregiao Homogenea 130 of the state of Sergipe). Aracaju-SE, Brasil, Empresa Brasileira de Pesquisa Agropecuária. Unidade de Execucao de Pesquisa de Ambito Estadual de Aracaju. Pesquisa em Andamento no.4. 3p. Port. [Unidade de Execucao de Pesquisa de Ambito Estadual de Aracaju, Caixa Postal 44, 49.000 Aracaju-SE, Brasil]

Phaseolus vulgaris. Intercropping. Zea mays. Gossypium hirsutum. Spacing. Planting. Brazil.

Two cotton cv. were intercropped with maize and bean cv. IPA 74-19 at Poco Verde, SE, Brazil, to evaluate the effect of the following 3 spatial

arrangements on yields: (a) maize-beans-cotton-beans, (b) maize-beans-cotton-cotton-beans, and (c) maize-cotton-beans-beans-cotton. Beans alone yielded 1460 kg/ha, while beans produced 818.7 and 748.0 kg/ha in association (a) with both cotton cv., 637.0 and 638.0 kg/ha in association (b), and 701.8 and 717.0 kg/ha in association (c). The highest land use efficiency index (1.43) was obtained with spatial arrangement (a). [CIAT]

0153

22139 SERPA, J.E.S.; BARRETO, A.C. 1982. Competicao de cultivares de milho em consorciacao com o feijao na Microregiao Homogenea 130 do Estado de Sergipe. (Competition of maize cultivars in association with beans in the Microrregiao Homogenea 130 of the state of Sergipe). Aracaju-SE, Brasil, Empresa Brasileira de Pesquisa Agropecuária. Unidade de Execucao de Pesquisa de Ambito Estadual de Aracaju. Pesquisa em Andamento no.5. 3p. Port. [Unidade de Execucao de Pesquisa de Ambito Estadual de Aracaju, Caixa Postal 44, 49.000 Aracaju-SE, Brasil]

Phaseolus vulgaris. Zea mays. Intercropping. Yields. Brazil.

Ten maize cv. were evaluated in association with bean cv. IPA 74-19 at Poco Verde, Brazil, to identify suitable maize cv. for intercropping with beans. The spatial arrangement used was 1:3 (1 maize row/3 bean rows) with plant densities of 25,000 and 150,000 plants/ha, resp. In general, bean yields in association were reduced 36.55% compared with sole cropped beans (1564 kg/ha). No significant differences between bean yields in association with the various maize cv. were found, ranging between 767.3-1103.3 kg/ha. The highest land use efficiency ratio, 2.32, was obtained with maize cv. Composto Arquitetura. [CIAT]

0154

24277 VIEIRA, C. 1985. O feijao em cultivos consorciados. (Beans in associated cropping systems). Vicosa-MG, Brasil, Universidade Federal de Vicosa. 140p. Port., 149 Refs., Illus.

Phaseolus vulgaris. Intercropping. Zea mays. Manihot esculenta. Coffee arabiga. Saccharum officinarum. Sorghum vulgare. Gossypium hirsutum. Oil crops. Brazil.

Research on beans in different associated cropping patterns and with various crops is reviewed. The following aspects of bean/maize association are discussed: folding of maize, bean and maize cv., plant populations, spatial arrangements, relative bean planting dates, diseases and insect pests, fertilization, atmospheric N fixation, weed control, environmental effects, simultaneous bean/maize mechanical plantings, economic considerations, use of maize as a support for climbing beans, and bean/maize associations between cropping seasons. Recommendations for bean/maize associations are given for Minas Gerais, western and southwestern Paraná, and regions of Bahía. Other associations discussed are beans with cassava (1, 2, and 5 rows), coffee, sugar cane, sorghum, maize and cotton, maize and castor oil plant, peanuts, or sunflower. [CIAT]

0155

24992 ZOEBL, D. 1984. Trials on bean/maize intercropping, as re-assessed by a farming systems economist. Farming System Newsletter no.18:10-19. Engl., 13 Refs.

Phaseolus vulgaris. Intercropping. Zea mays. Planting. Spacing. Economics. Kenya.

An agronomy trial on plant density of beans when intercropped with maize was reassessed on its economic merits and its applicability for various target groups of Kenyan farmers. The trial recommended the intercropping of 1 or 2 rows of beans in between maize rows based only on yield increase. Economic analysis indicated that it is not significant to increase to 2 rows of beans in between maize rows, in terms of additional costs of required inputs and labor, nor do 2 rows of beans produce a higher benefit of protein balance and of carbohydrates for the family. [CIAT]

See also 0113 0162 0196 0199 0290 0300 0322 0327 0332 0346 0348 0364 0416

D04 Seed Production

0156

22237 VANEGAS, J.A. 1983. Producción de semilla básica de fríjol común. (Basic bean seed production). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común *Phaseolus vulgaris* L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.116-118. Span.

Phaseolus vulgaris. Cultivars. Seed production. Nicaragua.

Nineteen bean var. have been released for production of basic seed in Nicaragua, of which 7 are local var. and 4, CIAT introductions. A list of the var. containing information on origin, seed color, seed use, and production is presented. [CIAT]

See also 0108 0426

D05 Varietal Trials

0157

24248 ALEMAN M., V.; CHUELA B., M. 1984. Ensayo regional de rendimiento. (Regional yield trial). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigaciones del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.19-24. Span.

Phaseolus vulgaris. Germplasm. Cultivars. Adaptation. Yields. Selection. Mexico.

Regional yield trials (20 bean lines and var.) were planted in Tepatitlán, Arandas, Lagos de Moreno, and El Carmen (Mexico) to identify promising materials based on their resistance to diseases, stability, and high yield. In Tepatitlán, the highest bean yields were obtained with lines A-195 and II-952-11-18 (627 and 524 kg/ha, resp.). In Arandas, line VII-13-CH-73 gave the highest yield (918 kg/ha). In Lagos de Moreno, the av. yield was 2100 kg/ha and the highest production was obtained with var. Bayo Zacatecas (3029 kg/ha). In El Carmen, lines II-951-11-18 and 1407 gave the highest yields (1500 kg/ha). [CIAT]

0158

24249 ALEMAN M., V.; CHUELA B., M. 1984. Ensayo uniforme de rendimiento de la zona templada húmeda. (Uniform yield trial in the humid temperate zone). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigaciones del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.25-29. Span.

Phaseolus vulgaris. Germplasm. Cultivars. Selection. Adaptation. Yields. Mexico.

In 1983 uniform yield trials were established in Tepatitlán and El Carmen (Mexico) to select high yielding bean materials with good adaptation and stability. In El Carmen, the av. yield was 1800 kg/ha and the best lines were II-952-M-135 (2372 kg/ha) and 997-CH-73 (2356 kg/ha). In Tepatitlán, the yields of the best 9 materials ranged between 907-1608 kg/ha, with line (220-XB-158)-2-1-1 being outstanding. The highest yielding lines were the most tolerant to diseases. [CIAT]

0159

24880 ARREDONDO A., J. 1980. Evaluación de rendimiento de 20 líneas de fríjol Phaseolus vulgaris L. tolerantes al mosaico común. (Yield evaluation of 20 bean lines tolerant to common mosaic). Tesis Ing.Agr. San Luis Potosí, México, Universidad Autónoma de San Luis Potosí. 50p. Span., Sum. Span., 15 Refs., Illus.

Phaseolus vulgaris. Germplasm. Cultivars. Adaptation. Technology evaluation. Yields. Resistance. Bean common mosaic virus. Mexico.

Agronomic performance (yield and resistance to BCMV) of 19 bean lines and one control, var. Flor de Mayo, was observed during the 1979 agricultural spring-summer cycle, under irrigated conditions at the exptl. field of the College of Agronomy, U. Autónoma de San Luis Potosí, Mexico. Parameters measured were days to emergence, first flower, last flower, and maturity; plant height; no. of pods/plant; no. of grains/pod, growth habit; wt. of 100 seeds; yield; and development of the diseases BCMV, root rot, and rust. Av. yield was 2289 t/ha. Among BCMV-free genetic material, the exptl. line II-330A-MPR-2-1-1 yielded highest (3124 t/ha). In spite of having phytopathological problems with BCMV, Flor de Mayo gave the highest yield (3645 t/ha). [AS (extract)-CIAT]

0160

22670 BAGGETT, J.R.; VARSEVELD, G.W. 1982. Green beans tested for yield and quality. Oregon Vegetable Digest 31(2):1-6. Engl.

Phaseolus vulgaris. Snap beans. Germplasm. Yields. Seed characters. Cultivars. Canned beans. USA.

The results of the evaluations of new breeding lines of snap beans for processing in Oregon, USA, during 1981 are presented. Two lines, Oregon 43 and Oregon 55, were released officially. The yields of 38 lines of 2 plantings and the canned green bean quality scores (color, appearance, texture, flavor, and flesh) are presented in table form. [CIAT]

0161

23376 CASTRO A., M. 1957. Fríjol variedades ejoteras y variedades comunes. (Evaluación del rendimiento en grano). [Snap bean and dry bean

varieties. (Evaluation of grain yield)]. Tesis Ing.Agr. Chapingo, México, Escuela Nacional de Agricultura. 49p. Span., Sum. Span., 27 Refs., Illus.

Phaseolus vulgaris. Cultivars. Yields. Adaptation. Snap beans. Apion godmani. Epilachna varivestis. Empoasca fabae. Colletotrichum lindemuthianum. Uromyces phaseoli. Pseudomonas phaseolicola. Xanthomonas phaseoli. Erysiphe polygoni. Bean common mosaic virus. Mexico.

The yield of 14 snap bean var. was assessed in El Horno exptl. field, Chapingo, Mexico. Highly significant differences were found for var. and significant differences for replications. Var. Tendergreen and Ferry's Plentiful are recommended when snap bean prices are low; these can be left to mature to be sold as dry grain. The major bean pests and diseases are briefly described as well as their control measures in the Chapingo region. [AS (extract)-CIAT]

016.2

24270 CHUELA B., M. 1984. Ensayo uniforme de fríjol semivoluble de la zona templada húmeda de México. (Uniform semiclimbing bean trial in the humid temperate zone of Mexico). In Centro de Investigaciones Agrícolas de El Bajío, México. Programa de Fríjol. Informe Anual de Investigaciones del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos, Instituto Nacional de Investigaciones Agrícolas. pp.136-140. Span.

Phaseolus vulgaris. Germplasm. Intercropping. Zea mays. Climbing beans. Adaptation. Yields. Selection. Mexico.

The uniform semiclimbing bean trial was sown in association with maize (35,000 maize plants and 70,000 bean plants/ha) in 1983 in Zapopán (Jalisco, Mexico) to select materials for adaptation, disease resistance, yield, and other characteristics for the humid temperate zone of Mexico. Some bean materials affected maize yields more than others, and var. Michoacán 15 reduced maize yield the most. Highly significant differences were observed between yields of the different bean materials. The most outstanding bean lines were G-2829, G-879, II-952-M-76, and P-364, with yields of 1098, 811, 665, and 606 kg/ha, resp. [CIAT]

016.2

23316 DELEPIERRE G., M.; TWAGIRUMUGABE, A. 1974. Groupe des plantes vivrieres. (Group of food crops). In Institut des Sciences Agronomiques du Rwanda. Rapport Annuel 1974. Rubona. 6p. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Adaptation. Yields. Intercropping. Rotational crops. Zea mays. Sorghum vulgare. Rwanda.

Information is given on the collection (1st and 2nd season crops), improvement, and cultural experimentation with food crops in Rwanda during 1974. A large part of the collection was planted on small plots (less than 1 ha). During the 1st season, 22 bean var. were planted and yields/ha varied from 901 kg for Mixed Mexico to 4592 kg for Nyiramahoro. During the 2nd season, 15 var. were planted and yields/ha varied from 178 kg for Mexico 142 to 1057 kg for Nyiramahoro. During 2 seasons a comparative trial was conducted with 16 var. and 6 replications. During the 1st season, var. Nyiramahoro outyielded the control Wulma (2916 and 2742 kg/ha, resp.), these 2 var. being significantly superior to the rest (P = 0.05 and P = 0.01). During the 2nd season Nyiramahoro also outyielded No. 49, Wulma, and Colorado (P = 0.05). Bean and maize monocrops were more

productive but the maize/bean association was more profitable. Fertilization in the bean-sorghum rotation did not have significative effects. [CIAT]

0164

24215 DEMOL, J. 1980. Recherches sur les légumineuses a graines. (Research on grain legumes). In _____. Rapport de mission au Burundi. Gembloux, Belgique, Faculté des Sciences Agronomiques de l'Etat. pp.22-24. Fr.

Phaseolus vulgaris. Plant introductions. Germplasm. Cultivars. Adaptation. Technology evaluation. Yields. Burundi.

Information is given on exptl. work with Phaseolus vulgaris in Burundi during 1980. Local and foreign material from Holland, Belgium, France, Colombia, Zaire, and Rwanda were evaluated. Screening trials were conducted in Mosso and Kisozi, and also definite trials during the 1st season. Performance of var. Calima during the 1st season is highlighted; this var. presents low % of damaged seed and, furthermore, the seed is relatively large. Multilocational trials were conducted in Imbo, Mparambo, Mosso, Murongwe, Gisha (Gyozi), Rutegama (Gitega), Rwira, and Kisozi, with the following var.: Farama var. 1/2, 0762 Mixed Mexico, Bayo 164, 0688 Colorado, ICA (Bunsi), Diacol Calima, and MEP 2 (the last 3 from CIAT). A list is presented of 14 trials conducted during the 2nd season of 1979-80 on (a) yield and var. adaptation; (b) IBYAN trials (CIAT-Colombia); (c) preliminary trials; and (d) seed collection, purification, and multiplication. [CIAT]

0165

24217 DEVOS, P. 1981. Sélection de la variété de haricot nain Diacol Calima. (Selection of the bush bean variety Diacol Calima). Bujumbura, Institut des Sciences Agronomiques du Burundi. Departement de la Production Végétale. Note Technique. 10p. Fr., Sum. Fr., Illus. [Institut des Sciences Agronomiques du Burundi, B.P. 795, Bujumbura, Burundi]

Phaseolus vulgaris. Dwarf beans. Cultivars. Adaptation. Germplasm. Technology evaluation. Timing. Flowering. Harvesting. Spacing. Yields. Yield components. Resistance. Colletotrichum lindemuthianum. Burundi.

Information is given on the 1st phase of bush and semiclimbing bean var. selection in Burundi during 1981. Six var. (Farama var. 1/2, 0762 Mixed Mexico, Bayo 164, 0688 Colorado, Bunsi, and Diacol Calima) were compared in various different alt. regions (Mosso, Imbo, Murongwe during 2 seasons; Gisha, Rutagama, Rwira, and Kisozi during 1 season). The parameters observed were time to 1st flowering and to harvest, final stand, no. of pods/plant (20 plants), dry seed wt. of the elementary plot, yield, damaged seed, and wt. of 1000 seeds. There were highly significative differences between var. and treatments, as well as for the var. x locality interaction. Var. Diacol Calima (introduced from CIAT in 1974) outyielded the other var. significantly. Farama var. 1/2, introduced from Rwanda in 1975 and already diffused in the region, occupied 2nd place. Var. Diacol Calima presented 1,[illegible] kg/ha, 14.2% damaged seed, 22.3 plants/m², 4.3 pods/plant, and 54.2 g/1000 seeds. Farama var. 1/2 is recommended for alt. below 1250 m and Diacol Calima for alt. between 1200-2000 m. Var. 0762 Mixed Mexico (bad quality seed, susceptible to anthracnose), Bayo 164 (bad quality seed), and Bunsi were eliminated, even though the latter, together with Diacol Calima, was one of the least susceptible to anthracnose. [CIAT]

0166

24915 ENRIQUEZ C., J.A. 1977. Ensayo comparativo de 18 variedades de frijol (Phaseolus vulgaris, L.) y contenido de proteína en la planta de 9 variedades de guía en Apodaca, N.L. primavera de 1975. (Comparative trial of 18 bean varieties and plant protein content of 9 climbing varieties in Apodaca, N.L., spring of 1975). Tesis Ing.Agr. Nuevo León, México, Instituto Tecnológico y de Estudios Superiores de Monterrey. 72p. Span., Sum. Span., 32 Refs.

Phaseolus vulgaris. Cultivars. Plant habit. Maturation. Yields. Yield components. Protein content. Mexico.

During 1975 in the agricultural exptl. field of the Instituto Tecnológico y de Estudios Superiores de Monterrey (Nuevo León, Mexico), growth habit, chlorosis, wt. of foliage, earliness, seed yield, no. of grains/pod, and amount of protein in the plants of 18 bean var. and lines were evaluated. Var. S. Agrarista, Delicias 71, Negro Huasteco, Matamoros 64, and Jamapa yielded highest. Vined and semivined var. gave the highest production. Var. C. Garbancillo, Flor de Mayo, and Matamoros 64 presented protein contents of 15.9, 15.4, and 15.1%, resp. [CIAT]

0167

23308 FISCHER, V. 1978. Essai comparatif varietal de haricots nains et volubiles a Karama. (Comparative varietal bean trial with bush and climbing beans in Karama). Rubona, Institut des Sciences Agronomiques du Rwanda. Note Technique no.2. 32p. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Dwarf beans. Climbing beans. Yields. Technology evaluation. Economics. Rwanda.

During 1975-77, promising bush and climbing bean var. were compared to determine the causes of reduced acceptance of the former in the traditional rural environment in Karama (Rwanda). Climbing var. were No. 54, Amarillo 156, Wulma, Ibundu, Urumira, Bayo 158, 7093, 7094, 7095, and 7096. Bush var. were 1/2, No. 11, Rouge, Extra Hatif, Saxa, Princesse Gordon, and Prenel. Recent colluvium soils from Lake Kilimbi and from the dry valleys of Maza were used. Partial and final results are presented. It is recommended to continue the diffusion of var. 1/2 and 54 which associate well with var. 11, Rouge, and Bayo 158 in the rural environment. Var. 11 has already been introduced; var. Rouge and Bayo 156 must be multiplied. Bean yields were higher in recent colluvium soils from the lake, with a greater field capacity and less rainfall shortage. A brief economic analysis of climbing and bush var. production is presented. Due to the need to use props, production of climbing beans cannot substitute bush var. in the region of Bugesera, unless the climbing var. yield over 400 kg/ha. [CIAT]

0168

22933 GAMBOA M., R. 1980. Evaluación de 13 variedades de frijol tipo voluble y 12 de tipo arbustivo, color bayo en siembra de invierno para la Costa Central. (Evaluation of 13 climbing and 12 bush bay-colored bean varieties, in the winter planting on the Central Coast). Tesis Ing.Agr. Ima, Perú, Universidad Nacional Agraria La Molina. 75p. Span., Sum. Span., 38 Refs.

Phaseolus vulgaris. Cultivars. Dwarf beans. Climbing beans. Adaptation. Plant introductions. Technology evaluation. Yields. Yield components. Resistance. Uromyces phaseoli. Viroses. Peru.

During the winter season of 1978, commercial and promising var. (12 bush and 13 climbing) were evaluated for yield at the Chacrilla I field of the U. Nacional Agraria La Molina, Peru. Bush var. were slightly late maturing, presented an av. of 9 pods/plant with 4 grains/pod, and did not present lodging. Eight var. were indehiscent and 4 dehiscent; grains were well accepted commercially and all var. were severely attacked by Oidium, viroses, and leaf miners. The most outstanding yields were shown by Canario Dives 8120, Bayo Chimú, Brasil 2, and Café Claro Chato with 1462, 1432, 1397, and 1255 kg/ha, resp. Climbing var. reached physiological maturity at 150 days, were late maturing, and yielded an av. of 12 pods/plant with 4-5 grains/pod. They presented slightly inclined lodging, showed dehiscence, and the seed was of commercial quality, bay-colored, and of medium size (av. wt. of 42 g/100 seeds). These var. were outstanding for their rusticity, resistance to rust, tolerance to Oidium and to viruses. Var. Promesa 2, U.A.-105, Lima 1, and Bayo F-1, yielding 1900, 1838, 1791, and 1790 kg/ha, resp., were considered promising. [AS (extract)-CIAT]

0169

22204 HERRERA, M.; LLANO G., A. 1983. Ensayos regionales de rendimiento con variedades locales e introducidas de fríjol común rojo en tres regiones de Nicaragua. (Regional yield trials with local and introduced red bean varieties in three regions of Nicaragua). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.19-20. Span.

Phaseolus vulgaris. Cultivars. Yields. Yield components. Selection. Adaptation. Nicaragua.

Thirteen local and introduced bean var. were evaluated for their yield in 3 different regions of Nicaragua. Five trials were planted (Campos Azules, La Concordia, Samulalí, Condega, and La Compañía) using a randomized complete block design with 3 replications. Data on days to flowering, plant height, days to maturity, yield, and yield components were recorded. Days to 1st flower ranged between 31-40 for Orgulloso and Bat-37, resp. Plant height ranged between 33-152 cm for Orgulloso and C-13R, resp. Bat-202 showed the highest no. of pods/plant (11.25), while Bat-896 had the highest no. of seeds/pod (6.26). A-21 and H-46 showed the highest wt./100 seeds. The highest av. yield of all bean var. was recorded at Condega (1941 kg/ha). [CIAT]

0170

22205 HERRERA, M.; LLANO G., A. 1983. Evaluación de variedades de fríjol común negro en siembras de primera y postrera. (Evaluation of black bean varieties in first and second plantings). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.21-23. Span.

Phaseolus vulgaris. Cultivars. Selection. Maturation. Yields. Yield components. Nicaragua.

Twenty-three black bean var. were evaluated during the 1st and 2nd planting seasons of 1981 at Campos Azules and La Compañía (Nicaragua), resp. Data on days to flowering and to harvest, plant height, yields, and yield components were recorded. Bat-304 and Bat-920 were the earliest maturing

var. (79 days). Var. Talamanca and G-4524 showed the highest no. of seeds/pod: 6.57 and 6.02, resp. The av. wt./100 seeds was approx. 20 g, the highest being 23.25 g for var. 77-EP-55. The highest yielding var. were Porrillo Sintético, Pijao, Jamapa, Bat-304, Jutiapan, and Quetzal with yields ranging between 1427-1946 kg/ha. [CIAT]

0171

22202 HERRERA, M.; LLANO G., A. 1983. Evaluación de 23 variedades de frfjol común rojo. (Evaluation of 23 red bean varieties). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del frfjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.15-16. Span.

Phaseolus vulgaris. Cultivars. Selection. Yields. Yield components. Nicaragua.

Twenty-three red bean var. were planted at Campos Azules (Masatepe, Nicaragua) to evaluate their agronomic performance for future use. A randomized complete block design with 5 replications was used. The highest yielding var. were A-21, Upala Rojo, and Rojo Nacional. The tallest var. were BAT-795 and Rojo Nacional. Upala Rojo and BAT-340 showed the highest no. of pods/plant and Orgulloso, BAT-340, BAT-789, Ex Rico 23, and BAT-1138 the highest no. of seeds/pod. Var. G-13R, A-21, H-46, and El Salvador-67 showed a 100-seed wt. over 20 g/100 seeds. [CIAT]

0172

24216 INSTITUT DES SCIENCES AGRONOMIQUES DU BURUNDI. 1981. Groupe des légumineuses. (Legumes). In _____. Rapport Annuel 1981. Bujumbura. pp.1-12. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Yields. Yield components. Plant introductions. Resistance. Diseases and pathogens. Dwarf beans. Climbing beans. Burundi.

Information is given on bean var. trials in Burundi during 1981, evaluating yield, vegetative cycle, % of damaged seed, density at harvest, no. of pods, and resistance to pests and diseases. Results are presented in tables. That year 21 var. were introduced. All climbing var. from Gembloux were susceptible to mosaic in Kisozi, and were thus eliminated. In definite var. trials at different alt., Karama 1/2 and Diacol Calima (800-1200 and 1200-1900 m.a.s.l., resp.) were the most outstanding; for higher alt. no acceptable var. were found. In Mosso and Kisozi, var. BAT 317 and Ex Rico 23 were the most outstanding. On the other hand, beans grew well in Rwira. Highest av. yields were registered by Doré de Kirundo, Diacol Calima, and line 17 with 1665, 1521, and 1501 kg/ha, resp. In a multilocational trial with dwarf var. in Mosso, Murongwe, Rwira, and Kisozi, the best var. were Doré de Kirundo and Jaune Pointillé (both local), Bataat, Aroana, and Calima. In Mosso, harvested beans were of better quality. BAT selections from CIAT presented little adaptation to Burundian conditions. [CIAT]

0173

24212 INSTITUT DES SCIENCES AGRONOMIQUES DU BURUNDI. 1977. Groupe des légumineuses. (Legumes). In _____. Rapport Annuel 1977. Bujumbura. pp.38,103-104. Fr.

Phaseolus vulgaris. Germplasm. Climatic requirements. Cultivars. Yields. Rainfall. Technology evaluation. Adaptation. Burundi.

Data for 1977 are presented on bean var. improvement in Kisozi and Mosso, regions in Burundi with high and intermediate alt., resp. Improvement and multiplication of this crop will not be continued in Kisozi. In Mosso, a min. yield of 700 kg/ha was obtained during the dry season; the max. yield during the rainy season was 700 kg/ha. Var. selection must be carried out during the rainy season to determine tolerance to rust. Performance of var. 1/2 (from the Extreme East) and Bayo 164 is highlighted. Bayo 164 yielded 660 and 1040 kg/ha during the rainy and dry seasons, resp. Selected and introduced var. from Colombia were compared in xeroferric soils. Furthermore, an improved var. mixture was obtained: 7 var. of more or less erect growth habit, with an av. yield of 1100 kg/ha. Five tons of seeds were multiplied in black clayey, xeroferric, and plinthonic soils. [CIAT]

0174

23313 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1981. Division des plantes vivrieres. Legumineuses: haricot (Phaseolus vulgaris L.). (Division of food plants. Legumes: beans). In _____. Compte rendu des travaux du Département Production Végétale. Rubona. pp.3-10. Fr.

Phaseolus vulgaris. Germplasm. Plant introductions. Cultivars. Adaptation. Dwarf beans. Climbing beans. Technology evaluation Yields. Rwanda.

The activities of the Food Crop Division in Rwanda during 1981 are summarized, including selection, breeding, and study of cultural techniques. The bean germplasm bank (524 var.) received 160 var. from the rural environment and 9 from abroad. In screening trials in Rubona, the most outstanding bush var. were Ki 555, Ki 572, IRW 8, and Ndimirakaguja (outyielding Bataaf during 2 seasons) and for snap beans, var. Prenel, Radio, Valgreen, Juri, Nain Princesse Cordor, Nain Conserva, and Multima (outyielding Saxa during the 1st season). Treatment with mancozeb increased yields in Rwerere by 39-60%. Var. Actoran and Richmond Nandos outyielded the control during the 2 seasons in Rwerere. In Karama, 3 var. (Sornel, Actoran, and Munyu) outyielded var. 1/2 during the 1st season and 1 var. (Raido Grado) during the 2nd. Many semiclimbing bean var., among them Caru 27 and Gikara, outyielded the control Kicaro in Rubona and others such as Rwerere 8, Nsuzumirurushako, and Amarillo 156 outyielded Unyumba in Rwerere. In Rubona, climbing var. Sabre a Rames was the most outstanding, in Rwerere and Karama var. Urunyumba, and in Karama var. 7211. In multilocational comparative trials, var. 11 showed good adaptation, followed by Actoran and Mutiki 2. Best yields were obtained in plantings of 15-20 seeds/m in continuous rows at 0.3 x 0.4 m spacings. The bean/maize association was not productive. A 0.5-m prop is enough to obtain a 40% increase in yields; the 2.5-m prop gave the best results. Phytosanitary data and the most productive var. for seed multiplication are included. [CIAT]

0175

23312 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1980. Cultures vivrieres. (Food crops). In _____. Rapport Annuel 1980. Kigali, Rwanda, Ministere de l'agriculture et de l'Elevage. Projet Semences Selectionnees. pp.1-8. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Adaptation. Yields. Technology evaluation. Rwanda.

Information is given on research results during 1980 of 5 multiplication centers (Mutura, Ruhunde, Muyumbu, Mututu, and Bumbogo) of various crops grown in Rwanda. During the 2nd season, bush bean var. Cajamarca yielded

983 kg/ha in Ruhunde (2300 m.a.s.l.), where drought affected Bataaf. Performance of var. 1/2, Melange Jaune, and Emma, and of the bean/maize association, was outstanding in the region of Muyumbu (± 1400 m.a.s.l.). On the other hand, 4 bean var. (1/2, Bataaf, Melange Jaune, and Mange Tout) yielded an av. of 1150 kg during the 1st season and 365 kg during the 2nd season, when drought problems were present. Bataaf yielded 505 kg/yr in a granitic soil region (Bumbogo, 1750 m.a.s.l.); Melange Jaune yielded 828 kg in the same locality. During the 1st season, a total of 6603 kg seed was disseminated or sold, and 14,048 kg during the 2nd; this is enough seed to plant 230 ha (90 kg/ha). Overall, legume yields increased very little during 1980. [CIAT]

0176

23309 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1980. Cultures vivrieres. (Food crops). In _____. Rapport Annuel 1979. Kigali, Rwanda, Ministere de l'Agriculture et de l'Elevage. Projet Semences Selectionnees. pp.1-7. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Adaptation. Dwarf beans. Climbing beans. Yields. Propagation. Rwanda.

Data are presented on the multiplication and dissemination of food crop seeds in Rwanda during 1978-79. In Ruhunde (2300 m.a.s.l.), climbing bean var. Cajamarca confirmed its superiority in relation to bush var. Bataaf and Inyumba (av. yields of 1420, 500, and 300 kg/ha, resp.). In Mutura (2300 m.a.s.l.), var. Cajamarca also showed an acceptable performance. In Muyumbu (± 1400 m.a.s.l.), var. 1/2 yielded 741 kg/ha and intercropped with maize, complemented maize yields. In Mututu (± 1400 m.a.s.l.), strong rains affected crops of var. 1/2 and Bataaf (323 and 403 kg/ha, resp.). In Bumbogo (less than 1800 m.a.s.l.), bush var. did not show an acceptable performance. It was necessary to obtain seed again from the best farmers' fields and from the Institut des Sciences Agronomiques du Rwanda (100, 500, and 300 kg of var. Bataaf, 54, and 1/2, resp.). Bean dissemination is good: var. 1/2 (9283 kg seed), Bataaf (4210 kg), Cajamarca (4142 kg), Phaseolus multiflorus (820 kg), and var. 54 (3875 kg). Beans occupy 186 ha (18% of total surface) and the 3rd place among the most important crops, after maize and soybean. [CIAT]

0177

23306 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1978. Legumineuses: haricot (Phaseolus vulgaris L.). (Legumes: beans). In _____. Compte rendu des travaux du Département Production Vegetale. Rubona. pp.1-13. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Dwarf beans. Climbing beans. Yields. Adaptation. Selection. Rwanda.

Partial conclusions are presented on var. screening trials with bush, semiclimbing, and climbing beans in Rubona, Karama, and Rwerere (Rwanda) during 1978. There were 18 new introductions from the rural areas and 8 from the Federal Republic of Germany. The no. of var. in the 3 localities was, resp., 122, 60, and 20 (climbing), 47, 68, and 52 (semiclimbing), and 47, 34, and 28 (bush). In general screening trials, the most outstanding bush var. were Actoran, Nain, Beau Port, and Emma (all outyielding Bataaf). Among the climbing var. the most outstanding were Gisenyi I, Bayo 158, 0688, Colorado, Bayo, and Nsuzumirurushako (var. 54 as control). Among the semiclimbing var., Nsuzumirurushako, N 7093, and Rwerere II outyielded the control Inyumba. Information Is given on the presence of bacterial blight. In comparative trials var. Gisenyi 1 and 2 bis (climbing) were the most

outstanding. Materials for pedigree selection were of no interest. Results of cultural trials (planting method with var. Saxa and Wulma, comparison of var. in pure and mixed stands, use of props) and of mutation trials (black tegument of var. Wulma) are summarized in table form. Application of fungicides increased seed yields significantly. [CIAT]

0178

23303 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1977. Haricot. (Beans). In _____. Compte-rendu des travaux du Département Production Vegetale. Rubona. pp.1-15. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Dwarf beans. Climbing beans. Selection. Technology evaluation. Yields. Rwanda.

Partial conclusions are presented on expt. with beans in Rwanda during 1977. Bean collections in Rubona, Karama, and Rwerere include, resp., in addition to pedigree offspring and mutants, 97, 60, and 29 climbing bean var. and 45, 23, and 28 bush bean var. In Rubona and Rwerere there are, resp., 24 and 52 semiclimbing var. Brief information is given on var. screening trials. The most outstanding climbing var. were Nyirakabuye Jaune, Mushali, Melange Jaune, Gisenyi 2, and some local var. (Caru 6, 8, 11). Among bush beans the most outstanding were Bataaf and Rose Coco and among the semiclimbing var., Angola and Nyiramahoro. Results of comparative trials are summarized in tables. During the 1st season, Bataaf (bush) outyielded Saxa ($P = 0.05$) and during the 2nd season, var. Emma was the best. Climbing var. Gisenyi 2, Gisenyi 1, Bayo 158, and Gikara outyielded the control var. 54. Controls Bataaf and 1/2 maintained their superiority in other trials. In colluvial soils, Bayo 158, 7093, Amarillo 156, and Ibundu were the most outstanding. Information is given on pedigree selection and cultural trials (planting distance, planting method, props). Spacings of 40 x 5 cm and 1 seed/site are recommended for bush var. Treatments with 1 prop/2 plants and 1 prop/4 plants were superior at the 0.05 level. Regarding the tegument mutation of Wulma, none of the lines outyielded the control. In trials with fungicides, none of the treatments outyielded the untreated control. During the 1st season of 1976, var. Cajamarca considerably outyielded var. Gisenyi 2, Gisenyi 3, and Urunyumba 1. [CIAT]

0179

23318 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1975. Especes cultivees. Legumineuses: haricot (Phaseolus vulgaris L.). (Cultivated species. Legumes: beans). In _____. Rapport Annuel 1975. Rubona. pp.23-34. Fr.

Phaseolus vulgaris. Plant introductions. Cultivars. Germplasm. Adaptation. Yields. Technology evaluation. Selection. Planting. Spacing. Irrigation. Rwanda.

Information is given on experimentation with beans in Rwanda during 1975. Eleven var. were introduced and in Rubona 94 var. were maintained. In screening trials with 4 bush var., using Saxa as control, var. Emma was outstanding. In Karama with var. 11 as control, var. Supermetis, Nanus, Richmond Wonder, Nain Mangetout, Rafado Grado, and Bataaf were outstanding. In Rwerere, production was poor and var. Actoran, Richmond Nandos, Munyu, and Sornel were outstanding. Among climbing var., Bayo 158, Gisenyi, Gikara, Melange Kabale, and Far Tang Tou were superior. Results of comparative trials are summarized, the most outstanding var. being Rafado Grado, Melange Jaune 1, and 7045, which outyielded the controls Saxa and Wulma. In lake and dry valley colluviums, none of the var. outyielded the

controls 1/2 and Bayo 158. Information is given on pedigree selection trials, cultural trials (planting density, fungicides, irrigation), and mutation trials of the black tegument of var. Wulma, carried out with different doses of EMS. [CIAT]

0180

23314 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1973. Legumineuses: haricot (Phaseolus vulgaris L.). (Legumes: beans). In _____. Rapport Annuel 1973. Rubona. pp.44-50. Fr.

Phaseolus vulgaris. Germplasm. Plant introductions. Cultivars. Irrigation. Drought. Dwarf beans. Climbing beans. Adaptation. Yields. Rwanda.

Information is given on bean expt. in Rwanda during 1973. Eleven var. were introduced to the collection of 150 var. In screening trials with bush beans (controls Saza, no. 11, and Bataaf), 13 var. were retained in Rubona, 5 and 8 var. (cultivated with and without irrigation, resp.) in Karama, and 15 var. in Rwerere. In Rubona, 4 var. presented acceptable tolerance to anthracnose: Jamapa Incremento la Stanzuella, Nyiramabuye, Sabana Grande, and Avinhado. In comparative trials with and without props, var. SG 44, 6473, Amarillo 156, and var. 54 were the most outstanding. In Rwerere, various var. outyielded Bataaf, among them Wulma, SG 44, and Amarillo 156. Information is given on pedigree selection, use of props, and mutation of the black tegument of var. Wulma. [CIAT]

0181

24155 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1970. Karama: 1ere saison. (Karama: first cropping season). In _____. Rapport Annuel 1970. Rubona. pp.39-50. Fr., Illus.

Phaseolus vulgaris. Germplasm. Cultivars. Adaptation. Yields. Rwanda.

A list is presented of var. planted in a screening trial carried out during the 1st (36 var.) and 2nd (55 var.) planting seasons in Karama, Rwanda, during 1970. Colluvial soil from lake Kilimbi and from the dry valley of Maza was used. Results are included in table form. Parameters evaluated were as follows: av. yield (5 replications), planting, establishment, flowering, pod formation, vigor, aspect, harvest date, and length of growth cycle. The control was Mixed Mexico (0.464 kg/plot) for the 1st season and the most productive var. was no. 76 (1.008 kg/plot). In the 2nd season, Mixed Mexico was inferior to the others, var. Wulma being the most outstanding (1.155 kg/plot). [CIAT]

0182

23323 INSTITUT NATIONAL POUR L'ETUDE AGRONOMIQUE DU CONGO BELGE. 1962. Cultures vivrieres: haricots. (Food crops: beans). In _____. Rapport Annuel 1962. Bruxelles. pp.1-2. Fr.

Phaseolus vulgaris. Cultivars. Germplasm. Yields. Technology evaluation. Phaseolus coccineus. Rwanda.

Seven bean var. were compared in Karama, Rwanda, during 1962. Bean var. Mixed Mexico was significantly superior (P = 0.01) to Colorado, Bataaf, Wulma, and Cuarentino. In the joint analysis, var. Cuarentino, Wulma, Caraotas, and Colorado were uniformly superior (P = 0.01) to Mixed Mexico, Bataaf, and Bayo. Concerning seed multiplication, yields were low (1300-1750 kg/ha) due to excess rain. White and violet Phaseolus coccineus seeds were multiplied and will be kept because of their rusticity and high yields (2300 and 1600 kg/ha, resp.). [CIAT]

0183

24187 INSTITUT NATIONAL POUR L'ETUDE AGRONOMIQUE DU CONGO BELGE. 1958. Annexe haricots: généralités sur les essais en C.E.L. (Annex on beans: generalities of trials in C.E.L.). In _____. Rapport Annuel 1958. Zaire, Station de Mulungu. pp.7-18. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Adaptation. Yields. Palatability. Technology evaluation. Zaire.

Results are included of evaluations carried out with beans during 1958 in the localities of Bataillon, Kiomvu, Tshondo, Kadjudju, Kirunbu, Vuhovi, Musienene, Kisuma, Ikema, Kibabi, Kingi, Luhotu, and Kendula (Zaire) at alt. of 1140, 1200, 1500, 1590, 1700, 1750, 1830, 1850, 1930, 1950, 1990, 2160, and 2170 m.a.s.l., resp. Data on vegetative cycle, yield, and organoleptic qualities of var. evaluated are presented for each locality. The best var. for the resp. localities were Colorado, Ibundu, Ibundu, Ibundu, local, Kaiko Ini, Kaiko Ini, Nain de Kiondo, Nain de Kiondo, Colorado, Kanvakilo, G,1002, and local yielding 1342, 832, 3406, 1556, 3306, 935, 834, 1650, 474, 980, 732, 2612, and 253 kg/ha, resp. [CIAT]

0184

24186 INSTITUT NATIONAL POUR L'ETUDE AGRONOMIQUE DU CONGO BELGE. 1958. Haricots. (Beans). In _____. Rapport Annuel 1958. Zaire, Station de Mulungu. pp.68-76. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Selection. Dwarf beans. Climbing beans. Phaseolus coccineus. Yields. Technology evaluation. Zaire.

During 1958, 131 var. were introduced to the Phaseolus vulgaris collection; selection trials, as well as comparative trials, were conducted with bush and climbing var. at the Mulungu Station, Zaire. That year a severe rust attack occurred; therefore, selection was directed towards resistance to this disease. Results of a comparative trial indicated that mass selection of Ibundu was not different from the cont. Ibundu, and was thus eliminated. Var. S.G.44 outyielded the other var. evaluated and its possible adoption by indigenous populations is suggested in spite of its black color. Use of var. mixtures is recommended. Bush var. no. 31 N'Dihira, 2756/97/67, 3/11/77/42, Pinto 162, Kawaloka, and no. 17 and climbing var. Gross Blanc, Musale, Nyirakiwete, Kushari, Amabenga, and P. coccineus (Nioka) were retained. Some climbing and semiclimbing var. showed exceptional yields in the multiplication plots. Hybrid selection continued. A syroptic table of local trials is included. [CIAT]

0185

24164 INSTITUT NATIONAL POUR L'ETUDE AGRONOMIQUE DU CONGO BELGE. 1957. Haricots. (Beans). In _____. Rapport Annuel 1957. Zaire, Station de Kondo. pp.1-4. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Adaptation. Technology evaluation. Yields. Zaire.

In a trial planted at the Kondo Station, Zaire, in Dec. 1955 and harvested in May 1956, local bean var. Funzi, Tukula, Diki di Susu, and Tuta (922, 894, 718, and 691 kg/ha, resp.) outyielded var. H 39, H 4, and H 40 (600, 475, and 450 kg/ha, resp.). These 7 var., together with PA01, PA05, H 27, Dinianla, H 3, Kamanti, H 24, H 1, and Zangi, formed the collection planted in Dec. 1955. A dry season collection was also established to obtain fresh seed for the 1956-57 comparative trials and for the collection. In a 2nd comparative trial, var. Tukula, Diki di Susu, H 39, Tuta, Funzi, H 4, and H 40 yielded 1022, 1004, 989, 936, 932, 881, and 705 kg/ha, resp. [CIAT]

0186

24185 INSTITUT NATIONAL POUR L'ETUDE AGRONOMIQUE DU CONGO BELGE. 1957. Haricots. (Beans). In _____. Rapport Annuel 1957. Zaire, Station de Mulungu. pp.53-63. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Selection. Dwarf beans. Climbing beans. Yields. Technology evaluation. Adaptation. Zaire.

Information is given on the Phaseolus vulgaris var. collection, screening trials with bush and climbing var. (for yield, earliness, and/or organoleptic characteristics), mass selection, natural and artificial hybrids, and local trials conducted at the Mulungu Station, Zaire, during 1957. Mass selection of var. Ibundu gave negative results. Among the most outstanding var. in the various trials were S.G. 44 and Cuarentino. Var. Bayo 164 (from Mexico), having yellow striped seeds, was outstanding for its yield (12.5 g/plant) and earliness. In bush bean screening trials where 5 lines and 5 var. were chosen. A severe thrip attack was registered that year. Var. Nyirakirete, Amabenga (to be used as control), and Bushari were chosen among 11 climbing var. from northern Kivu evaluated in screening trials. Local trials were carried out with var. Ibundu, Nain de Kiondo, Colorado, Beurré d'Alger, Languy, and the local var. from southern Kivu and Kisuma. At these sites, var. Ibundu ranked 1st. It was recommended to disseminate a mixture of 4 selected var. which had proved to be clearly superior to local var.: Ibundu, Beurré d'Alger, Nain de Kiondo, and Colorado. [CIAT]

0187

24184 INSTITUT NATIONAL POUR L'ETUDE AGRONOMIQUE DU CONGO BELGE. 1956. Haricots. (Beans). In _____. Rapport Annuel 1956. Zaire, Station de Mulungu. pp.12-20. Fr.

Phaseolus vulgaris. Germplasm. Technology evaluation. Cultivars. Adaptation. Selection. Hybrids. Zaire.

During 1954-55, pedigree selection with beans and var. trials were continued at the Mulungu Station, Zaire. Forty-eight var. were introduced. In comparative trials, var. S.G. 10, S.G. 44, and Cuarentino were outstanding. Mass selection of Ibundu (SM Ibundu) showed higher susceptibility to thrip attack than the control Ibundu. In an eliminatory trial with 6 var. and 18 lines, var. Black Mexico and 9 lines were selected. Late application of diazinon (800 l/ha) did not improve the condition of plants attacked by thrips. Historical and technical information and results of the selection of natural and artificial hybrids are presented. Trials carried out in Bataillon, Tshondo, Kadjudju, Bitalé, Kavuma, Walungu, Ikoma, Nya-Kasiba, and Fabaré are summarized. It was concluded that the selected var. yield better than the local mixtures by 14%, and therefore the dissemination of a mixture of the best 4 var. (Ibundu, Beurré d'Alger, Nain de Kiondo, and Colorado) is recommended in the native environment of southern Kivu. [CIAT]

0188

24169 INSTITUT NATIONAL POUR L'ETUDE AGRONOMIQUE DU CONGO BELGE. 1956. Haricots. (Beans). In _____. Rapport Annuel 1956. Zaire, Station de M'Vuazi. pp.51-53. Fr.

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Seed color. Cercospora canescens. Zaire.

Data are presented on var. performance (yield, % damaged seed) and on mass selection of beans during the short and long dry seasons of 1956 at the

M'Vuazi Station, Zaire. In a competition trial with 16 var., Cercospora canescens attacked leaves and pods; the disease was more severe in land cleared during the preceding long dry season and yields were very low. Black-seeded var. H 12 (Black Mexico) was the most resistant to the disease and the most productive (5.1 kg of selected dry seed/area). During the prolonged dry season, in silty clay soil using 3 different exptl. designs, the best black-seeded var. were H 4 (16.5, 11.2, and 14.2 kg/area), H 12 (15.7, 13.0, and 11.6 kg/area), and H 3 (15.2, 9.1, and 14.1 kg/area); the best white-seeded var. was H 40 (15.0, 8.9, and 14.1 kg/area). The best selection criteria were wt. of healthy grains/plant (more than 20 g) and the no. of pods/plant (more than 15 pods). [CIAT]

0189

24183 INSTITUT NATIONAL POUR L'ETUDE AGRONOMIQUE DU CONGO BELGE. 1955. Haricots. (Beans). In _____. Rapport Annuel 1955. Zaire, Station de Mulungu. pp.1-6. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Technology evaluation. Selection. Yields. Adaptation. Zaire.

Information is given on the collection and selection of Phaseolus vulgaris var. during 1955 at the Mulungu Station, Zaire. Fifteen var. were added to the collection which was completely revised to avoid repetition of identical var. having different names. During the 2nd season of 1949, 11 var. were compared with the control Varia Vaganda which was intercropped every 2 rows; the best var. were Ibundu, Wulma, and M 29. In Kabara, during a severe attack of Melanagromyza phaseoli, var. Ibundu and Wulma were the most outstanding; however, according to results obtained during the 2nd season of 1950, planting of Ibundu, Wulma, and Varia Vaganda are not recommended in this locality. On the other hand, outstanding var. in Fadjudju were Wulma, Ibundu, and M 29; in Eavuru, var. Wulma; and in Kalungu, var. Ibundu and Wulma. Var. Varia Vayanda, Namusinho, and Inkoos will be compared with the 4 var. (Wulma, Ibundu, and M 29) recommended for an alt. of 1700 m. A trial on optimum planting date was begun. [CIAT]

0190

24160 INSTITUT NATIONAL POUR L'ETUDE AGRONOMIQUE DU CONGO BELGE. 1955. Haricots. (Beans). In _____. Rapport Annuel 1955. Station de Nioka. pp.9-10. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Dwarf beans. Climbing beans. Technology evaluation. Adaptation. Yields. Phaseolus coccineus. Zaire.

Data are presented on preliminary trials with bush and climbing beans carried out at the Ndiikira Station, Zaire, during 1955-56. In a trial with 9 bush var., only Eakala outyielded the control (506 vs. 425 kg/ha). Kibongo was used as control for climbing beans. Theoretical yields were 3181, 2650, 2050, 1925, 1793, and 1287 kg/ha for var. Esali, Muhuta, Awaweza, Kinimba, Kinyamunderere, and Kibongo, resp. A 1st trial is being carried out with 5 Phaseolus coccineus var. [CIAT]

0191

24181 INSTITUT NATIONAL POUR L'ETUDE AGRONOMIQUE DU CONGO BELGE. 1954. Haricots. (Beans). In _____. Rapport Annuel 1954. Zaire, Station de Mulungu. pp.11-20. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Plant introductions. Yields. Technology evaluation. Maturation. Zaire.

A list of bean var. eliminated in 1954 from the Mulungu Station, Zaire, is presented; information is given on new introductions (3 natural hybrids of Ndihira and 9 var.) and on intervarietal screening trials. Yield and earliness of 27 var. were evaluated during the 1st half of the rainy season, using Ibundu as control. The late maturing var. Cuarentino (817) occupied 1st place in yield/plot and per plant. H.98 Rupondo, H.152 Bukini, and H.160 Mwenalize were the earliest-maturing var. During the 2nd half of rainy season 18 var. were evaluated and 9 chosen. Seed % varied from 71 to 78% among selected var. In comparative trials, control Ibundu yielded 2476 kg/ha, being outyielded by Beurré d'Alger with 2679 kg/ha. In another trial, var. Magabori, Bibi, and Cuarentino outyielded the control. Precision (6.3%) of the exptl. method used and its reduction of space and labor were confirmed. Background information on pedigree selection (natural and artificial hybrids) is presented. Mass selection was done only with var. Ibundu. Conclusions on exptl. techniques (modifications in the no. of replications and plot shape and length) are given. It was concluded that soil fertility is the factor most affecting yields in local trials and that the microclimate is more important than the alt. [CIAT]

019.

24180 INSTITUT NATIONAL POUR L'ETUDE AGRONOMIQUE DU CONGO BELGE. 1953. Haricots. (Beans). In _____. Rapport Annuel 1953. Zaire, Station de Mulungu. pp.1-2,8-12,249. Fr.

Phaseolus vulgaris. Germplasm. Technology evaluation. Cultivars. Adaptation. Yields. Resistance. Ophiomyia phaseoli. Selection. Zaire.

During 1953 various trials were carried out with food crops, beans included, at the Mulungu Station, Zaire. Bean var. selection must be aimed at the formation of new high yielding populations. Comparative trials with the controls H.22 and Ibundu are currently being carried out. On the other hand, trials for yield and resistance to Melanagromyza (Ophiomyia) phaseoli showed that earthing up had a favorable but nonsignificant effect. Goals and methods of pedigree research and of mass selection and exptl. techniques are indicated. In a trial on border effect, using various combinations of Varia Vayanda, Wulma, and Nain de Flondo, it was concluded that exptl. plots must have at least one border row on each side. Uniformity of blocks could be improved by using 2- to 3-row plots (excluding borders). Var. Ibundu headed the selection and was recommended for multiplication in the native environment. [CIAT]

0193

24176 INSTITUT NATIONAL POUR L'ETUDE AGRONOMIQUE DU CONGO BELGE. 1947. Haricots. (Beans). In _____. Rapport Annuel 1947. Zaire, Station de Mulungu. pp.14-15. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Technology evaluation. Adaptation. Ophiomyia phaseoli. Zaire.

Information is given on the collection of Phaseolus species, and on bean multiplication and var. trials carried out at the Mulungu Station, Zaire, during 1947. To obtain material for var. selection, 30 bush var. were multiplied. In a preliminary trial in a plot previously planted to sweet potato, beans established vigorously and an attack of Melanagromyza phaseoli was observed. In another trial with 12 var., the pest attacked almost all var.; likewise, rust invaded all plots. Var. Metis, Itangaza, Acme, and Samba showed apparent viral resistance. [CIAT]

0194

23311 LE MARCHAND, M.G. 1979. Phaseolus vulgaris. Gembloux, Belgique, Faculté des Sciences Agronomiques de l'Etat. 13p. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Dwarf beans. Climbing beans. Cultivation. Experiment design. Rwanda.

General data are presented on Phaseolus spp. in Rwanda, especially P. vulgaris. A list is included of cv. and data on yield and characteristics of some of them. Indeterminate bush types are used more in Kivu (Rwanda) and Burundi. Under very favorable conditions (rich lowlands of Bugoye with volcanic ashes), the growth habit becomes climbing. In the mountains of Gembloux (Belgium) all of the indeterminate forms are climbing. The most outstanding cv. are 271, 272, and 273 from China, CIAT series 555 through 572, and 2 traditional Colombian cv., 618 and 645 (for high alt.). Technical recommendations on the crop are annexed, regarding: (1) multiplication during the period of climate adaptation, (2) soil selection, (3) planting practices, (4) observations on resistance. Detailed information is given on exptl. techniques and their variation factors. [CIAT]

0195

24179 LE MARCHAND, M.G.; VAN DAELE, E. 1952. Haricots (Phaseolus spp.). [Beans (Phaseolus spp.)]. In Institut National pour l'Etude Agronomique du Congo Belge. Rapport Annuel 1952. Zaire, Station de Mulungu. pp.1-3. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Adaptation. Technology evaluation. Yields. Ophiomyia phaseoli. Resistance. Zaire.

Information is given on the collection of Phaseolus spp. at the Mulungu-Tshibinda Station (Zaire) and on results of comparative and local trials carried out during 1952. Collection and intermediate multiplication plots included 74 bean var. In a comparative trial with 26 var. and 10 replications (2nd season, 1951), 11 var. outyielded the control Varia Vaganda (621 kg/ha), var. Beurré d'Alger being the most productive (1365 kg/ha). A table is presented on local trials, each with 6 replications, at 8 sites: Nya-Mukubi, Kadjudju, Tshigoma, Kavumu, Kabare, Walungu, Nya-Ngezi, and Nya-Kazila. Results are very heterogeneous, although var. 5237, Virovsky, Caroline Lea, and M46 were the most productive overall. Based on results obtained since 1949, var. Wulma and Ibundu (preferred locally) were the highest yielding. Trials were conducted on (1) exptl. design with var. Wulma, (2) planting density, and (3) resistance of Wulma to Melanagromyza phaseoli and possible favorable effect of earthing up. [CIAT]

0196

24269 LEDESMA G., L.A. 1984. Ensayo uniforme de fríjol semivoluble. (Uniform semiclimbing bean trial). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.132-135. Span.

Phaseolus vulgaris. Climbing beans. Intercropping. Zea mays. Yields. Cultivars. Mexico.

The uniform semiclimbing bean trial, consisting of 21 materials, was evaluated in 1983 in Los Altos de Jalisco, Mexico, to search for

alternatives for planting maize and beans in association. The material P-168 gave the highest production (1729 kg/ha), followed by G-2829 (1687 kg/ha) and G-731 (1555 kg/ha). Anthracnose was the disease of highest incidence, specially in the pods; var. Amapola del Camino (1291 kg/ha) was the most affected. Lodging of maize plants does not occur with these types of bean materials. Data on days to flowering, days to maturity, and yields are presented for 16 selections (yield range: 895-1729 kg/ha). [CIAT]

0197

24251 LEPIZ I., R. 1984. Ensayo internacional de rendimiento y adaptación (IBYAN AM). [International bean yield and adaptation nursery (IBYAN AM)]. In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.33-36. Span.

Phaseolus vulgaris. Germplasm. Genotypes. Cultivars. Adaptation. Yields. Mexico.

The IBYAN for highlands, established by CIAT in 1983, was evaluated for its resistance to diseases, adaptation, and yield under rainfed conditions in Jalisco, Mexico. The trial consisted of 20 genotypes, including the regional checks Bayo 400 and line II-952-M-26. The expt. was affected by herbicide residues and excess moisture; therefore the genotypes did not express their full yield potential. The best introduced materials were Carioca, A 445, and A 442 (2656, 2506, and 2044 kg/ha, resp.) which did not outyield the check II-952-M-26 (2863 kg/ha). Materials resistant to Colletotrichum lindemuthianum were observed, with good adaptation and high grain yields. [CIAT]

0198

24250 LEPIZ I., R. 1984. Ensayo uniforme de rendimiento de la zona templada semárida. (Uniform yield trial in the semiarid temperate zone). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.30-32. Span.

Phaseolus vulgaris. Germplasm. Cultivars. Selection. Adaptation. Yields. Mexico.

The uniform yield trial in the semiarid temperate zone, carried out in Tepatitlán (Mexico) in 1983, included 16 bean var. and lines. Results should be interpreted with care since the expt. was affected by excess water and many plants died. In general, adaptation was low and var. Bayo Madero, II-952-M-26-M, Rio Grande, and Bayo Zacatecas again showed resistance to Colletotrichum lindemuthianum. Grain yield was very low: 60-547 kg/ha. [CIAT]

0199

24266 LEPIZ I., R. 1984. Evaluación de germoplasma criollo. (Evaluation of local germplasm). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.123-126. Span.

Phaseolus vulgaris. Climbing beans. Germplasm. Intercropping. Zea mays. Adaptation. Yields. Selection. Mexico.

In 1983, in Zapopán, Mexico, 142 climbing bean materials from Jalisco were evaluated in association with maize. The yields of the best 20 materials are presented (range 1262-2029 kg/ha). The climbing bean var. selected in Tepatitlán (Garbancillo Zarco, Frijola, Cejita, and Rosa de Castilla) show good adaptation and yields in Zapopán. In general, local material is susceptible to the attack of pathogens such as Colletotrichum lindemuthianum, Isariopsis griseola, and Uromyces phaseoli; climbing beans had less problems with the residual effect of herbicides. [CIAT]

0200

24246 LEPIZ I., R. 1984. Evaluación de germoplasma introducido. (vivero de adaptación). [Evaluation of introduced germplasm (adaptation nursery)]. In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.3-14. Span.

Phaseolus vulgaris. Germplasm. Plant introductions. Selection. Adaptation. Yields. Resistance. Drought. Colletotrichum lindemuthianum. Mexico.

A total of 500 bean entries, many of them from CIAT, were evaluated for their resistance to diseases, adaptation, and yield potential, and to select progenies for the crossbreeding program and/or for yield trials. Trials were planted in 3 Mexican localities: Tepatitlán (adaptation and disease resistance), El Llano (drought resistance), and Durango (drought resistance and adaptation). There was material with specific adaptation in each of the 3 localities; some Brazilian materials presented an excellent adaptation to the conditions of Tepatitlán. There were also genotypes with good general adaptation in terms of the mean grain yield. A list is included that contains the best entries tested, adaptation and disease resistance indexes, and yields. [CIAT]

0201

22203 LLANO G., A. 1983. Evaluación de variedades de fríjol común rojo del Vivero Centroamericano de Adaptación. VICAR. (Evaluation of red bean varieties from the Central American Yield Nursery. VICAR). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.17-18. Span.

Phaseolus vulgaris. Cultivars. Selection. Rhizoctonia solani. Bean common mosaic virus. Resistance. Yields. Plant breeding. Nicaragua.

Fourteen red bean var. from VICAR (Central American Yield Nursery) were evaluated for their yield and resistance to diseases at La Compañía (Carazo, Nicaragua). In terms of yield, there were significant statistical differences between the different var. MCS-97R, Acacias-4, Acacias-6, Mexico-80R, Rojo Nacional, Orgulloso, and H-46 showed the lowest disease incidence. The most frequent diseases were common mosaic and web blight. Revolución-79 and Rojo Nacional are being used for basic seed production. [CIAT]

0202

24258 MARTINEZ R., J.L. 1984. Evaluación del vivero internacional de roya del CIAT en Tepatitlán, Jal. (Evaluation of CIAT's international rust nursery in Tepatitlán, Jalisco). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.83-86. Span.

Phaseolus vulgaris. Germplasm. Cultivars. Adaptation. Selection. Mexico.

CIAT's International Bean Rust Nursery (IBRN) was evaluated in 1983 in Tepatitlán (Jalisco, Mexico). Unfortunately, for the 2nd consecutive year, Uromyces phaseoli did not occur and therefore the expected results were not obtained. However, the following materials were selected for their good adaptation and general sanitary conditions: Guerrero 6, Turrialba 1 (P-709), G-1098-1C-1C-BAT-1,10 (80-VEF-246), EMP-110 (81-VEF-848), EMP-81, Guanajuato 10-A-5, and VRA-81023 (81-VEF-929). [CIAT]

0203

22931 MONTES Y MONTES, L.E. 1980. Evaluación de líneas avanzadas (F_7) de diferentes variedades de fríjol (Phaseolus vulgaris L.) en dos épocas de cultivo en la Costa Central. [Evaluation of advanced lines (F_7) of different bean varieties during two planting periods on the Central Coast]. Tesis Ing.Agr. Lima, Perú, Universidad Nacional Agraria La Molina. 69p. Span., Sum. Span., 19 Refs.

Phaseolus vulgaris. Cultivars. Yields. Adaptation. Climatic requirements. Technology evaluation. Planting. Timing. Peru.

In the La Viña and El Carmen fields of the U. Nacional Agraria La Molina (Peru), 20 advanced bean lines (CIAT IBYAN-78) and 5 local controls were evaluated for their yield and adaptation to summer conditions during 2 planting seasons (spring and summer). During summer, seed coming from La Molina (spring planting) and CIAT were used to determine the effect of seed origin and planting time on bean yields. A randomized complete block design was used with 25 treatments and 4 replications. Seed origin and planting time influenced yields significantly. Higher yields were observed for lines and/or var. FF16-3-1-M-M-M (during spring), Bra-2 Bico de Ouro (during summer with seed from La Molina), and FF16-3-1-M-M-M (during summer with CIAT seed) with yields of 1220, 1479, and 1648 kg/ha, resp. In the 3 trials, introduced lines always outyielded local controls; the best local control was Pi-309-804 with an av. yield of 1088 kg/ha. Introduced beige-seeded lines FF16-3-M-M-M-M and FF16-3-1-M-M-M, white-seeded Aurora, and red-seeded FF16-10-2-CM-M-M and FF16-10-1-CM-M-M showed high yield potentials and adaptation to the zone. [AS (extract)-CIAT]

0204

22217 MORALES R., C.; MIRANDA, E. 1983. Efecto de la densidad de población en siembras de cuatro variedades de fríjol común rojo. (Effect of planting density on four red bean varieties). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.58-60. Span.

Phaseolus vulgaris. Cultivars. Planting. Spacing. Yields. Nicaragua.

Field trials were conducted in Estelí and Carazo (Nicaragua), in 1982, to study the performance of 4 newly released bean var. (Revolución-81, Revolución-82, Rojo Nacional, and Orgulloso) at 3 planting densities (250,000, 160,000, and 120,000 plants/ha). In Estelí, var. Revolución-81 yielded 11% more than Revolución-82 and Rojo Nacional and 81% more than Orgulloso. In Carazo, the most productive var. was Revolución-82 which outyielded Revolución-81 and Rojo Nacional by 11%, and Orgulloso by 73%. All var. gave the highest yields at a planting density of 120,000 plants/ha. [CIAT]

0205

22934 MOSQUERA C., O.A. 1981. Respuesta de 16 variedades de fríjol tipo bayo bajo distintos niveles agronómicos en tres épocas de cultivo en la Costa Central. (Response of 16 bayo-type bean varieties under different agronomic levels and three planting dates on the Central Coast). Tesis Ing.Agr. Lima, Perú, Universidad Nacional Agraria La Molina. 112p. Span., Sum. Span., 22 Refs.

Phaseolus vulgaris. Cultivars. Dwarf bean. Climbing beans. Planting. Timing. Dung. Yields. Pest control. Genotypes. Peru.

In the Galería, Guayabo 1, and Guayabo 2 fields of the U. Nacional Agraria La Molina, Peru, agronomic performance of 16 bayo-type bean genotypes of bush and climbing growth habit was evaluated under 2 agronomic levels (with FYM application and appropriate pest control and without FYM application and min. pest control) during 3 planting periods (summer, winter, and autumn). No significant differences were found between agronomic levels or in the cv. x level interaction. During the summer, the most outstanding bush cv. were Costa Rica I-8, Brasil 2, Venezuela 12, and Pirata 1 with 2697, 2572, 1804, and 1584 kg/ha, resp., and during autumn, Costa Rica I-8, Venezuela 12, Café Claro Chato, and Brasil 2 with 1957, 1695, 1543, and 1345 kg/ha, resp. During autumn the most outstanding climbing cv. were Bayo Púrpura 1, Puebla 152, Promesa 2, and UA-105-1 with 1632, 1430, 1403, and 1334 kg/ha, resp., and during winter, UA 105-1, Bayo Claro, Amarillo F-1, and Promesa 2 with 1427, 1304, 1190, and 998 kg/ha, resp. [CIAT]

0206

23322 NAGANT, D. 1976. Legumineuses: haricot (Phaseolus vulgaris L.). (Legumes: beans). In _____. Les plantes vivrieres, synthese des recherches. Conclusions et perspectives (Karama 1961-1975). Rubona, Institut des Sciences Agronomiques du Rwanda. Note Technique no.6. pp.35-80. Fr.

Phaseolus vulgaris. Plant introductions. Germplasm. Cultivars. Adaptation. Dwarf beans. Climbing beans. Selection. Yields. Fertilizers. Inoculation. Rhizobium. Planting. Spacing. Timing. Intercropping. Rwanda.

Tables are presented summarizing var. introduced to Karama (Rwanda) since 1962 and their origin, for a total of 109 introductions by 1974. Thirty-four climbing and semiclimbing var. and 8 bush var. were selected. In screening trials, different soils (lake and dry valley colluviums), irrigation treatments, and fungicides were used. In 1973 the var. were regrouped according to growth habit and in 1975 new screening trials were conducted. From an agronomic point of view, var. 54, Amarillo 156, Wulma, 5644, and Vera Cruz 78 form a group with higher yields than Bleu, 15C, Amarillo Ouro, 6473, and Nyirarubuye. The importance of props is highlighted. In comparative trials (1975-77) the most outstanding var. were 1/2 (bush) and Bayo 158 (climbing). Pedigree selection was begun in 1968 with 135 F_4 progenies of the hybrid Phaseolus vulgaris var. Cuarentino x P. vulgaris

var. Aborigineus. Three lines competed with var. Wulma and 6 lines with var. 54. In var. mixtures, Wulma and Bayo dominated Mixed Mexico. In trials on potential productivity of soils and organic fertilization, colluvial soils from dry lakes were favorable to the bean crop, as well as direct fertilization, even though no residual effect of fertilization was registered. Beans did not respond to mineral fertilization in lake colluviums; in clayey soils, fertilization was favorable but not profitable. Information is included on: inoculation with Rhizobium; planting distance, density, and period; phytosanitary measures; irrigation; cultural practices; multiplication list; and bean/banana association. [CIAT]

0207

19788 PACOVA, B.E.V.; SANTOS, A.D. DOS; VARGAS, A.A.T.; CANDAL NETO, J.F. 1983. Avaliacao de feijoeiros do grupo de cor no Espírito Santo. (Evaluation of colored beans in Espírito Santo). Campo Grande, Cariacica-ES, Brasil, Empresa Capixaba de Pesquisa Agropecuária. Comunicado Técnico no.12. 3p. Port.

Phaseolus vulgaris. Cultivars. Yields. Adaptation. Fertilizers. N. Rhizobium phaseoli. Xanthomonas phaseoli. Colletotrichum lindemuthianum. Resistance. Brazil.

Sixteen colored bean cv. were evaluated for yield under different environments in Espírito Santo, Brazil, between the 1981 dry season and the 1982 dry season. The av. yield across all 10 environments was 1422 kg/ha, ranging between an av. of 915 kg/ha for Mulatinho AC and 1802 kg/ha for Ricopardo 896. Eight cv. outyielded the av. yield across sites. Except for Ricopardo 896 and Roxinho, all the other cv. were susceptible to Colletotrichum lindemuthianum. Perhaps these 2 cv. could be recommended for commercial release throughout the region. Tolerance to Xanthomonas phaseoli was observed in all cv. in general. Yield responses to Rhizobium phaseoli inoculations and mineral N applications were observed in selected cv. [CIAT]

0208

23455 SALGADO D., D. 1983. Evaluación agronómica y económica de manejos en invernaderos de plástico: caso del poroto verde (Phaseolus vulgaris L.). (Agronomic and economic evaluation of the management of plastic greenhouses: the case of snap beans). Tesis Ing.Agr. Quillota, Chile, Universidad Católica de Valparaíso. 95p. Span., Sum. Span., 21 Refs., Illus.

Phaseolus vulgaris. Cultivars. Yields. Laboratory experiments. Adaptation. Climatic requirements. Chile.

At La Palma exptl. station of the U. Católica de Valparaíso (Chile), the economic and agronomic feasibility of growing snap beans in greenhouses under plastic was studied. Variables evaluated were as follows: non-disinfected soil, soil disinfected with aldicarb, dimethylaminobenzene sodium diazosulfonate, and maneb with Zn salt; var. Apolo and Enriqueta; 2 direct plantings and 2 in pots in July and Aug. Snap beans would be a feasible and profitable alternative for cultivation in greenhouses under plastic. Var. Enriqueta presents a greater total yield and pod size than var. Apolo. Direct planting or in pots in July is fundamental to achieve greater commercial production and profitability. [AS (extract)-CIAT]

0209

23699 SOBRAL, C.A.M.; SOBRAL, E.S.G. 1984. Comportamento de linhagens de feijao (Phaseolus vulgaris L.) no municipio de Ouro Preto D'Oeste em Rondonia. (Performance of bean lines at Ouro Preto D'Oeste in Rondonia). Porto Velho-RO, Brasil, Empresa Brasileira de Pesquisa Agropecuária. Unidade de Execucao de Pesquisa de Ambito Estadual de Porto Velho. Pesquisa em Andamento no.75. 9p. Port. [Empresa Brasileira de Pesquisa Agropecuária. Unidade de Execucao de Pesquisa de Ambito Estadual, Caixa Postal 406, 78.900 Porto Velho-RO, Brasil]

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Yield components. Brazil.

Seventy-six black bean and 84 red bean lines were evaluated at Ouro Preto D'Oeste, RO, Brazil, to select promising materials. Yields ranged between 264-1585 and 524-1312 kg/ha for red and black bean lines, resp. Av. plant height, no. of pods/plant, no. of seeds/pod, and yield of these lines are given. [CIAT]

0210

23658 SOTO G., A. 1985. Ensayo comparativo de rendimiento y adaptación de quince variedades de fríjol arbustivo (Phaseolus vulgaris L.) en dos localidades de Caldas. (Comparative yield and adaptation trial with 15 bush bean varieties in two localities of Caldas). Tesis Ing.Agr. Manizales, Colombia, Universidad de Caldas. 131p. Span., Sum. Span., 14 Refs., Illus.

Phaseolus vulgaris. Germplasm. Cultivars. Adaptation. Technology evaluation. Yields. Yield components. Plant habit. Colombia.

In the localities of La Cabaña and San Peregrino, municipality of Manizales, Colombia, an adaptation and yield trial was conducted with the following 15 bush bean var: BAT 1297, PAI 29, PAI 11, BAC 43, PAI 89, PAI 92, A 179, BAT 1579, PAI 111, ICA L-24, PAT 1, Calima (local control), PAI 27, PAI 113, and DOR 198. The variables determined were no. of pods/plant, no. of grains/pod, wt. of 100 seeds, yield, overall reaction to pests and diseases, growth habits, and development stages. In La Cabaña the most outstanding var. were PAI 11, PAI 29, BAT 1297, and PAI 27 with 3441, 3064, 2869, and 2584 kg/ha, resp., presenting highly significative differences in comparison with the control (1439 kg/ha). In San Peregrino the most oustanding var. were PAI 11, PAI 111, PAI 27, and BAT 1297 with 2417, 2087, 2082, and 1854 kg/ha, resp.; PAI 11 presented highly significative, and var. PAI 11 and PAI 27 significative differences compared with the control (1310 kg/ha). In both localities there were highly significative differences among treatments. The variable most related to yield was the no. of grains/pod. [AS (extract)-CIAT]

See also 0065 0072 0096 0097 0105 0106 0125 0140 0253 0323 0324 0332 0339 0340 0341 0342 0349 0355

E00 PLANT PATHOLOGY

0211

24738 AUTRIQUE, A. 1981. Haricot. (Beans). In _____. Principaux ennemis des cultures de la région des Grands Lacs d'Afrique Centrale. Bujumbura, Institut des Sciences Agronomiques du Burundi. pp.108-119.

Fr., Illus. [Institut des Sciences Agronomiques du Burundi, B.P. 795, Bujumbura, Burundi]

Phaseolus vulgaris. Plant injuries. Disease control. Aphis fabae. Ophiomyia phaseoli. Maruca testulalis. Xanthomonas phaseoli. Colletotrichum lindemuthianum. Rhizoctonia microsclerotia. Uromyces phaseoli. Isariopsis griseola. Ascochyta phaseolorum. Ramularia phaseoli. Africa.

The damage caused by the main diseases and pests of beans in the Great Lakes region, Africa, and their control are described; color photos are included. Among the pests are Aphis fabae, Melanagromyza (Ophiomyia) phaseoli, and Maruca testulalis. The diseases considered include viroses, Xanthomonas phaseoli, Colletotrichum lindemuthianum, Rhizoctonia microsclerotia, Uromyces phaseoli, Isariopsis griseola, Ascochyta phaseolorum, and Ramularia phaseoli. [CIAT]

0212

24736 AUTRIQUE, A. 1981. Principaux ennemis des cultures de la région des Grands Lacs d'Afrique Centrale. (Major crop enemies in the Great Lakes region of Central Africa). Bujumbura, Institut des Sciences Agronomiques du Burundi. 144p. Fr., Illus. [Institut des Sciences Agronomiques du Burundi, B.P. 795, Bujumbura, Burundi]

Phaseolus vulgaris. Plant injuries. Disease control. Aphis fabae. Ophiomyia phaseoli. Maruca testulalis. Xanthomonas phaseoli. Colletotrichum lindemuthianum. Rhizoctonia microsclerotia. Uromyces phaseoli. Isariopsis griseola. Ascochyta phaseolorum. Ramularia phaseoli. Africa.

As an introduction, the causal factors of physiological diseases and of parasite affections of crops, in general, are briefly discussed. Then, the damage caused by the enemies of the major crops, including beans, in the Great Lakes region (Africa) is described. For each one, control measures and color photos are included. [CIAT]

0213

19773 LLANO G., A.; CAMPOS L., C. DE 1983. Enfermedades del fríjol. (Bean diseases). In Tapia B., H.; García A., J.E., eds. Manual de producción de fríjol común. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. pp.113-125. Span., 17 Refs.

Phaseolus vulgaris. Etiology. Epidemiology. Symptomatology. Disease control. Rhizoctonia solani. Xanthomonas phaseoli. Uromyces phaseoli. Colletotrichum lindemuthianum. Chaetoseptoria wellmanii. Entyloma petuniae. Isariopsis griseola. Fusarium solani phaseoli. Fusarium oxysporum. Sclerotium rolfsii. Macrophomina phaseoli. Erysiphe. Meloidogyne. Bean common mosaic virus. Bean golden mosaic virus. Bean chlorotic mottle virus. Bean rugose mosaic virus. Bean southern mosaic virus. Bean yellow stipple virus. Nicaragua.

The etiology, distribution, symptoms, and control of major bean diseases in Nicaragua are presented. The pathogens included are Thanatephorus cucumeris, Xanthomonas phaseoli, Uromyces phaseoli, Colletotrichum lindemuthianum, Chaetoseptoria wellmanii, Entyloma petuniae, Isariopsis griseola, BCMV, BCMV, bean chlorotic mosaic virus, BRMV, BSMV, and bean yellow stipple virus. Other minor diseases for which information is provided in table form, regarding multiplication and control, are Rhizoctonia solani, Fusarium solani, F. oxysporum, Sclerotium rolfsii, Macrophomina phaseoli, Erysiphe sp., and Meloidogyne spp. [CIAT]

0214

15294 MENTEN, J.O.M.; CASTAÑO, M. 1980. Reaction to problem X of some Brasilian varieties of beans (Phaseolus vulgaris L.). Bean Improvement Cooperative. Annual Report 23:94-95. Engl.

Phaseolus vulgaris. Diseases and pathogens. Resistance. Cultivars. Selection. Brazil.

Thirty-nine Brazilian bean var. were evaluated for their resistance to problem X originated in the soil and detected in Colombia. Eleven materials previously evaluated were used as controls. The plants, grown in pots with soil collected at the places where the problem is common, were evaluated 20 and 30 days after seedling emergence using a scale of 1 (no symptoms) to 5 (serious malformation of leaves and plants). The reaction to problem X among the Brazilian var. varied widely. Var. Enxofre was the most resistant (no symptoms). The most common cv. in Brazil showed the following reactions, evaluated at 20 and 30 days, resp.: Goiano Precoce, 2 and 3; Rosinha G-2, 3 and 3; Roxo, 3 and 3; Rico 23, 4 and 3; Bico de Ouro, 3 and 4; Carioca, 4 and 5; Aete, 5 and 5. [CIAT]

0215

21074 MOHAN, S.K.; BIANCHINI, A.; MENEZES, J.R. DE 1981. Orientacoes para o controle de doencas do feijoeiro no Estado do Paraná. (Handbook for the control of bean diseases in the state of Paraná). Londrina-PR, Brasil, Fundacao Instituto Agronomico do Paraná. Circular no.39. 12p. Port. [Fundacao Inst. Agronomico do Paraná, Caixa Postal 1331, Londrina-PR, Brasil]

Phaseolus vulgaris. Fromyces phaseoli. Colletotrichum lindemuthianum. Erysiphe polygoni. Rhizoctonia solani. Fusarium solani phaseoli. Fusarium oxysporum. Sclerotium rolfsii. Macrophomina phaseoli. Isariopsis griseola. Ascochyta. Alternaria. Cercospora. Nematospora coryli. Xanthomonas phaseoli. Pseudomonas syringae. Bean common mosaic virus. Bean yellow mosaic virus. Bean golden mosaic virus. Bean chlorotic mottle virus. Epidemiology. Disease transmission. Disease control. Chemical control. Cultural control. Brazil.

Guidelines on the etiology, transmission, and cultural/chemical control of major bean diseases in Paraná, Brazil, are presented. The diseases included are those caused by fungi (Fromyces phaseoli, Colletotrichum lindemuthianum, Erysiphe polygoni, Rhizoctonia solani, Fusarium solani f. sp. phaseoli, F. oxysporum f. sp. phaseoli, Sclerotium rolfsii, Macrophomina phaseoli, Isariopsis griseola, Ascochyta sp., Alternaria sp., Cercospora sp., and Nematospora coryli), bacteria (Xanthomonas phaseoli and Pseudomonas syringae pv. tabaci), and viruses (BCMV, BYMV, BGMV, and bean chlorotic mottle virus). [CIAT]

0216

22689 QUIROZ E., C.; SEPULVEDA R., P.; TAPIA F., F. 1983. Enfermedades y plagas del porote. (Bean diseases and pests). Investigación y Progreso Agropecuario La Platina (Chile) no.19:14-17. Span., Illus.

Phaseolus vulgaris. Diseases and pathogens. Injurious insects. Disease control. Insect control. Chile.

A list of the main diseases and insects attacking beans in Chile is presented. Data include developmental stages of the plant during which they occur, characteristics and/or symptoms, and control measures. [CIAT]

0217

22225 RUIZ B., J.F. 1983. Inventario de enfermedades del fríjol Phaseolus vulgaris L. en dos regiones de Nicaragua. (Bean diseases inventory in two regions of Nicaragua). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.74-77. Span.

Phaseolus vulgaris. Cultivars. Rhizoctonia solani. Xanthomonas phaseoli. Colletotrichum lindemuthianum. Uromyces phaseoli. Isariopsis griseola. Alternaria. Sclerotium rolfsii. Entyloma petuniae. Selection. Resistance. Nicaragua.

Four red bean var. (Revolución-79, Honduras-46, El Salvador-67, and Orgulloso) were planted in 2 regions of Nicaragua (Masaya and Matagalpa) to evaluate the incidence (% of affected plants) and severity (% of damaged leaf area) of various bean diseases. Diseases were identified by field observations of symptoms, and later verified by microscopic analysis in the lab. Common blight, caused by Xanthomonas phaseoli, was the most important disease in both regions for all var. evaluated, Revolución-79 being the most affected. The other bean diseases observed were those caused by Entyloma petuniae, Colletotrichum lindemuthianum, Uromyces phaseoli, Isariopsis griseola, Rhizoctonia solani, Alternaria sp., and Sclerotium rolfsii. [CIAT]

See also 0001 0042 0141 0161 0280 0322

E02 Bacterioses

0218

25203 ANDERSON, A.J. 1984. Differences between lipopolysaccharide compositions of plant pathogenic and saprophytic Pseudomonas species. Applied and Environmental Microbiology 48(1):31-35. Engl., Sum. Engl., 27 Refs. [Dept. of Biology, Utah State Univ., Logan, UT 84322, USA]

Phaseolus vulgaris. Pseudomonas phaseolicola. Pseudomonas syringae. Pseudomonas tabaci. Races. Resistance. USA.

The lipopolysaccharides of 2 pathovars of Pseudomonas syringae had glucose and rhamnose as major components (13 and 87% for P. syringae pv. pisi, 18 and 76% for P. syringae pv. syringae). Fucose was also present in P. syringae pv. phaseolicola and P. syringae pv. tabaci. The lipopolysaccharides from different races of P. syringae pv. pisi and P. syringae pv. phaseolicola could not be distinguished by neutral sugar composition. Three saprophytic species also produced lipopolysaccharides which had different proportions of rhamnose, fucose, and glucose. The lipopolysaccharide fractions from plant pathogenic and saprophytic Pseudomonas spp. did not elicit browning or phytoalexin production in treated dark red kidney bean cotyledons or red Mexican bean leaves, but chlorosis of the lipopolysaccharide-treated leaf tissue was observed. [Review of Plant Pathology]

0219

24292 EL-SAID, H.M.; GEWAILY, E.M.; SALEM, S.H.; TOHAMI, M.R. 1982. Biological and chemical control of Pseudomonas aeruginosa, the causal organism of blight disease of bean plants in Egypt. Egyptian Journal of

Microbiology 17(1-2):65-80. Engl., Sum. Engl., Ar., 18 Refs. [Botany Dept., Faculty of Agriculture, Zagazig Univ., Zagazig, Egypt]

Phaseolus vulgaris. Pseudomonas phaseolicola. Disease control. Biological control. Chemical control. Egypt.

The antagonistic effect between the isolated rhizosphere microflora and the causal bacterium of blight disease in bean plants was studied. Different antibiotics and fungicides were evaluated for disease control. Application of antagonistic Streptomyces to the soil had success in combating the bacterial blight disease of bean plants a few days after application; however, the effect faded away rapidly. Antibiotics were found to inhibit the soil-borne bacteria, namely, Pseudomonas aeruginosa and P. phaseolicola. With respect to fungicide application, carbendazim apparently had a phytotoxic effect when applied at the recommended dose. Coprozan inhibited the growth of P. aeruginosa, followed by T.O.C. 158. Fungicide application after 30 days gave satisfactory disease control. [AS]

0220

25350 ERCOLANI, G.L. 1985. The relation between dosage, bacterial growth and time for disease response during infection of bean leaves by Pseudomonas syringae pv. phaseolicola. Journal of Applied Bacteriology 58(1):63-75. Engl., Sum. Engl., 33 Refs., Illus. [Istituto di Microbiologia Agraria e Tecnica, Universita degli Studi di Bari, Facolta di Agraria, 70126 Bari, Italy]

Phaseolus vulgaris. Pseudomonas phaseolicola. Cultivars. Pathogenicity. Inoculation. Italy.

Strain 113 of the bacterium Pseudomonas syringae pv. phaseolicola was infiltrated at 0.5-512.0 times the median effective dose (ED_{50}) into the leaves of bean cv. Borlotto di Vigevano (ED_{50} ca. 15 bacteria) and Saluggia (ED_{50} ca. 34). The distributions of time for development of symptoms after inoculation with up to 64 ED_{50} were in agreement with those predicted by the simple birth-death model for microbial infection. Individual times of response to higher doses were longer and more widely distributed than expected from the model. Growth curves of bacteria in leaves inoculated with 16, 64, or 512 ED_{50} could be viewed conventionally as a sequence of an exponential phase, a phase of decelerating growth and a stationary phase. Bacterial growth parameters estimated from response times and infectivity titration data were consistent with those calculated from viable counts in vivo. [AS (extract)]

0221

24974 HABTU ASSEFA. 1981. Effect of plant densities, weeding practices and chemicals on the control of common bacterial blight in haricot beans. Ethiopia, Nazret Research Station. 20p. Engl., Sum. Engl., 10 Refs. [Nazret Research Station, P.O. Box 103, Nazret, Ethiopia]

Phaseolus vulgaris. Xanthomonas phaseoli. Disease control. Cultural control. Planting. Spacing. Weeding. Chemical control. Yields. Ethiopia.

A series of expt. were conducted to determine the effect of plant population densities, weeding practices, and chemicals on the incidence of common bacterial blight (Xanthomonas phaseoli) in haricot bean at the Institute of Agricultural Research Station in Melkassa, Ethiopia. Under Melkassa conditions, neither morning weeding in the presence of dew, nor weeding late in the morning when the leaves were devoid of dew, significantly influenced disease incidence. However, intrarow spacing

favored the development of the disease more than interrow spacing. Seed treatments with sodium hypochlorite, streptomycin, cupric hydroxide, and Copper Count N, or foliar sprays with cupric hydroxide, Copper Count N, streptomycin, and Kasugamycin, did not appear to give effective disease control. [AS]

0222

22238 LLANO G., A.; OCCOM P., I.; CAMPOS L., C. DE 1983. Patología de semillas en fríjol común. (Bean seed pathology). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.119-121. Span.

Phaseolus vulgaris. Cultivars. Xanthomonas phaseoli. Seed transmission. Mycoses. Nicaragua.

Fourteen red and black bean var. were planted in Carazo, Nicaragua, to evaluate damage caused by Xanthomonas phaseoli. Damage was ranked as mild (10 var.), intermediate (3 var.), and severe (1 var.). Another lab. expt. involved a pathologic analysis of seeds of 6 bean var. Rhizoctonia solani was the most frequent pathogen with 3-25% of infected seeds. [CIAT]

0223

19893 MITCHELL, R.E. 1983. Atypical toxin production by Pseudomonas syringae pv. phaseolicola. Physiological Plant Pathology 22(2):123-128. Engl., Sum. Engl., 11 Refs., Illus. [Dept. of Scientific & Industrial Research, Mt Albert Research Centre, Private Bag, Auckland, New Zealand]

Phaseolus vulgaris. Pseudomonas phaseolicola. Toxins. Amino acids. New Zealand.

Unusual toxin production by a single isolate from a strain of Pseudomonas syringae pv. phaseolicola is reported. A mixture of phaseolotoxin and 2 new S-containing toxins was isolated from a culture supernatant by QAE Sephadex chromatography, and each component was then separated and purified by further chromatography on QAE Sephadex and LH20 Sephadex. Each component yielded phosphosulphamylornithine, alanine, and a 3rd amino acid when reacted with leucine aminopeptidase, or when hydrolyzed with acid; with phaseolotoxin the 3rd amino acid was homoarginine but with the other 2 toxins the 3rd amino acid for each was an unidentified, uncommon, nonprotein amino acid. The new toxins are thus amino acid analogues of phaseolotoxin. Repeated attempts to prepare the analogues from the same strain have failed. [AS]

0224

22226 RUIZ B., F. 1983. Control químico del tizón bacterial Xanthomonas phaseoli del fríjol común. (Chemical control of common blight, Xanthomonas phaseoli, in beans). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.78-80. Span.

Phaseolus vulgaris. Cultivars. Xanthomonas phaseoli. Disease control. Chemical control. Nicaragua.

Field trials with bean cv. Revolución-79 were conducted at Campos Azules (Masatepe, Nicaragua) to evaluate the effectiveness of 2 chemical

treatments to control Xanthomonas phaseoli. A randomized complete block design with 5 replications was used. Treatments were: (1) check, (2) copper oxychloride (4 kg/ha), and (3) streptomycin (1.7 kg/ha). Three preventive applications were made at 15-day-intervals, beginning 2 wk. after the appearance of the 1st trifoliate leaf. Disease incidence (% of affected plants) and severity (% of damaged leaf area) were evaluated for each plot. Variance analysis on yield did not show differences between treatments; however, the application of copper oxychloride increased av. yield by 127.12 kg. [CIAT]

0225

21975 SCHUSTER, M.L. 1983. Variability of Dominican Republic Xanthomonas phaseoli isolates in CIAT Phaseolus vulgaris cultivars. Bean Improvement Cooperative. Annual Report 26:66-67. Engl. [Horticulture Dept, Univ. of Nebraska, Lincoln, NB 68583, USA]

Phaseolus vulgaris. Xanthomonas phaseoli. Cultivars. Resistance. Selection. USA.

In greenhouse expt., 2 virulent Dominican Republic strains of Xanthomonas phaseoli (DR 7 and DR 8) and a standard strain (Nebraska EK-11) were used to determine leaf and pod reaction of 13 bean cv. from CIAT and a standard check cv., Great Northern U.I. 59. In general, cv. Great Northern U.I. 59 was the most susceptible to leaf inoculation but not to pod inoculation for the 3 X. phaseoli isolates. Reactions of the 13 CIAT cv. ranged from tolerant to intermediate in leaf infection; however, a definitive cv. x strain interaction was evident for both leaf and pod reactions. Data obtained indicate the importance of using a wide range of X. phaseoli isolates in a control program for common blight. [CIAT]

0226

15241 SCHUSTER, M.L.; COYNE, D.P.; SMITH, C. 1979. New strain of halo blight bacterium in Nebraska. Bean Improvement Cooperative. Annual Report 22:19-20. Engl.

Phaseolus vulgaris. Pseudomonas phaseolicola. Races. Cultivars. Resistance. USA.

A brief report on the detection of new strains of the halo blight bacterium in Nebraska (USA) is presented. These were recovered from beans and were found virulent to the var. Great Northern UI 59 and California Pink. [CIAT]

0227

23982 SHEPPARD, J.W. 1983. Detection of seed-borne bacterial blights of bean. Seed Science and Technology 11(3):561-567. Engl., Sum. Engl., Fr., Germ., 29 Refs. [Seed Borne Disease Unit, Seed Biology Laboratory, Agriculture Canada, Plant Products Building, 22 C.E.F. K1A 0C5 Ottawa, Canada]

Phaseolus vulgaris. Disease transmission. Xanthomonas phaseoli. Seed transmission. Xanthomonas phaseoli var. fuscans. Pseudomonas phaseolicola. Corynebacterium flaccumfaciens. Analysis. Canada.

Methods for detection of seed-borne bacteria (Xanthomonas phaseoli, X. phaseoli var. fuscans, Pseudomonas phaseolicola, and Corynebacterium flaccumfaciens) in bean are described. These include phage plaque tests and serological tests. The latter tests show great promise for diagnostic use. Tests such as enzyme immunoassay and immunofluorescence microscopy are

rapid and require small amounts of reagents. Often tests can be completed in a single day. In the case of enzyme immunoassay, testing and evaluation of the results can be readily automated. [AS]

See also 0079 0145 0313 0324 0327 0335 0336 0351 0354 0359 0360 0363

E03 Mycoses

0228

15270 ALVAREZ-AYALA, G.; SCHWARTZ, H.F. 1979. Preliminary investigations of pathogenic variability expressed by Isariopsis griseola. Bean Improvement Cooperative, Annual Report 22:86-88. Engl., 2 Refs.

Phaseolus vulgaris. Isariopsis griseola. Cultivars. Inoculation. Isolation. Pathogenicity. Resistance. Colombia.

Investigations were conducted at CIAT to develop methodology required to evaluate resistance to Isariopsis griseola inherent in bean germplasm and breeding progeny. Abundant sporulation by the pathogen has been achieved by growing isolates in the lab. on V-8 medium incubated at 19°C in darkness for 10 days. Conidia are harvested in a water suspension from petri plates by rubbing the colony surface with a soft brush or thin wire. Inoculum concn. is adjusted to 2×10^4 conidia/ml. The following glasshouse inoculation procedures have been utilized: (1) rubbing leaf surfaces with cheesecloth coated with a conidial suspension, (2) immersing leaf blades in a conidial suspension, and (3) spraying the conidial suspension onto leaves. The latter method has proven to be most reliable and practical to evaluate large nurseries. Inoculated plants are incubated in a large moisture chamber at 19-22°C for 6-8 days or until symptoms appear. Evaluations are based upon the leaf area expressing lesions, lesion size, and frequency/unit area. [CIAT]

0229

23049 BEPA, S.C. 1983. A new leaf spot disease of beans caused by Alternaria brassicicola. Indian Phytopathology 36(4):729-730. Engl., 3 Refs. [Vegetable Research Station, Kalimpong, Darjeeling 734 101, India]

Phaseolus vulgaris. Snap beans. Alternaria brassicicola. Symptomatology. Etiology. India.

A leaf spot disease of French beans was detected during a local survey of Kalimpong and in the vicinity of Darjeeling District (India). Most of the plants were severely attacked in field conditions from March to May of 1981. The disease was characterized by brown circular spots in concentric rings on all parts of the plant. At the final stage of infection, most of the leaves dried up and dropped. The fungus was identified as Alternaria brassicicola (Schw.) Wiltshire. [CIAT]

0230

25194 CARDENAS S., E.; ENGLEMAN, E.M. 1981. Cambios anatómicos en la semilla de Phaseolus vulgaris durante la infección por Colletotrichum lindemuthianum. (Anatomic changes in Phaseolus vulgaris seed during

infection by Colletotrichum lindemuthianum). Revista Mexicana de Fitopatología 1(3):9-15. Span., Sum. Span., Engl., 14 Refs., Illus.

Phaseolus vulgaris. Colletotrichum lindemuthianum. Inoculation. Seed. Epidemiology. Resistance. Mexico.

Structural changes that occur in the bean seed of var. Puebla 224 due to the invasion of Colletotrichum lindemuthianum were identified. To achieve a rapid infection, pods of different ages were opened without removal from the plant, uncovering the seeds. A drop of inoculum was applied and it was allowed to dry. Pods were then placed in a moist chamber for 48 h. The seeds were collected every 24 h for making cross sections and staining, mainly with periodic acid-Schiff reagent and naphthol blue black. It was found that in the beginning of the invasion there are no structural changes apparent in the host tissues; these appear when the infection is quite advanced, 6 days after inoculation. The cells become disorganized and collapse, and their content of condensed tannins increases. The limits between individual host cells are not visible. Small seeds (2-7 mm) are more susceptible to invasion than large ones (9-15 mm). [AS]

0231

23301 CARDENAS S., E. 1976. Cambios anatómicos en la semilla de Phaseolus vulgaris durante la infección por Colletotrichum lindemuthianum. (Anatomic changes in Phaseolus vulgaris seeds during Colletotrichum lindemuthianum infection). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. Escuela Nacional de Agricultura. 50p. Span., Sum. Span., 20 Refs., Illus.

Phaseolus vulgaris. Colletotrichum lindemuthianum. Seed. Plant injuries. Etiology. Mexico.

An expt. was carried out to determine the damage and changes suffered by seed tissues of bean var. 224 (susceptible) during fungal (Colletotrichum lindemuthianum) infection. Different-sized seeds were inoculated in opened pods; after 48 h in humid chambers, seeds were collected at 24-h intervals and histological preparations were made. Optimum seed size for development of infection was 5-7 mm. Conidia begin to germinate after 9 h, forming appresoria. Macroscopic symptoms appear from 5 to 6 days after inoculation and mycelia remain viable in the seed even 60 days after inoculation. Hyphae were observed within the lumen of host cells 48 h after inoculation; after approx. 72 h they arrived at the intermediate cells of the testa, after 113 h they reached the last strata of the testa, and finally penetrated the embryo. Formation of acervulus on the seed surface was registered 168 h after inoculation. There are no structural damages to host cells infected during penetration of the pathogen or during subsequent development within the host's tissues. Damage takes place when infection is well established and consists in cells becoming disorganized, and suffering a collapse, and in increased condensed tannin content; individual limits were not observed among host cells. [AS (extract)-CIAT]

0232

24421 CARDONA G., W.; ESCOVAR R., M. 1980. Duración en el suelo del hongo causante de la antracnosis (Colletotrichum lindemuthianum) en fríjol (Phaseolus vulgaris). (Duration in the soil of the fungus causing anthracnose in beans, Colletotrichum lindemuthianum). Medellín, Universidad Nacional de Colombia. 43p. Span., Sum. Span., 15 Refs., Illus.

Phaseolus vulgaris. Colletotrichum lindemuthianum. Disease transmission. Etiology. Colombia.

At La Selva Exptl. Station of the Instituto Colombiano Agropecuario (Rionegro, Colombia), studies were conducted during 5 mo. to determine the duration in the soil of the fungus Colletotrichum lindemuthianum. Twenty boxes with sterilized soil were used to which the same amount of bean material highly infected with anthracnose was simultaneously incorporated. A complementary trial was also carried out to determine the importance of rains in the dissemination of the disease. It was found that the fungus lasts from 5 to 6 mo. in the soil, living on crop residues, and that the dissemination of the disease by rains is as important as soil transmission, the latter causing more severe damage. [AS (extract)-CIAT]

0233

19084 CASTAÑO J., M. 1982. Evaluación de germoplasma de fríjol (Phaseolus vulgaris L.) para resistencia a mustia hilachosa. (Evaluation of bean germplasm for resistance to web blight). ASCOLFI Informa 8(4):37-38. Span.

Phaseolus vulgaris. Cultivars. Resistance. Rhizoctonia solani. Leaves. Roots. Relative humidity. Germplasm. Colombia.

The resistance of 9 bean cv. to isolates of Thanatephorus cucumeris collected from either leaves (Th-5) or roots (Rs-8) of infected plants was tested under controlled conditions in growth chambers (22-25°C, 80-100% RH and 12 h artificial light). Adequate concn. of inoculum of virulent isolates were used. All cv. showed some degree of susceptibility. The severity on a 1-5 scale (1 = symptomless plants; 5 = more than 75% leaf surface infected) ranged between 4.2-5.0 for Th-5 isolate and between 2.5-4.0 for the Rs-8 isolate in all cv. The RH is the factor most affecting web blight development since infection can occur at temp. of 18°C at RH higher than 80%. [CIAT]

0234

22678 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1984. Vivero Internacional de Roya del Fríjol; resultados 1979-1980. (International bean rust nursery; results 1979-80). Cali, Colombia. 36p. Span., Engl., Illus. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Germplasm. Resistance. Uromyces phaseoli. Cultivars. Plant introductions. Races. Latin America. USA. Europe. Africa. Australia.

Results of the evaluation of the International Bean Rust Nursery obtained by collaborators during 1979-80 are presented. The nursery included 98 bean cv. and was sent to 26 collaborators in 28 localities of Latin America, USA, Europe, Africa, and Australia. (The report only registers data received from 22 of these localities.) Standard handling and classification procedures of reaction to the disease caused by Uromyces phaseoli were used. None of the cv. or entries were immune in all the localities where the nursery was evaluated, but some were resistant or intermediate in all of the localities. Introductions Redlands Green Leaf C, Mexico 235, 51051, BAT 261-2C, BAT 445-1C, BAT 66-1C, BAT 68-1C, BAT 76-1C, and V 3249-13-1C were not susceptible in any of the localities. The current evaluation system in the nursery measures the combined interaction among groups of nursery entries and the population of rust races; this system allows collaborators to observe changes in resistance (expressed by specific entries) and in variability (expressed by the pathogenicity of specific rust populations) by locality and by time. Results show there are

specific localities where the population varied over plantings and years; there are different races among and within the localities, from both a qualitative and a quantitative point of view. These contrasts between sites and seasons enables the identification of entries with broad resistance to all rust populations present in the regions of the countries where the entries are evaluated. Detailed results are presented in table form. [CIAT]

0235

25205 CHEW, P.S.; HALL, R. 1984. Effect of Pythium root rot on yield of white bean, Phaseolus vulgaris L. Crop Protection 3(4):423-429. Engl., Sum. Engl., 18 Refs., Illus. [Pennwalt Agricultural Chemicals, Serangoon Garden Post Office, Singapore 9155]

Phaseolus vulgaris. Pythium. Chemical control. Yields. Canada.

The effects of Pythium paroecandrum and Pythium spherical on seed yield of white bean were determined under field conditions at the Arkell Research Station of the U. of Guelph (Canada). Fenaminosulf applied as a soil drench selectively suppressed Pythium populations in soil and increased seed yields by 47 and 33% in 1976 and 1977, resp. Fumigation of soil with DD-MIT (Vorlex), a commercial mixture of methyl isothiocyanate, diclororopenes, and dichloropropanes, reduced populations of Pythium and Fusarium in soil and increased seed yields by 79 and 29% in 1976 and 1977, resp. The combination of fenaminosulf and DD-MIT produced the greatest reductions in soil populations of Pythium and Fusarium and increased seed yields by 65%. P. paroecandrum and Pythium spherical were associated with feeder-root necrosis and were the only bean root pathogens detected at the exptl. site. Losses in seed yield of white bean due to Pythium root rot were estimated to be 44 and 39% in 1976 and 1977, resp. [AS]

0236

23659 FADL, F.A.M. 1984. Work carried out at Agricultural Research Centre (ARC). 7. Bean rust disease. In El-Fouly, M.M., ed. Grain Legumes Workshop, Mariut, Egypt, 1981. Proceedings. Cairo-Dokki, Egypt, National Research Centre. pp.109-112. Engl., 7 Refs. [Plant Pathology Inst., Agricultural Research Centre, Giza, Egypt]

Phaseolus vulgaris. Cultivars. Uromyces phaseoli. Resistance. Amino acids. Egypt.

Research work carried out on bean rust in Egypt is summarized. Bean var. Vadenal and Astro showed less infection than others; Giza 3 was promising due to its low % of infection. Studies indicated that reducing, nonreducing, and total sugars increased in leaves and stems of inoculated plants compared with uninoculated plants; this increase was more evident in the leaves than in the stems. Quantitative analysis indicated that the content of total amino acids was higher in susceptible var. whereas the levels of phenols were higher in resistant var. Phenol levels increased when plants were inoculated with rust. The highest seed yield was obtained when the disease was controlled with oxycarboxin, triforine, or benomyl. [CIAT]

0237

24891 HOCH, H.C.; STAPLES, R.C. 1983. Visualization of actin in situ by rhodamine-conjugated phalloin in the fungus Uromyces phaseoli. European Journal of Cell Biology 32:52-58. Engl., Sum. Engl., 25 Refs., Illus. [Dept. of Plant Pathology, New York State Agricultural Experiment Station, Geneva, NY 14456, USA]

Phaseolus vulgaris. Uromyces phaseoli. Etiology. USA.

Rhodamine-conjugated phalloin, a derivative of phalloidin which binds to F-actin, was associated with 3 types of structures in uredospore germlings of the bean rust fungus, Uromyces phaseoli. The structures were filaments, peripheral plaques, and intranuclear inclusions. The filaments, located throughout the germ tube but especially in the more basipetal regions, were observed as either barely perceivable, fine elements or as easily detectable, coarser structures. The plaques, which were suggested to be equivalent to filasomes, occurred near the periphery of the cell cytoplasm. They were most numerous in the hyphal tip regions. Nuclear inclusions occurred within the nucleoplasm subjacent to the spindle pole body. Treatments with KI and phalloidin substantiated that the fluorescently labelled sites were F-actin. Treatment of the germlings with cytochalasin E caused the intranuclear inclusions to become extended often with branched, fine filaments. Similar treatments led to a disappearance of cytoplasmic filaments, but had no perceivable effect on the peripheral plaques. [AS]

0238

24229 HOWLAND, A.K.; STOREY, H.H. 1965. Rust disease of beans (Phaseolus vulgaris L.). In East African Agricultural and Forestry Research Organization. Record of Research. Annual Report 1964. Kikuyo, Kenya. pp.73-74. Engl.

Phaseolus vulgaris. Uromyces phaseoli. Races. Resistance. Cultivars. Kenya.

Research activities on Uromyces phaseoli in beans in Kenya are summarized. With the few pathogen samples sent for identification, a new 6th race was revealed. Var. Mexico 142 is susceptible to 2 of the 6 races. A collection of 16 var. from Uganda was evaluated against 4 races of the pathogen. [CIAT]

0239

24231 HOWLAND, A.K.; STOREY, H.H. 1964. Rust disease of beans (Phaseolus vulgaris L.). In East African Agricultural and Forestry Research Organization. Record of Research. Annual Report 1963. Kikuyo, Kenya. pp.57-58. Engl., 2 Refs.

Phaseolus vulgaris. Uromyces phaseoli. Races. Resistance. Cultivars. Snap beans. Tanzania.

Research activities on Uromyces phaseoli in beans in 1963 are summarized. From the samples received it appeared that races B and C were the most prevalent; however, a 5th race of rust was identified. The 1st record of race E came from Morogoro, Tanzania. Snap bean var. Tengeru No. 21 was susceptible to this race. The inoculation technique now uses light oil as a suspension medium; the incubation period under a polyethylene hood was also reduced from 48 to 24 h. The scales of classification of infection used by the East African Agricultural and Forestry Research Organization and in Mexico are compared. [CIAT]

0240

24230 HOWLAND, A.K.; STOREY, H.H. 1963. Rust diseases of beans (Phaseolus vulgaris L.). In East African Agricultural and Forestry Research Organization. Record of Research. Annual Report 1962. Kikuyo, Kenya. pp.44-47. Engl.

Phaseolus vulgaris. Uromyces phaseoli. Races. Cultivars. Resistance. Germplasm. Kenya.

Research activities on Uromyces phaseoli in beans in Kenya are briefly presented. These have concentrated on obtaining information on the prevalent races and their distribution. A reliable inoculation method adopted was to use a spore suspension in 0.125% saponin, painted onto the upper leaf surface with a camel-hair brush when the seedlings were about 10 days old. The plants were incubated for 48 h under closed hoods of polyethylene in a cool shaded glasshouse. Records were taken 16 days after inoculation. Spores were successfully stored in an incubator for up to 120 days. The scales of classification of infection of the Zaumeyer system and the East African Agricultural and Forestry Research Organization system are compared. The reaction of 7 differential bean var. to races A, B, C, and D is presented. Races A, B, and C were widespread and frequently all occurred at a single site. Germplasm of Central American white beans with high resistance to races A, B, and C was found. Var. Tengeru No. 8 was resistant to race D. [CIAT]

0241

23328 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1966. Essai de fongicides contre la rouillé du haricot. (Fungicide trials against bean rust). In _____. Rapport Annuel 1966. Rubona. pp.H8-H9. Fr.

Phaseolus vulgaris. Uromyces phaseoli. Disease control. Chemical control. Yields. Rwanda.

The effects of rust on bean yields were studied and the efficiency of propineb and a cupric fungicide (copper oxychloride 50%) were evaluated in Rubona, Rwanda, during 1965-66. Four applications of each product were made at 10-day intervals; the 1st application was made 4 wk. afer planting with 2 kg chemical/500 l water/ha, followed by 3 applications of 3 kg chemical/750 l water/ha. The treatment with propineb was significantly superior (P = 0.01) to Cu and check treatments (1812.5, 1274.5. and 1187.5 kg/ha, resp.). [CIAT]

0242

25334 IPSA, E.; SINIGAGLIA, C.; OLIVEIRA, D.A. 1983. Control químico da antracnose (Colletotrichum lindemuthianum (Sacc. & Magn.) Scrib.) e de duas outras doencas do feijoeiro (Phaseolus vulgaris, L.). [Chemical control of anthracnose (Colletotrichum lindemuthianum) and of two other diseases of bean]. Biológico 49(4):89-95. Port., Sum. Port., Engl., 15 Refs. [Inst. Biologico, Avda. Cons. Rodrigues Alves 1252, Caixa Postal 7119, Sao Paulo, Brasil]

Phaseolus vulgaris. Colletotrichum lindemuthianum. Chemical control. Alternaria alternata. Isariopsis griseola. Disease control. Brazil.

In field trials in Campinas (Brazil) against Colletotrichum lindemuthianum, captafol and benomyl + captafol gave the best control. Benomyl was the most effective against Alternaria alternata, but results were poor. Benomyl, benomyl + captafol, and chlorothalonil + copper oxychloride gave the best control of Isariopsis (Phaeoisariopsis) griseola. [Review of Plant Pathology]

0243

25337 KULIK, M.M. 1984. Symptomatology and epidemiology of several green bean diseases incited by seed-borne fungi. Seed Science and Technology

12(3):841-850. Engl., Sum. Engl., Fr., Germ., 55 Refs. [Seed Research Laboratory, Plant Genetics & Germplasm Inst., US Dept. of Agriculture, Beltsville, MD 20705, USA]

Phaseolus vulgaris. Snap beans. Symptomatology. Epidemiology. Isariopsis griseola. Colletotrichum lindemuthianum. Ascochyta phaseolorum. Macrophomina phaseoli. Fusarium oxysporum. Whetzelinia sclerotiorum. USA.

Background information, symptomatology, and epidemiology of the following diseases of Phaseolus vulgaris are presented: angular leaf spot [Isariopsis (Phaeoisariopsis) griseola], anthracnose (Colletotrichum lindemuthianum), Ascochyta leaf spots (A. boltshauseri and A. phaseolorum), ashy stem blight and charcoal rot (Macrophomina phaseoli), Fusarium yellows (F. oxysporum f. sp. phaseoli), and Sclerotinia wilt (S. sclerotiorum). [AS]

0244

24420 MARCUCCI R., J.S. 1985. Evaluación de dos métodos de control de mustia hilachosa Thanatephorus cucumeris en cultivo del fríjol Phaseolus vulgaris L. [Evaluation of two methods to control web blight (Thanatephorus cucumeris) in bean crops]. Tesis Ing.Agr. Guatemala, Universidad del Valle de Guatemala. 48p. Span., Sum. Span., 16 Refs., Illus.

Phaseolus vulgaris. Cultivars. Rhizoctonia solani. Disease control. Chemical control. Cultural control. Yields. Guatemala.

During 1984 a study was conducted in the SE and on the southern coast of Guatemala to determine if min. tillage and the use of the fungicide benomyl constituted effective practices to reduce web blight (Thanatephorus cucumeris) attack on bean var. ICTA Tamazulapa and on a local var. An exptl. randomized block design was used with split-split plots and 2 replications. Variables measured were incidence, severity, and yield. The variance analysis showed that the differences observed were not significant for the severity and yield variables. However, a comparison of means was established and the following treatments gave better results in terms of less severe web blight attack and higher yield: (1) for the south coast area, min. tillage using the local var. with 1 and 3 applications of benomyl for yields of 2662 and 2556 kg/ha, resp., in comparison with the control which yielded 1083 kg/ha; (2) for the SE, tillage with ridges using var. ICTA Tamazulapa with 1, 2, and 3 applications of benomyl for yields of 3227, 3200, and 3076 kg/ha, resp., in comparison with the control which yielded 1836 kg/ha. The economic analysis indicates that the previously mentioned treatments are cheaper and provide the farmer with additional income, more than 145.8% in relation to the control. [AS-CIAT]

0245

15462 MENTEN, J.O.M.; GIACOMELLI, W.J.; TULMANN NETO, A.; ANDO, A. 1980. Eremothecium cymbalariae Borzi, a new causal agent of yeast spot in bean (Phaseolus vulgaris L.) seeds. Bean Improvement Cooperative. Annual Report 23:95. Engl.

Phaseolus vulgaris. Eremothecium cymbalariae. Nematospora coryli. Brazil.

A brief report is presented of the detection of a new causal agent of yeast spot, Eremothecium cymbalariae, detected in seeds of bean var. Rosinha G-2 and Carioca from Sao Paulo, Brazil. E. cymbalariae was recovered at low frequency and sometimes associated with Nematospora coryli; it differs from other species in cultural and morphological aspects. The pathogenicity of

E. cymbalariae is similar to that of N. coryli and Ashbya gossypii. Pure cultures of the pathogen were obtained by reisolation. [CIAT]

0246

23305 MOSTADE, J.M. 1977. Les légumineuses: haricot (IBYSHYIMBO). (Legumes: beans). In _____. Guide pratique de défense des cultures Rwandaises. Rubona, Institut des Sciences Agronomiques du Rwanda. Note Technique no.9. pp.37-40. Fr.

Phaseolus vulgaris. Symptomatology. Disease control. Rhizoctonia solani. Colletotrichum lindemuthianum. Uromyces phaseoli. Sclerotium. Isariopsis. Ascochyta. Ophiomyia phaseoli. Chemical control. Cultural control. Rwanda.

The symptomatology and control measures of some bean diseases and pests in Rubona (Rwanda) in 1977 are described. Planting during rainy seasons must be avoided since the incidence of Rhizoctonia solani is higher; furthermore, it is convenient to include grasses in the crop rotation. To control rust, it is recommended to burn dry leaves after harvesting, avoid consecutive bean crops, and spray with zineb 65% WP at 7-day intervals, 3 wk. after planting. Against anthracnose, it is recommended to use healthy seeds, burn stems and leaves after harvesting, and to not to plant legumes for a period of 2 yr once this disease has attacked. To control Sclerotium, dry leaves and roots must be burnt and the successive planting of susceptible crops should be avoided. To control Isariopsis, dry leaves and plantlets from seeds germinating out-of-season must be burnt. Damage caused by Ascochyta is slight; therefore, no control measure is necessary. To control the bean fly, the planting time and the land must be well selected for plantlets to develop rapidly and be able to resist the pest; it is also recommended to harrow after establishment and to earth up when the plants have grown 4 leaves. Diseased plants must be pulled out and burnt, the same for leaves and stems after harvest. [CIAT]

0247

22228 PELAEZ, D. 1983. Investigación en mustia hilachosa afectando fríjol común en Nicaragua 1981-1982. (Research on web blight affecting common beans in Nicaragua, 1981-82). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. p.86. Span.

Phaseolus vulgaris. Rhizoctonia solani. Research. Nicaragua.

A brief review is presented on the research carried out on Rhizoctonia solani affecting beans in Nicaragua during 1981-82. [CIAT]

0248

24227 RAMOS L., A.; ALTAMIRANO A., A. 1983. Enfermedades. (Diseases). In Lepiz I., R.; Navarro S., F.J. Fríjol en el noroeste de México (Tecnología de producción). México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. Centro de Investigaciones Agrícolas del Pacífico Norte. pp.159-193. Span., 76 Refs., Illus.

Phaseolus vulgaris. Uromyces phaseoli. Whetzelinia sclerotiorum. Erysiphe polygoni. Rhizoctonia solani. Fusarium. Pythium. Bean common mosaic virus. Bean golden mosaic virus. Bean yellow mosaic virus. Bean chlorotic mottle

virus. Etiology. Symptomatology. Host range. Epidemiology. Disease control. Disease transmission. Mexico.

A description is given of the etiology, symptomatology, host range, plant infection, physiological races, and control of the most important diseases in northwestern Mexico. These are classified into fungal (Uromyces phaseoli, Sclerotinia sclerotiorum, Erysiphe polygoni, Rhizoctonia solani, Fusarium, and Pythium) and viral (BGMV, BCMV, BYMV, and bean chlorotic mottle virus) diseases. [CIAT]

0249

23050 SAINI, S.S.; SUPPAL, H.S.; RAMZAN, M. 1983. A new Corynespora leaf spot disease of Phaseolus vulgaris. Indian Phytopathology 36(4):719. Engl., 1 Ref. [Dept. of Botany, Punjabi Univ., Patiala 147 002, India]

Phaseolus vulgaris. Corynespora cassiicola. Symptomatology. Etiology. India.

A new leaf spot disease of common beans was detected in Patiala, India, in 1977. The disease is characterized by light brown, circular to ovoid, distinct spots with concentric rings which measure 2-14 mm in diameter. On the basis of morphological characters, the pathogen was identified as Corynespora cassiicola. C. cassiicola has not been reported before on Phaseolus vulgaris. [CIAT]

0250

22682 SANTOS, A.F. DOS; ATHAYDE, J.T. 1983. Mofo branco do feijoeiro no Estado do Espírito Santo. (Sclerotinia sclerotiorum in beans in the state of Espírito Santo). Vitória-ES, Brasil, Empresa Capixaba de Pesquisa Agropecuária. Circular Técnica no.4. 12p. Port., 16 Refs. [Empresa Capixaba de Pesquisa Agropecuária, Caixa Postal 391, 29.000 Vitoria-ES, Brasil]

Phaseolus vulgaris. Whetzelinia sclerotiorum. Symptomatology. Etiology. Disease control. Cultural control. Biological control. Brazil.

The geographic distribution, development, and control of Sclerotinia sclerotiorum attacking beans in Espírito Santo, Brazil, are reviewed. Control measures include the elimination of infected crops, the use of crop rotations (especially with forage grasses), the use of increased interrow or interplant spacings, the delimitation of infected areas and their separate harvesting, the delimination of infested areas to avoid plowing and harrowing in them, and the use of fungicides (benomyl). Infested areas should be left uncultivated since numerous alternate host plants exist that can contribute to increase inoculum density. [CIAT]

0251

25306 STOCKWELL, V.O. 1984. Mechanisms of resistance of bean plants to Rhizoctonia solani. Ph.D. Thesis. Fort Collins, Colorado State University. 147p. Engl., Sum. Engl., 144 Refs., Illus.

Phaseolus vulgaris. Hypocotyls. Rhizoctonia solani. Cell walls. Ca. Resistance. USA.

Two factors were studied in vivo: calcification of cell walls at lesion borders of Rhizoctonia solani-infected bean hypocotyls and the phenolic infusion of cell walls. The role of the cuticle in older bean plant resistance to R. solani was also examined. Ca was implicated as an

inhibitor for endopolygalacturonase activity by altering the enzyme's substrate, pectic acid. Calcified cell walls were present in older bean hypocotyls and were thought to be present in cell walls around limited lesions. The mechanisms of older plant resistance and lesion limitation were different and Ca does not play a role in either form of resistance. On older plants the thickened cuticle does not allow the formation of infection cushions and subsequent penetration. On young seedlings Ca was not found in higher concn. in cell walls around lesions and chelation of Ca from lesions did not increase the susceptibility of lesion border cell walls to maceration. Extraction of phenolics and lignin from tissues rendered cell walls susceptible to maceration. [AS (extract)]

0252

23932 SUTTON, D.C. 1982. Field protection of bean against Colletotrichum lindemuthianum by Colletotrichum lindemuthianum. Australasian Plant Pathology 11(4):50-51. Engl., 3 Refs. [Dept. of Plant Pathology & Agricultural Entomology, Univ. of Sydney, N.S.W. 2006, Australia]

Phaseolus vulgaris. Colletotrichum lindemuthianum. Disease control. Inoculation. Australia.

Expt. were carried out to induce protection in beans against Colletotrichum lindemuthianum. Bean plants of cv. Redlands Pioneer were grown singly in pots in a glasshouse. Fourteen days after planting primary leaves were inoculated with a conidiospore suspension (10^6/ml) or distilled water as a control. Twelve days after the 1st inoculation 25 plants from each treatment were planted in a field plot and sprayed with a spore suspension (10^6/ml). Within 6 days after the 2nd inoculation, more than 30% of the leaf area of most 1st trifoliate leaves on control plants was necrotic, compared with less than 10% for most 1st and 2nd trifoliate leaves on pretreated plants. Results indicate that beans can be partially protected under field conditions against C. lindemuthianum by 1 prior treatment with the same fungus. Pretreatment initially decreased the % of leaf area affected and subsequently increased the survival rate of plants. [CIAT]

0253

22932 TAMAFA N., J. Comportamiento agronómico de tres variedades de fríjol (Phaseolus vulgaris L.) en relación al control químico de la roya y oidiosis en la costa central. (Agronomic performance of three bean var. in relation to chemical control of oidium and rust on the central coast). Tesis Ing.Agr. Lima, Perú, Universidad Nacional Agraria La Molina. 91p. Span., Sum. Span., 45 Refs., Illus.

Phaseolus vulgaris. Cultivars. Adaptation. Resistance. Uromyces phaseoli. Erysiphe polygoni. Yields. Yield components. Disease control. Chemical control. Peru.

During 1978-79, 2 expt. were conducted at the U. Nacional Agraria La Molina (Peru) to evaluate the agronomic performance of bean var. Porrillo Sintético, PI-309-804, and Canario Divex 8130, and to determine the effect of rust (Uromyces phaseoli) and powdery mildew (Erysiphe polygoni) on the main yield components. Fungicides bitertanol in doses of 0.1 and 0.2%, benodanil 0.1%, oxycarboxin 0.1%, triadimefon (Amiral) 0.2%, and an untreated control were evaluated. Diseases were assessed weekly, observing the upper, middle, and lower parts of the plant. The greatest intensity of rust attack was observed in the upper parts of the plant and, for powdery mildew, in the lower parts. Var. Porrillo Sintético and PI-309-804 were resistant to rust and susceptible to powdery mildew; therefore they presented better agronomic performance and consequently higher yields.

Var. Canario Divex 8130 showed greater susceptibility to the 2 diseases studied and its yield was lower. At the 2 doses evaluated, bitertanol had the best control over both diseases. No statistically significative differences were observed between treatments when analyzing yield components. [AS (extract)-CIAT]

0254

23375 VERDUGO G., F. 1978. Estudio de algunos aspectos relacionados con el control de Whetzelinia sclerotiorum (Lib.) Korf y Dumont (=Sclerotinia sclerotiorum (Lib.) de Bary) agente causal del moho blanco del fríjol. [Study of some aspects related to the control of Whetzelinia sclerotiorum (= Sclerotinia sclerotiorum), causal agent of white mold]. Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. Escuela Nacional de Agricultura. 81p. Span., Sum. Span., 52 Refs., Illus.

Phaseolus vulgaris. Whetzelinia sclerotiorum. Disease transmission. Seed transmission. Disease control. Chemical control. Phaseolus acutifolius. Phaseolus lunatus. Mexico.

Expt. were carried out in the greenhouse, lab., and field to quantify the frequency, type of transmission by seed, and chemical control of the fungus Whetzelinia sclerotiorum in beans; materials for the selection of resistant germplasm were also evaluated. Under greenhouse conditions the transmission by seed was 55.2% (36.3% corresponding to rugose and decolored seed and 18.8% to normal seed). In vitro, the frequency of transmission of the fungus was 48.2%. The fungus is transmitted internally and externally. In the greenhouse, 4 bean species (Phaseolus vulgaris, P. coccineus, P. lunatus, and P. acutifolius) were evaluated. Various plants of P. coccineus var. Puebla 890, F-444, and Hidalgo 45-A were resistant to the pathogen. Under greenhouse conditions, 6 fungicide were evaluated at 2 doses each and applied in different forms; the best eatment was dycloran in combined application to leaves (1000 ppm) and se (1000 ppm). Under in vitro conditions, dicloran, benlate, and thiabendazole were evaluated at 3 doses each (1500, 1000, and 500 ppm); dicloran was found to inhibit the development of the fungus at these 3 doses. [AS (extract)-CIAT]

0255

23910 VILLALOBOS P., F. 1985. Evaluación del desarrollo de la telaraña (Thanatephorus cucumeris (Frank) Donk. = Rhizoctonia solani Khun) y medición de las pérdidas en rendimiento en cultivares de fríjol común. [Evaluation of web blight (Thanatephorus cucumeris = Rhizoctonia solani) development and measurement of yield losses in common bean cultivars]. Tesis Ing.Agr. Costa Rica. Universidad de Costa Rica. 56p. Span., Sum. Span., 52 Refs., Illus.

Phaseolus vulgaris. Rhizoctonia solani. Cultivars. Disease control. Chemical control. Yields. Resistance. Costa Rica.

In Esparza, Costa Rica, the development of the web blight disease (Thanatephorus cucumeris) was evaluated, and its effect on the yield of 4 bean cv. (Porrillo 70, Huetar, Diacol Calima, and ICA Pijao) was determined. Four treatments were applied: spraying the soil with PCNB, PCNB + benomyl, benomyl alone, and control (without fungicides). A visual estimate of % disease severity was performed. The infection rate was greater for cv. Diacol Calima in all treatments, followed by cv. ICA Pijao; the lowest infection rate was presented by cv. Porrillo 70 and Huetar with benomyl alone. Yield losses were over 75% for the PCNB treatments and for the control in all the cv. The highest yield was obtained with cv. Porrillo 70 treated with benomyl alone, and the lowest with cv. Diacol Calima

treated with PCNB. There were no significative yield differences at the 5% level among the cv. evaluated. [AS (extract)-CIAT]

See also 0100 0105 0145 0200 0222 0261 0264 0266 0312 0315 0317 0318 0319 0323 0324 0326 0327 0330 0334 0337 0344 0349 0352 0354 0356 0357 0358 0363 0364 0365 0367 0372

E04 Viroses

0256

25198 ALMEIDA, L. D'A. DE; PEREIRA, J.C.V.N.A.; RONZELLI JUNIOR, P.; COSTA, A.S. 1984. Avaliacao de perdas causadas pelo mosaico dourado do feijoeiro (Phaseolus vulgaris L.), em condicoes de campo. (Evaluation of losses caused by bean golden mosaic virus under field conditions). Fitopatologia Brasileira 9(2):213-219. Port., Sum. Port., Engl., 6 Refs. [Inst. Agronomico, Secao de Leguminosas, Caixa Postal 28, 13.100 Campinas-SP, Brasil]

Phaseolus vulgaris. Cultivars. Crop losses. Bean golden mosaic virus. Yields. Yield components. Brazil.

From. Feb. to May 1978, a field trial with 12 dry bean cv. was carried out at Ribeirao Preto expt. station (SP, Brazil) to evaluate the losses induced by BGMV attack. Plants with early infection (before flowering) and with late infection (pod filling), as well as healthy plants, were identified. No. of pods/plant, seeds/pod, yield, seed wt. and germination were measured. BGMV reduced all studied parameters, and with greater intensity in the earlier infection. The av. yield was reduced by 73 and 43% in early and late infections, resp. [AS]

0257

17316 BLANCO S., N.; LASTRES G., N. 1981. Presencia en Cuba de las razas amarilla y severa del virus del mosaico del fríjol de carita [CPMV] sobre fríjol. [Presence in Cuba of the yellow and severe cowpea mosaic virus (CPMV) strains on beans]. Ciencias de la Agricultura 8:123-124. Span., 9 Refs.

Phaseolus vulgaris. Cowpea mosaic virus. Etiology. Cuba.

The detection of both the yellow and the severe strains of the cowpea mosaic virus on beans in Cuba is briefly reported. Both were found throughout the country and were identified based on their differential symptoms on Vigna sinensis, Chenopodium amaranticolor, and Phaseolus vulgaris cv. Bekã. The strains were strongly immunogenic and 1:1024 antisera titers were obtained. A strong serological relation between both strains was found using the double dilution method. [CIAT]

0258

17312 BLANCO S., N. 1981. Vida media del virus del moteado amarillo del fríjol [BYSV]. [Half-life of the bean yellow stipple virus (BYSV)]. Ciencias de la Agricultura 8:121-122. Span., 6 Refs.

Phaseolus vulgaris. Bean yellow stipple virus. Etiology. Cuba.

The determination of the half-life of bean yellow stipple virus (BYSV) is briefly reported. Dolichos lablab was inoculated with crude sap of bean

cv. Velasco infected with BYSV. A total of 120 local lesions were counted on leaves inoculated with recently extracted sap (P_0) and 5 lesions on leaves with sap extracted 56 h before inoculation (P_1). By applying the formula $T\ 1/2 = T \log 2/(\log P_0 - \log P_1)$, the half-life of BYSV isolated in Cuba was estimated to be 12 h at 20-22°C. [CIAT]

0259

23990 HUSSEIN, M.M. 1978. Diseases of French beans (Phaseolus vulgaris). In Ed-Damer, Sudan. Hudeiba Research Station. Annual Report 1977-1978. Ed-Damer. pp.10-11. Engl.

Phaseolus vulgaris. Snap beans. Curly top virus. Symptomatology. Disease transmission. Resistance. Cultivars. Sudan.

Information on symptoms, disease transmission, and bean var. resistance to curly top virus in Sudan is briefly presented. Although the virus is transmitted by Aphis craccivora, this specie is not a pest of French beans in this region. The disease is sporadic and local var. Beladi and RO 2/1 seem to be highly tolerant in comparison with introduced var. Red Kloud and Red Kote. [CIAT]

0260

25335 KEARNEY, C.M.; WU, J.E. 1984. Beta-1,3-glucanase and the spread of tobacco mosaic virus in Nicotiana and Phaseolus. Canadian Journal of Botany 62(10):1984-1988. Engl., Sum. Engl., Fr., 37 Refs. [Dept. of Plant Pathology, Cornell Univ., Ithaca, NY 14853, USA]

Phaseolus vulgaris. Leaves. Tobacco mosaic virus. Enzymes. USA.

A comparison was made for lesion size (indicating viral spread) and activity of the enzyme beta-1,3-glucan callose in (1) excised leaves of Phaseolus vulgaris cv. Pinto inoculated with U1 strain of TMV and supplied with sugar (small lesions) or deprived of sugar (large lesions); (2) Nicotiana glutinosa infected with the VM strain (small lesions) or the U1 strain (large lesions) of TMV; and (3) Nicotiana sylvestris infected with the VM strain (small lesions) or the U2 strain (large lesions) of TMV. In all cases the more rapidly spreading lesions did not have significantly higher levels of beta-1,3-glucanase activity than the smaller lesions. Uninfected bean leaves had a significantly higher activity when incubated in sucrose or under light then when deprived of both. For each incubation condition, infected leaves had a significantly higher activity than uninfected leaves, except for those incubated in water in the dark. [CIAT]

0261

19782 KRAMM M., V. 1980. Enfermedades del porote. (Bean diseases). Investigación y Progreso Agropecuario (Chile) 4:17-19. Span., Illus.

Phaseolus vulgaris. Bean common mosaic virus. Bean yellow mosaic virus. Fusarium. Rhizoctonia. Pythium. Symptomatology. Disease transmission. Disease control. Cultivars. Resistance. Chile.

The symptoms, transmission, and control of BCMV, BYMV, and root rots (Fusarium, Rhizoctonia, and Pythium) attacking beans in Chile are briefly described. Var. Hallados Dorados, Negro Argel, Seaway, Suaves, and Tórtola Diana are resistant to BCMV, while var. Tórtola INIA and Orfeo INIA are resistant to both BCMV and BYMV. Root rots can be transmitted through infected seed; therefore, seed disinfection is recommended as well as the

use of well-drained soils, crop rotations, and good cultural practices. [CIAT]

0262

23383 MONTENEGRO B., J. 1970. Identificación de los principales virus del fríjol en el Estado de Guanajuato y evaluación de la resistencia de veinte variedades. (Identification of the principal bean viruses in the state of Guanajuato and evaluation of resistance of twenty varieties). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. Escuela Nacional de Agricultura. 62p. Span., Sum. Span., 46 Refs., Illus.

Phaseolus vulgaris. Bean common mosaic virus. Cultivars. Disease transmission. Seed transmission. Host range. Yields. Resistance. Mexico.

Research was carried out to identify the principal viruses of beans in the state of Guanajuato, Mexico, to evaluate resistance of 20 commercial var., and to determine the % of seed transmission. A random sampling of viruses was done in the bean-growing zones where plants of var. Flor de Mayo and a group of 15 different var. of Phaseolus vulgaris were mechanically inoculated. Two types of reactions were obtained from which representative samples were taken and used in subsequent work. Inoculations were carried out in different species of legume and nonlegume plants to study host range. Some physical properties of the viruses studied were determined. Highly significative differences in yield were observed when inoculated and uninoculated treatments were compared, the latter showing yield reductions of up to 53%. A seed transmission % of 14-43 was confirmed. Viruses studied correspond to BCMV; the type variant was identified to be representative of reaction 1 and the New York variant, of reaction 2. [AS (extract)-CIAT]

0263

20954 OMUNYIN, M.E. 1983. Viral diseases of beans in Kenya and possible remedies. Phaseolus Beans Newsletter for Eastern Africa no.1:14-17. Engl., 7 Refs. [Grain Legume Project, National Horticultural Research Station, P.O. Box 220, Thika, Kenya]

Phaseolus vulgaris. Bean common mosaic virus. Disease control. Kenya.

The importance of BCMV and its possible control measures in Kenya are discussed. The use of bean lines resistant to the virus offers the best advantage to Kenyan farmers. However, other methods such as chemical control and cultural practices may be considered. [CIAT]

0264

19742 RHEENEN, H.A. VAN; MUIGAI, S.G.S. 1982. Control of bean common mosaic by deployment of the dominant I gene. Thika, Kenya, Ministry of Agriculture. National Horticultural Research Station. Grain Legume Project. 18p. Engl., Sum. Engl., Germ., Fr., 24 Refs., Illus.

Phaseolus vulgaris. Bean common mosaic virus. Disease control. Genes. Resistance. Yields. Thielaviopsis basicola. Kenya.

The deployment of the dominant I gene for the control of BCMV exposes a bean crop to severe damage by black root rot (Thielaviopsis basicola) if one or more recessive genes to prevent the hypersensitive plant reaction are lacking. However, during 3 yr of observation in Kenya, black root rot occurred only exceptionally to more than 10% of the crops, and in such cases the yields from crops having the dominant I gene exceeded significantly those from BCMV-susceptible crops. The use of the dominant

resistance factor in Kenya is therefore recommended, but continued caution and monitoring of the disease situation are required. Broadening the resistance basis by adding recessive genes to control black root rot is advisable. [AS]

0265

19892 SINGH, R.N. 1982. Natural occurrence of leaf crinkle disease on common bean. Indian Phytopathology 35(2):320-321. Engl., 11 Refs.

Phaseolus vulgaris. Bean leaf crinkle virus. Symptomatology. Disease transmission. Host range. Etiology. India.

Research on symptoms, sap transmission, host range, and physical properties of a viral bean leaf crinkle disease are summarized. Transmission was mechanical, by sap, by seeds, and by the beetles Epilachna vigintioctopunctata and E. dodecastigma. Common bean lines Pusa Parvati, Contender, and Kentucky Wonder were affected by the disease in 2-40%. This virus had its thermal inactivation point between 55-65°C, dilution end point between 10^{-4} and 10^{-5}, and longevity in vitro at room temp. (14-30°C) between 72-96 h. The resemblance of this virus to the urd bean leaf crinkle virus is indicated. [CIAT]

See also 0100 0105 0159 0248 0308 0315 0316 0317 0318 0320 0324 0327 0351 0368 0374 0382

E05 Nematodes

0266

25193 ABAWI, G.S.; JACOBSEN, B.J. 1984. Effect of initial inoculum densities of Heterodera glycines on growth of soybean and kidney bean and their efficiency as hosts under greenhouse conditions. Phytopathology 74(12):1470-1474. Engl., Sum. Engl., 24 Refs., Illus. [Dept. of Plant Pathology, New York State Agricultural Experiment Station, Cornell Univ., Geneva, NY 14456, USA]

Phaseolus vulgaris. Heterodera glycines. Nematodes. Fusarium. Growth. USA.

There was no significant difference (P = 0.05) in the no. of 2nd stage larvae of the soybean cyst nematode that penetrated the roots of bean cv. California Light Red Kidney and the soybean cv. Amsoy 71, as determined by direct microscopic examination of stained roots of by the shaker technique. Larval development was similar in both crops. The final population (P_f) densities of soybean cyst nematode in soils planted to both crops did not differ significantly. In a 6 wk. greenhouse test, dry wt. of cv. California Light Red Kidney, at initial population (P_i) densities of 0, 3, 6, 12, 24, and 48 viable eggs and larvae of soybean cyst nematode/cm^3 of soil, was 1.47, 1.82, 1.61, 1.65, 1.16, and 1.40 g, resp. Growth and root rot severity ratings of cv. California Light Red Kidney were not significantly affected when soil from a bean field with a history of severe Fusarium root rot was infested with soybean cyst nematode at P_i densities from 1 to 100 eggs and larvae/cm^3 of soil. [AS (extract)]

0267

25354 ELLIOT, A.P.; BIRD, G.W.; LEAVITT, R.A.; ROSE, L.M. 1984. Dynamics of aldicarb soil residues associated with Pratylenchus penetrans control in dry bean production. Plant Disease 68(10):873-874. Engl., Sum.

Engl., 12 Refs., Illus. [Dept. of Plant Pathology & Physiology, Virginia Polytechnic Inst. & State Univ., Blacksburg, VA 24061, USA]

Phaseolus vulgaris. Nematode control. Pratylenchus penetrans. Nematodes. Chemical control. USA.

Aldicarb at 0.86, 1.72, 2.31, 2.88, and 4.62 kg a.i./ha was used to control Pratylenchus penetrans on Phaseolus vulgaris in Michigan, USA. All treatments significantly reduced population densities of P. penetrans. Soil residues of aldicarb were directly related to the rate of application, and the residues decreased throughout the growing season. Eighty days after application, aldicarb soil residues were detectable only at application rates of 2.88 and 4.62 kg a.i./ha. [AS]

0268

20616 GOMEZ T., J. 1983. Nemátodo de quiste, Heterodera glycines, asociado al cultivo de soya y fríjol en el Valle. (Heterodera glycines associated with soybean and bean crops in the Valle). Asiava no.6:33-34. Span., Illus.

Phaseolus vulgaris. Nematodes. Heterodera glycines. Colombia.

The presence of Heterodera glycines associated with soybean and bean crops is reported for the 1st time in Colombia and South America. A total of 172 nematode samples were collected from soils and roots of soybean and bean crops from Cali to Bugalagrande (Valle del Cauca, Colombia) for subsequent identification. Data on distribution and infestation levels are given for the region. [CIAT]

See also 0381

E06 Physiological Disorders

0269

23394 ADAMS, C.M.; HUTCHINSON, T.C. 1984. A comparison of the ability of leaf surfaces of three species to neutralize acidic rain drops. New Phytologist 97(3):463-478. Engl., Sum. Engl., 36 Refs. [Dept. of Botany, Univ. of Toronto, Ontario M5S 1A1, Canada]

Phaseolus vulgaris. Air pollution. Leaves. Plant injuries. Canada.

To compare the ability of leaf surfaces of different species to neutralize acidic rain, acidic droplets of identical size were placed on leaves of Artemisia tilesii, Spinacea oleracea, and Phaseolus vulgaris. The pH values over time were measured using a micro-pH electrode. The pH of rain droplets, initially of 3.0, 3.5, and 5.6, increased after contact with leaves of these species. However, for droplets of pH 2.5 the pH of droplets actually decreased with time on leaves as the drops evaporated, despite the very large quantity of hydrogen ions neutralized by the leaf surface. In each species the more acidic the rain, the greater the quantity of hydrogen ions neutralized by the leaf surface. This ability to neutralize acidic droplets on the leaf surface may be an effective means of reducing damage by acid rain, especially since rain events with a pH less than 3.0 are very rare. Neutralization of acidic droplets may be brought about when cations are leached from exchangeable pools or by dissolution of salts deposited on the leaf surface through guttation. [AS]

0270

24870 AMTHOR, J.S.; FONG, F.; MERKLE, M.G.; BEARD, J.B. 1980. Trifluralin-ozone interactions in primary leaves of Phaseolus vulgaris cv Pinto. In Abdel-Rahman, A.M., ed. 1980. Plant Growth Regulator Working Group, Longmont, Colorado, 1980. Proceedings. Colorado, Plant Growth Regulator Working Group. pp.164-171. Engl., Sum. Engl., 15 Refs., Illus.

Phaseolus vulgaris. Ozone. Leaves. Carbohydrate content. Stomata. Inhibitors. Plant injuries. Roots. Rooting. USA.

Phaseolus vulgaris cv. Pinto plants exposed to 2 ppm trifluralin for 3-4 days showed no signs of toxicity from O_3 fumigation at concn. of 0.5 ppm for 4 h. Stomatal complexes were not closed before, during, or after O_3 fumigation when plants had been treated with trifluralin. Primary leaf reducing sugar and starch contents were increased by trifluralin treatment, possibly the major protection mechanism of trifluralin against O_3 injury. [AS (extract)]

0271

25352 DOMINY, P.J.; HEATH, R.L. 1985. Inhibition of the K^+-stimulated ATPase of the plasmalemma of pinto bean leaves by ozone. Plant Physiology 77(1):43-45. Engl., Sum. Engl., 15 Refs., Illus. [Dept. of Biophysics, Chelsea College, Univ. of London, Manresa Road, London, England]

Phaseolus vulgaris. Leaves. Enzymes. Ozone. Cultivars. Resistance. Plant physiological disorders. Biochemistry. USA.

Three Phaseolus vulgaris cv. which differ in their sensitivity to O_3 were examined for changes in some physiological and structural plasma membrane characteristics. Plasma membrane vesicles were prepared from control and O_3-treated (0.2-0.5 microliter O_3 for 5 h) leaf tissue, and the (K^+ + Mg^{2+})-ATPase activity was determined and compared. No major changes were observed in the resistant cv. The sensitive cv. showed a severe inhibition of ATPase activity which was largely due to a decrease in the K^+-stimulated component. This inhibition was completely reversed by the addition of sulfhydryl compounds. O_3-induced plasma membrane permeability changes may be effected by damage to membrane proteins, perhaps by oxidation of amino acid sulfhydryl groups to disulfide and sulfenic moieties. [AS]

0272

24878 SILVA, E.A.M. DA 1981. Correlation of various developmental and physiological variables of Phaseolus vulgaris L. Bush Blue Lake 290 with ozone sensitivity. Ph.D. Thesis. Raleigh, North Carolina State University. 152p. Engl., Sum. Engl., 153 Refs., Illus.

Phaseolus vulgaris. Leaves. Air pollution. Ozone. Plant physiological disorders. USA.

The development of leaf area and thickness of leaves of Phaseolus vulgaris var. Bush Blue Lake 290 were measured at close intervals. Repeated measurements were also made of leaf diffusion resistance and gas exchange during plant growth. These responses were then correlated with O_3 levels. Primary, 1st and 2nd trifoliate leaves of this var. have identical developmental patterns and responses to O_3. [CIAT]

0272

24890 THOMPSON, C.R.; KATS, G.; DAWSON, P.W.; DOYLE, D.A. 1981. Protocol for measuring the relative toxicity of substances on plant foliage. Bulletin of Environmental Contamination and Toxicology 26(2):281-287. Engl., 5 Refs., Illus. [Statewide Air Pollution Research Center, Univ. of California, Riverside, CA 92521, USA]

Phaseolus vulgaris. Growth chamber experiments. Plant physiological disorders. Air pollution. Toxicity. USA.

A procedure, equipment, and a mathematical equation are described for evaluating the effects of a range of phytotoxic compounds on standard test plants of kidney bean and cucumber. It utilizes the stress response by injured tissue of increased ethylene production. Plants are grown in light in a growth chamber, sprayed with the compound under investigation (results are shown for endothal treatment of beans), and allowed to dry for 0.5 h before ethylene determination. Dry plants are encapsulated for 24 h in darkness at 24°C, after which gas samples are obtained by syringe. [Field Crop Abstracts]

F00 PEST CONTROL AND ENTOMOLOGY

0274

23005 HONDURAS. SECRETARIA DE RECURSOS NATURALES. 1981. Evaluación de la campaña nacional contra la plaga de la babosa del frijol (Olancho); zona de San Francisco de la Paz. (Evaluation of a nation campaign against the bean slug; San Francisco de la Paz area-Olancho). Honduras. 11p. Span.

Phaseolus vulgaris. Slugs. Insect control. Technology evaluation. Honduras.

The results of a survey conducted in the area of San Francisco de la Paz, Honduras, to evaluate a campaign established to control bean slugs are presented. Slug attacks to bean crops in the region were severe (53% of the area affected); the recommended bait was not effective (67% of farmers surveyed). The educational objective of the campaign, teach the farmer how to prepare the bait, was not met in 91% of the cases. Technical assistance was successful in teaching the farmers how to apply the chemical. The radio, followed by the extension worker, played a key role in the campaign. Extension workers should demonstrate the preparation of the bait to obtain satisfactory results. Local farmer committees for controlling slugs should continue. [CIAT]

See also 0001 0322 0374

F01 Injurious Insects, Mites and their Control

0275

23014 AGARWAL, N.S.; PANDEY, N.D. 1961. Bionomics of Melanagromyza phaseoli Coq. (Diptera:Agromyzidae). Indian Journal of Entomology 23:293-298. Engl., 14 Refs., Illus.

Phaseolus vulgaris. Ophiomyia phaseoli. Insect biology. Plant injuries. Host range. India.

The host range, distribution, life cycle, developmental stages (egg, maggot, pupa, and adult), nature and extent of damage, and seasonal periods of the bean fly Ophiomyia (Melanagromyza) phaseoli are described. [CIAT]

0276

23901 ALI, A.M. 1957. On the bionomics and control on the bean-fly, Agromyza phaseoli Coq. Bulletin de la Societé Entomologique d'Egypte 41:551-554. Engl., 3 Refs.

Phaseolus vulgaris. Ophiomyia phaseoli. Insect biology. Insect control. Chemical control. Egypt.

The biology and chemical control trials of Agromyza (Ophiomyia) phaseoli, which causes damage to beans in Egypt, are described. Var. Monte-calm, Swiss Blanc, and Contender were evaluated for resistance and proved to be highly susceptible to attack. To control this pest, it is recommended to import from Australia A. phaseoli-resistant var. In a chemical control trial it was found that chlordane and diazinon may be recommended as long as chlordane is not used for beans consumed fresh because it's a hazard. Parathion (2% a.i.) also proved to be satisfactory, but is inferior to the 2 previous insecticides. [CIAT]

0277

23147 AREVALO A., O. 1977. Azúcares reductores y no reductores como posibles factores de resistencia del fríjol, hacia Epilachna varivestis (Muls.) (Coleoptera: Coccinellidae). [Reducing and nonreducing sugars as possible resistance factors of beans to Epilachna varivestis (Coleoptera:Coccinellidae)]. Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. Escuela Nacional de Agricultura. 79p. Span., Sum. Span., 53 Refs., Illus.

Phaseolus vulgaris. Cultivars. Resistance. Epilachna varivestis. Sugar content. Mexico.

In Chapingo, Mexico, sucrose, glucose, and fructose contents were determined for bean var. Pue. 84, Zac. 48, and Gto 18 (resistant to Epilachna varivestis attack) and Chis. 2-A-3, Hgo. 4-A, and Pue. 35 (susceptible) under greenhouse conditions at 25 days of age and at the beginning of flowering. The phagostimulating effect of sucrose, fructose, and glucose combined on E. varivestis 3rd-instar larvae was also evaluated. Var. Pue. 84 and Zac. 48 were biologically inferior to var. Chis. 2-A-3, Hgo. 4-A, and Pue. 35 in sucrose, fructose, and glucose contents. Var. Gto. 18 performed similarly to the susceptible var. Larvae were clearly phagostimulated with at least 0.32% sucrose and 0.005% glucose + fructose, when exposed to filter paper saturated with sugar solution, and with sugar solution + bean foliage extract. This effect increased by increasing the % of sucrose and decreasing that of glucose + fructose. There is evidence of the presence of anti-phagostimulants in the bean foliage extract. [AS-CIAT]

0278

24226 ARMENTA C., S. 1983. Plagas del fríjol y su control. (Bean pests and their control). In Lepiz I., R.; Navarro S., F.J. Fríjol en el noroeste de México (Tecnología de producción). México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. Centro de Investigaciones Agrícolas del Pacífico Norte. pp.137-158. Span., 18 Refs., Illus.

Phaseolus vulgaris. Trialeurodes vaporariorum. Empoasca. Thysanoptera. Euschistus servus. Diabrotica balteata. Diabrotica variegata. Bemisia

tabaci. Liriomyza. Estigmene acrea. Agrotis ipsilon. Feltia subterranea. Peridroma saucia. Elasmopalpus lignosellus. Acanthoscelides obtectus. Zabrotes subfasciatus. Insect biology. Insect control. Host range. Mexico.

The biology, type of damage, host range, and control of bean pests in northwestern Mexico are presented. Pests are classified into sucking insects (Trialeurodes vaporariorum, Bemisia tabaci, Empoasca spp., Caliothrips phaseoli, Euschistus servus); leaf-feeding insects (Diabrotica balteata and D. variegata, Liriomyza sp., Estigmene acrea); mining insects (Agrotis ipsilon, Feltia subterranea, Peridroma saucia, Elasmopalpus lignosellus); rodents (Sigmodon sp., Rattus sp.); stored grain pests (Acanthoscelides obtectus, Zabrotes subfasciatus). [CIAT]

0279

24276 AVALOS Q., F. 1977. Control químico del barrenador de brotes Epinotia aporema Wlsm en fríjol. (Chemical control of Epinotia aporema in beans). Avances en Investigación 8(1-2):1-5. Span., 2 Refs.

Phaseolus vulgaris. Epinotia aporema. Chemical control. Insect control. Peru.

The efficiency of 9 insecticides in controlling Epinotia aporema on bean var. Bayo was compared, these were sprayed once 30 days after planting. Fenvalerate and carbaryl controlled E. aporema larvae effectively and showed excellent immediate and residual effects (15 days after application). Monocrotophos, methomyl, methamidophos, and deltamethrin also gave good control with similar properties to those of the former insecticides. Phenthoate was excellent for immediate control but had an inefficient residual effect. Sulprofos and Bacillus thuringiensis reduced the population but were not satisfactory in controlling the pest. [CIAT]

0280

23191 BINNING, L.K.; WYMAN, J.A.; STEVENSON, W.R. 1981. Pest control in commercial snap bean production. Madison, University of Wisconsin. Cooperative Extension Programs. Publication no.A2329. 8p. Engl., Illus.

Phaseolus vulgaris. Snap beans. Weeding. Herbicides. Injurious insects. Insect control. Diseases and pathogens. Disease control. Chemical control. USA.

Two aspects of pest control are described. The 1st deals with weed control which can be effectively achieved by good cultivation practices and the use of herbicides. Several herbicides are listed along with the weed types for which they were intended. The 2nd aspect includes chemical and cultural control of the major insects and diseases in bean crops. Insect pests include European corn borers, seed corn maggot, corn ear worm, plant bugs, potato leafhopper, bean aphids, cutworms, loopers, wireworms, and white grubs. Diseases include root rots (caused by Rhizoctonia, Pythium, and Fusarium), bacterial blights, white mold, Botrytis gray mold, rust, common mosaic, and yellow bean mosaic. [CIAT]

0281

24257 DE LA PAZ, G.S. 1984. Fluctuación de adultos de algunas plagas de importancia agrícola en Tepatitlán, Jal., capturadas por medio de la trampa de luz negra. (Fluctuation of adults of various insect pests of agricultural importance in Tepatitlán, Jalisco, captured with black light traps). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo

Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.77-81. Span.

Phaseolus vulgaris. Injurious insects. Mexico.

Field expt. were conducted in Tepatitlán (Mexico) in 1983 to determine the fluctuation of insect populations of agricultural importance, including those attacking bean crops. Black light traps were used to capture the insects; these operated daily year-round from 6:00 p.m. until 8:00 a.m., determining not only population fluctuation but also the higher abundance of each insect under field conditions. The behavior of the populations changed radically compared with that of the previous year, due in part to rainfall and its distribution. In general, low and unstable populations occurred. The insects provisionally identified with the no. 22 and 23 were the only species showing high populations between May-Sept. [CIAT]

0282

24256 DE LA PAZ, G.S. 1984. Formación y mantenimiento de una colección de insectos (adultos e inmaduros) en el área de influencia del CAEAJAL. [Formation and maintenance of an insect collection (adults and immature stages) in the area of influence of CAEAJAL]. In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.70-76. Span.

Phaseolus vulgaris. Injurious insects. Mexico.

A report is presented on the insect collection obtained from different crops, including beans, in the area of influence of Los Altos de Jalisco exptl. agricultural field, Mexico. The collection currently has 1049 samples belonging to diverse orders. A detailed list of the existing collection is given which includes information on order, family, genus, specie, and no. of specimens. [CIAT]

0283

25223 EL-NAHAL, A.K.M.; ASSEM, M.A. 1970. The chemical control of certain vegetable leaf miners in U.A.R. Bulletin of the Entomological Society of Egypt (Economic Series) 4:257-263. Engl., Sum. Engl., 13 Refs.

Phaseolus vulgaris. Ophiomyia phaseoli. Insect control. Chemical control. Egypt.

Field expt. were undertaken at the Faculty of Agriculture Farm (Giza, Egypt) on the chemical control of 3 important vegetable leaf miners: the beet fly Pegomyia hyoscyami, the cucurbit fly Liriomyza bryoniae, and the bean fly Melanagromyza phaseoli. Endrin 19.5% EC at 0.4% and fenthion 50% at 0.25% are recommended for the control of M. phaseoli. [AS (extract)]

0284

25338 FYE, R.E. 1984. Damage to vegetable and forage seedlings by overwintering Lygus hesperus (Heteroptera:Miridae) adults. Journal of Economic Entomology 77(5):1141-1143. Engl., Sum. Engl., 9 Refs. [Crop Science Research Lab., P.O. Box 5367, MS 39762, USA]

Phaseolus vulgaris. Lygus hesperus. Seedlings. Plant injuries. USA.

Feeding damage by Lygus hesperus to seedlings of onion, radish, turnip, rape, clover, lucerne, lentil, pea, bean, dill, and carrot grown in pots in the greenhouse in eastern Washington State (USA) ranged from slight with full recovery to relatively heavy with mortality of young seedlings. Damage to crucifer, forage, and umbellifer seedlings was the heaviest, whereas in seedlings of kidney, snap, pinto, and navy beans, peas, and lentils, damage was light and consisted mainly of damage to individual leaves fed on the petiole. [AS]

0285

22224 GOMEZ D., D.M.; AMADOR W., M.; FLORES G., C. 1983. Estudio del crecimiento y desarrollo de la planta de fríjol común, área foliar y su relación con plagas del follaje. (Growth and developmental studies of bean plants, leaf area and its relationship with leaf attacking insects). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. p.73. Span.

Phaseolus vulgaris. Injurious insects. Cultivars. Leaf area. Yields. Nicaragua.

Three bean var., Revolución-79, Revolución-81, and Honduras-46, were planted in Campos Azules (Masatepe, Nicaragua) in 1982 to study their phenology as well as the relationship between leaf area and leaf attacking insects. Bemisia tabaci, Empoasca sp., and Urbanus proteus were the most important insects. Var. Revolución-79 had the highest leaf area (0.406 m^2) and yield (20.62 g/plant). [CIAT]

0286

22222 GOMEZ D., D.M.; CALDERON V., S. 1983. Insectos asociados al cultivo de fríjol común en Tola, Rivas. (Insect pests associated with bean crops in Tola, Rivas). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. p.70. Span.

Phaseolus vulgaris. Injurious insects. Nicaragua.

Beans were planted in Tola (Rivas, Nicaragua) to carry out a field survey of the insects occurring in bean fields. The majority of all insects found belonged to the Spodoptera complex. [CIAT]

0287

25332 HUBBARD, J.P.; HARMAN, G.E.; ECKENRODE, C.J. 1982. Interaction of a biological control agent, Chaetomium globosum, with seed coat microflora. Canadian Journal of Microbiology 28(4):431-437. Engl., Sum. Engl., Fr., 22 Refs., Illus. [Agrigenetics Corp., 1120-220th St. West, Farmington, MN 55024, USA]

Phaseolus vulgaris. Delia platura. Biological control. Chaetomium globosum. USA.

The mechanism by which Chaetomium globosum, applied as ascospores to seeds of squash, snap bean, and pea, reduces damage caused by larvae of the seed corn maggot, Hylemya platura, and by soil-borne plant pathogens was discussed. [CIAT]

0288

21922 KAREL, A.K.; RWEYEMAMU, C. 1983. Yield losses in field beans following foliar damage by Ootheca bennigseni Weise. Bean Improvement Cooperative. Annual Report 26:51-52. Engl. [Dept. of Crop Science, Univ. of Dar es Salaam, P.O. Box 643, Morogoro, Tanzania]

Phaseolus vulgaris. Cultivars. Ootheca bennigseni. Insect control. Chemical control. Yields. Tanzania.

Expt. were conducted to study the effect of foliar damage by Ootheca bennigseni on the grain yields of several bean cv. under various insecticide treatments during the preflowering stage. Four bean cv., T8, Mexican 142, Masonga, and Selian Wonder, were used. A split plot design with 4 replications was used with 4 insecticide regimes as main plots and cv. as subplots. The visual foliar damage was evaluated by measuring the leaf area damage using a planimeter. The relation between infestation of O. bennigseni, visual foliar damage ratings, % of leaf area damage, and yield of bean cv., with and without chemical insect control, are tabulated. [CIAT]

0289

22923 MARRONE, P.G. 1983. The effects of soil physical factors on the biology of the bean leaf beetle, Cerotoma trifurcata (Forster). Ph.D. Thesis. Raleigh, North Carolina State University. 313p. Engl., Sum. Engl., 156 Refs., Illus.

Phaseolus vulgaris. Cerotoma trifurcata. Insect biology. Soils. USA.

The effects of soil moisture, texture, and temp. on oviposition, survival, and development of the immature stages, and larval movement of the bean leaf beetle (Cerotoma trifurcata) were investigated in lab. and greenhouse studies. The beetles laid the most eggs in wet and organic treatments, and the least in dry and loamy sand treatments. Egg survival in loamy sand, sandy clay loam, and organic soil at a range of moistures from oven-dry to saturation decreased at both moisture extremes. Eggs were less sensitive after they had absorbed moisture, and hatch depended on critical moisture thresholds specific for each soil. Survival of newly laid and swollen eggs held in oven-dry soil at 4 temp. for different exposure durations decreased as exposure time increased. Development ceased while the eggs were held in the dry soil, resulting in a delay in egg developmental time that was equivalent to the exposure duration. Egg survival also decreased as exposure to saturated soil increased. Survival was greatest and development was least inhibited in saturated, organic soil. Survival decreased with increasing soil temp. and depth. Survival and adult wt. were highest in wet and organic treatments and lowest in dry and loamy sand treatments. These results were confirmed in greenhouse soil plots. All larval instars have the capability for relatively large movements in short time periods in the soil, and will move from unfavorable to favorable food, texture, and moisture conditions. [Dissertation Abstracts International]

0290

23285 MARTINEZ R., M. 1978. Efecto de dos plagas en la producción del frijol (Phaseolus spp.). [Effect of two insect pests on bean (Phaseolus spp.) production]. Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 112p. Span., Sum. Span., 64 Refs., Illus.

Phaseolus vulgaris. Phaseolus coccineus. Cultivars. Epilachna varivestis. Apion godmani. Insect control. Intercropping. Zea mays. Yields. Yield components. Mexico.

Expt. were carried out to study the differences between the damage to beans caused by the bean pod weevil (Apion godmani) and that caused by the Mexican bean beetle (Epilachna varivestis) in 2 Phaseolus vulgaris var. (Negro 150 and Canario 107) and 2 local P. coccineus var. The influence of 2 production systems (beans in monoculture and in association with maize), 2 NP fertilizer levels (0 and 100-50), and 2 insecticide levels (with and without) was studied. E. varivestis had more preference for P. vulgaris than for P. coccineus; it 1st attacked beans in monoculture and then in association. Concerning A. godmani, it preferred late populations of P. coccineus than those of P. vulgaris. A. godmani caused more damage to Canario 107 in monoculture than in association with maize. [CIAT]

0291

24409 KYIIRA, Z.M. 1978. Pests of grain legumes and their control in Uganda. In Singh, S.R.; Emden, H.F. Van; Taylor, T.A., eds. Pests of grain legumes: ecology and control. London, England, Academic Press. pp.117-171. Engl.

Phaseolus vulgaris. Pests. Stored grain pests. Uganda.

The importance and distribution of the grain legume pests in Uganda are briefly described, among them beans which is the main food legume in that country. The pests are classified by their attack to seedlings, foliage and leaf bud feeders, flowers and flower bud feeders, pod feeders, and storage pests. [CIAT]

0292

19010 OLIVEIRA, M.A.S. 1982. Eficiencia de inseticidas no controle da vaquinha do feijoeiro em Rondonia. (Efficiency of insecticides to control Diabrotica and Andrector in beans in Rondonia). Porto Velho-RO, Brasil, Empresa Brasileira de Pesquisa Agropecuária. Unidade de Execucao de Pesquisa de Ambito Estadual de Porto Velho. Pesquisa em Andamento no.27. 3p. Port., 4 Refs.

Phaseolus vulgaris. Diabrotica. Andrector. Insect control. Chemical control. Brazil.

Two expt. were conducted in Rondonia, Brazil, to test the efficiency of insecticides to control Diabrotica and Andrector in bean cv. Rosinha. Ten adult insects were placed on 4 bean plants/screen cage (1 x 1 m) in the field which had received applications of thiometon, endrin, trichlorfon, omethoate, diazinon, and endosulfan in expt. 1, and Carvin 85, methyl parathion, trichlorfon, omethoate, diazinon, and endosulfan in expt. 2. Omethoate, trichlorfon, and thiometon were the most efficient in expt. 1 with 90, 85, and 80% insect mortality, resp., and methyl parathion, omethoate, and diazinon in expt. 2 at both 1 and 30 days after application. [CIAT]

0293

23580 PERALTA J., F. 1979. Dosificación de insecticidas para control de las principales plagas del frijol en el Estado de Morelos. (Dosification of insecticides to control main bean pests in the state of Morelos). Tesis Ing.Agr. Chapingo, México, Secretaría de Agricultura y Recursos Hidráulicos. Universidad Autónoma Chapingo. 95p. Span., Sum. Span., 25 Refs., Illus.

Phaseolus vulgaris. Empoasca. Liriomyza. Bemisia tabaci. Trialeurodes vaporariorum. Insect control. Chemical control. Mexico.

In the agricultural exptl. field of Zacatepec (Morelos, Mexico), an expt. was carried out on dosification of insecticides to control whiteflies (Trialeurodes vaporariorum and Bemisia tabaci), leafhoppers (Empoasca sp.), and leaf miners (Liriomyza sp.) in beans. Different doses of the following insecticides were used: omethoate, methamidophos, monocrotophos, endosulfan, and disulfoton in addition to an untreated control. The best treatments were methamidophos (0.427 l/ha) and omethoate (0.641 l/ha) for the adult and immature stages, resp., of whiteflies and leafhoppers. [AS (extract)-CIAT]

0294

18757 RIPA S., R. 1981. La polilla del frejol y alfalfa. (Epinotia aporema attacking beans and alfalfa). Investigación y Progreso Agropecuario 4:12-14. Span., Illus.

Phaseolus vulgaris. Epinotia aporema. Insect biology. Plant injuries. Insect control. Biological control. Chemical control.

The biology, damage, symptoms, and control of Epinotia aporema, which attacks beans and alfalfa, are described. Larvae prefer tender shoots and in beans the greatest damage is caused by consuming flower buds and thus reducing yields. Egg eclosion occurs 4 days after oviposition and the total period between egg and adult lasts 30-33 days under lab. conditions. Natural parasites controlling E. aporema are the hymenoptera Trichogramma sp. and Prospaltella porteri, bugs, the bacterium Streptococcus, and a virus. Methamidophos and fenvalerate are recommended insecticides. [CIAT]

0295

22223 RIZO, M. DEL P. 1983. Control químico y dinámica de población de plagas del follaje en fríjol común negro cultivar Pijao. (Chemical control and population dynamics of leaf attacking insects on black bean cultivar Pijao). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.71-72. Span.

Phaseolus vulgaris. Cultivars. Insect control. Chemical control. Nicaragua.

Studies were conducted with black bean var. Pijao to evaluate the effectiveness of 3 insecticides: acephate (1.4 kg/ha), monocrotophos EC (1.4 l/ha), and permethrin (0.2 l/ha). The planted area was divided into 4 plots; 1 was used as a check, and the other 3 were sprayed with each of the 3 insecticides. The main insects found in the bean field were Spodoptera exigua, Trichoplusia ni, Liriomyza sp., and Bemisia tabaci. The most effective insecticide was permethrin which controlled Spodoptera exigua after 3 days. The other 2 insecticides were also effective. [CIAT]

0296

22221 RIZO, M. DEL P.; PAREDES, P. 1983. Cuantificación de plagas del suelo y su identificación. (Quantification of soil-borne insects and their identification). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.68-69. Span.

Phaseolus vulgaris. Injurious insects. Soils. Nicaragua.

A field survey was conducted on 2 farms (Santa Marta and Casimiro Sotelo) in León, Nicaragua, to quantify and identify soil-borne insects infesting beans. The most abundant species in Santa Marta were Epitragus sallei, Aeolus trimaculatus, Phyllofaga spp., and Elasmopalpus lignosellus with 21.20, 15.20, 2.76, and 0.37 larvae/m^2, resp. In Casimiro Sotelo these figures were much lower: 1.10, 0.37, 0.74, and 0 larvae/m^2, resp. [CIAT]

0297

25226 ROHLFS III, W.M.; MACK, T.P. 1983. Effect of parasitization by Ophion flavidus Brulle (Hymenoptera:Ichneumonidae) on consumption and utilization of a pinto bean diet by fall armyworm (Lepidoptera: Noctuidae). Environmental Entomology 12(4):1257-1259. Engl., Sum. Engl., 15 Refs.

Phaseolus vulgaris. Spodoptera frugiperda. Predators and parasites. USA.

Spodoptera frugiperda larvae parasitized by Ophion flavidus continued to feed after parasitoid oviposition. Consumption of a pinto bean diet was measured from parasitoid oviposition to parasitoid emergence or until pupation by control larvae. Parasitized S. frugiperda larvae of 2 size groups consumed 17 and 22% less diet, resp., than control larvae. Parasitized larvae consumed less food, gained less wt., and produced less feces than unparasitized larvae at 48 and 72 h after exposure to a female parasitoid. Parasitized larvae had significantly larger ($P < 0.05$) approximate digestibility index values and significantly smaller efficiency of conversion of digested food index values at 48 h than control larvae. [AS]

0298

23058 RUPPEL, R.F. 1983. Protecting dry beans from mid-season insects. Michigan Dry Bean Digest 7(4):2-3,7. Engl., Illus. [Michigan State Univ., Dept. of Entomology, East Lansing, MI 48824, USA]

Phaseolus vulgaris. Injurious insects. Epilachna varivestis. Homoptera. Lygus. Insect control. USA.

The insects that are most damaging to beans during midseason in Michigan bean growing areas (USA) are aphids, tarnished plant bug, potato leafhopper, green cloverworm, and the Mexican bean beetle. Some suggestions are given on how to check the fields for these insects, and guidelines are included on when and how abundant each insect has to be to justify its control. [CIAT]

0299

21042 RUPPEL, R.F. 1982. A survey of dry bean insects in 1981. Michigan Dry Bean Digest 6(3):20,23. Engl., 5 Refs.

Phaseolus vulgaris. Injurious insects. USA.

A structured survey of the dry bean insect complex was undertaken by the Agricultural Extension Agents in the main bean and bean seed producing areas of Michigan, USA. The potato leafhopper was by far the most important and most widely distributed insect pest of dry beans in 1981. The seed corn maggot, tarnished plant bug, and Mexican bean beetle were also important and widely distributed. Reports on insecticides indicated that carbaryl and dimethoate were most commonly used for the control of the insects in dry beans. [CIAT]

0300

23291 SANCHEZ P., S. 1977. El fríjol asociado con maíz y su respuesta a la conchuela (Epilachna varivestis Muls.) y al picudo del ejote (Apion spp.). [Bean intercropped with maize and its response to the Mexican bean beetle (Epilachna varivestis) and to the bean weevil (Apion spp.)]. Tesis Mag.Sc. Chapingo, México, Escuela Nacional de Agricultura. Colegio de Postgraduados. 117p. Span., Sum. Span., 44 Refs., Illus.

Phaseolus vulgaris. Epilachna varivestis. Apion. Intercropping. Zea mays. Fertilizers. Insect control. Chemical control. Yields. Yield components. Mexico.

In an expt. in the localities of Chapingo and San Martin (Mexico), the behavior of the Mexican bean beetle (Epilachna varivestis) and the pod weevil (Apion spp.) was evaluated in 3 bean var. (Canario 107, Bayo 107, and Negro 150), planted in monocrop and in association with maize, with 2 levels of fertilization and 2 pest control levels. Populations of E. varivestis and Apion spp. were more numerous in Chapingo than in San Martín. E. varivestis concentrated more on the late maturing var. (Negro 150) than on the early maturing var. (Bayo 107 and Canario 107); the contrary happened with Apion spp. E. varivestis concentrated more on beans in monocrop than on beans in association, while with Apion spp., the contrary occurred on var. Negro 150. E. varivestis tended to concentrate more on fertilized beans than on unfertilized ones whereas Apion spp. did not show preference for either of the 2 treatments. E. varivestis caused more severe damage to beans than Apion spp. when the growth cycle of the plant coincided with the reproduction period of the insects. Population growth of E. varivestis and Apion spp. was negatively correlated with bean yield due to greater plant damage caused by insects. The use of insecticides and fertilizers and the practice of planting beans in monocrop tend to encourage population growth of E. varivestis and consequently, the degree of damage to the bean crop. [AS (extract)-CIAT]

0301

21723 TAYLOR, C.E. 1958. The bean stem maggot. Rhodesia Agricultural Journal 55(6):634-636. Engl., 1 Ref., Illus.

Phaseolus vulgaris. Ophiomyia phaseoli. Symptomatology. Plant injuries. Insect biology. Insect control. Biological control. Predators and parasites. Chemical control. Zimbabwe.

The symptoms, life cycle, and control of Agromyza (Ophiomyia) phaseoli, a pest causing losses in bean crops in Zimbabwe, are briefly described. Heaviest infestations generally occur between Nov.-Jan.; plantings from Feb. onwards are only lightly infested since the parasite Opius liogaster excercises effective control of the pest. [CIAT]

0302

21722 TAYLOR, C.E. 1959. Control of the bean stem maggot by insecticidal dressings. Rhodesia Agricultural Journal 56(5):195-196. Engl., 5 Refs.

Phaseolus vulgaris. Ophiomyia phaseoli. Insect control. Chemical control. Zimbabwe.

Eight insecticides in the form of emulsions were evaluated for the treatment of bean seeds against Agromyza (Ophiomyia) phaseoli attack in trials carried out in Salisbury, Zimbabwe. Evaluations made 70 days after planting (1st trial) indicated that infestation was nil or very low in treatments with endrin, dieldrin, and aldrin (0, 0, and 0.5% of infested

plants, resp.), compared with the untreated check (80.0% infestation). In the 2nd trial, the treatments with dieldrin and aldrin showed 1.0 and 3.0% infestation, resp., at the 1st count 5 wk. after planting, and 7.0 and 6.0% at the final count (10 wk.). Endrin did not give such an effective protection as in the 1st trial, but the final infestation figure was only 10.0%. These 2 trials show that endrin, dieldrin, and aldrin emulsions, applied as seed dressings at the rate of 0.2% actual insecticide (wt./wt. of seed), give almost complete protection against A. phaseoli. [CIAT]

0303

24884 ZEPEZ G., G.; MONTAGNE A., A. 1985. Estudio sobre algunos aspectos de la biología de Andrector arcuatus Olivier, A. ruficornis Olivier y Gynandrobrotica equestris Fabricius (Coleoptera:Chrysomelidae), plagas de importancia en caraota (Phaseolus vulgaris L.). [Study on some biological aspects of Andrector arcuatus, A. ruficornis, and Gynandrobrotica equestris (Coleoptera:Chrysomelidae), important pests of black beans]. Boletín de Entomología Venezolana 4(5):33-44. Span., Sum. Span., Engl., 17 Refs. [Inst. de Zoología Agrícola, Facultad de Agronomía, Univ. Central de Venezuela, Apartado 4579, Maracay, Venezuela]

Phaseolus vulgaris. Insect biology. Andrector arcuatus. Andrector ruficornis. Gynandrobrotica equestris. Venezuela.

Information is given on some aspects of the biology of Andrector arcuatus, A. ruficornis, and Gynandrobrotica equestris, reared on black beans under lab. conditions. Larvae of these pests feed on the roots and nodules, and adults on the foliage. The adults are also virus vectors. Av. duration of the immature stage was 33.4 ± 1.6, 38.6 ± 2.7, and 40.0 ± 2.0 days for A. arcuatus, A. ruficornis, and G. equestris, resp., being significantly shorter for A. arcuatus. Within species, there were no significant differences between sexes. G. equestris females had a significantly longer adult life span (76.7 days) than A. arcuatus (42.3 days) and this, in turn, longer than A. ruficornis (23.1 days). Males of all 3 species followed the same trend as females, but in this case Andrector males had no significant differences between them. Both A. arcuatus and G. equestris had a greater fecundity than A. ruficornis. Mortality in the preadult stage increased in the following order: A. arcuatus, G. equestris, A. ruficornis. From these data and field observations it is concluded that A. arcuatus seems to be better adapted to the black bean plant than the other 2 species. [AS]

See also 0100 0118 0126 0136 0161 0192 0205 0211 0212 0216 0246 0314 0327 0333 0432 0433 0434 0435

G00 GENETICS AND PLANT BREEDING

0304

15293 BANNEROT, H. 1980. Five cases of male sterility in beans. Bean Improvement Cooperative. Annual Report 23:121A-121B. Engl.

Phaseolus vulgaris. Phaseolus coccineus. Cultivars. Hybridizing. Cross-breeding. Plant fertility. France.

Five cases of male sterility were detected in the progeny of interspecific hybrids, with the exception of case 1 in which it was observed in a plant

of var. Peteco (Phaseolus coccineus). The 2nd case was detected in the progeny of Panache X (P. vulgaris x P. formosus) x (P. coccineus x P. obvallatus). The other 3 cases were detected in crosses involving wild P. coccineus on plants resembling P. vulgaris. The abnormal pollen of male sterile plants does not fertilize an emasculated flower of a normal fertile P. vulgaris plant, thus incompatibility is not involved. The character is recessive but seems to be controlled by more than 1 gene. It is possible that the 3 last cases are the same because they were derived from a common ancestor. [CIAT]

0305

25204 COTTER, E.W.; SNYDER, J.C. 1984. Inheritance of two cotyledonary polypeptides of bean. HortScience 19(6):864-866. Engl., Sum. Engl., 8 Refs., illus. [Dept. of Horticulture & Landscape Architecture, Univ. of Kentucky, Lexington, KY 40546, USA]

Phaseolus vulgaris. Seed. Proteins. Cultivars. Inheritance. Genes. Hybridizing. USA.

Phaseolus vulgaris lines Black Turtle and Pinto differed in 2 major cotyledonary electrophoretic bands. Black Turtle contained a 35,000 dalton band whereas Pinto contained a 28,000 dalton band. Both polypeptides were present in the F_1 and segregated in the F_2 with a 3 present:1 absent frequency. No segregation differences were observed between reciprocal crosses. [AS]

0306

23688 GHADERI, A.; ADAMS, M.W.; HASSIB, A.M. 1984. Relationship between genetic distance and heterosis for yield and morphological traits in dry edible bean and faba bean. Crop Science 24(1):37-42. Engl., Sum. Engl., 24 Refs., illus. [Dept. of Crop & Soil Sciences, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Vicia faba. Plant geography. Heterosis. Cultivars. Genetics. USA.

The association of genetic distance and heterosis was investigated in dry edible bean and faba bean. Dry bean materials consisted of 28 F_2 populations of an 8 x 8 diallel, and their resp. parents, grown in 8 replications in the field at East Lansing (Michigan, USA) in 1981. Correlations in dry beans between heterotic effects and parental distances were positive and highly significant for yield at harvest and for 2 of the 3 yield components, namely, no. of pods/plant and no. of seeds/pod. No relationship was found for 100-seed wt. A highly significant positive correlation was obtained for leaf wt. [AS]

0307

24883 GOVINDARASU, P.; SAMPATH, V. 1983. Genetic variability in snap bean (Phaseolus vulgaris L.). Legume Research 6(2):97-98. Engl., 9 Refs. [Horticultural Research Station, Kodaikanal-624103, Tamil Nadu, India]

Phaseolus vulgaris. Snap beans. Yields. Yield components. Genetics. Inheritance. Plant breeding. India.

Studies on genetic variability in snap beans were conducted at the Horticultural Research Station, Kodaikanal (Tamil Nadu, India), to investigate the magnitude of genetic variability, heritability, and

expected genetic advance for yield and its components so as to serve as the basis for further breeding programs for the region. Twenty-one dwarf snap bean cv. of diverse origin were grown in a randomized complete block design with 3 replications. It is indicated that wt. and no. of pods exhibited a high genetic coefficient variation, heritability, and genetic advance as % of mean; they thus form the most reliable indices for selection in snap beans. [CIAT]

0308

22926 MACHADO, P.F.R. 1973. Herança das reacoes do feijoeiro (Phaseolus vulgaris L.) ao virus do mosaico rugoso do feijao. (Inheritance of the bean reactions to the bean rugose mosaic virus). Tese Mag.Sc. Turrialba, Costa Rica, Instituto Interamericano de Ciencias Agrícolas da OEA. Centro Tropical de Ensino e Pesquisa. 35p. Port., Sum. Port., Engl., 23 Refs., Illus.

Phaseolus vulgaris. Bean rugose mosaic virus. Cultivars. Resistance. Inheritance. Genetics. Brazil.

The inheritance of the reaction of the common bean to BRMV, a potential threat to bean production in Latin America, was determined using seeds from 3 pure lines, NH_3 (immune to BRMV), NH_{12} (hypersensitive) and RH_3 (susceptible). The 3 lines were grown in the greenhouse and all the possible crosses were made to produce F_1, F_2, and backcross progenies. The extract of virus-infected bean leaves was used as inoculum source. Seedlings were inoculated 8-10 days after planting by wetting the index finger in the extract and rubbing it gently over the seed leaves, which had been previously sprayed with carborundum. Reactions in F_1, F_2, and backcrosses were visually evaluated and compared with those exhibited by the corresponding parents. Results were analyzed with the X^2 test. Hereditability of the reactions to BRMV proved to be monogenic, governed by 3 alleles: MRF_1, MRF_2, and MRF_3. The 1st allele confers immunity and is dominant over the "other" 2. The 2nd gives hypersensitivity and is dominant over the 3rd, which in turn gives a systemic reaction in a homozygous stage. No cytoplasmatic effect was observed. [AS]

0309

15261 RHEINEN, H.A. VAN 1979. A sub-lethal combination of two dominant factors in Phaseolus vulgaris L. Bean Improvement Cooperative. Annual Report 22:67-69. Engl., Sum. Engl.

Phaseolus vulgaris. Crossbreeding. Cultivars. Genetics. Kenya.

The origin of bean plants showing a severe stunting and necrosis, apparently caused by the cross of cv. GLP-12 and GLP-3, was studied. Stunted F_1 plants were transplanted from the field into pots and checked for viral, bacterial, and fungal infection. Seed of stunted F_1 plants was sown to observe the behavior of F_2 plants; at the same time, remnant F_1 seed were backcrossed with the 2 parents to observe the behavior of the progenies. The F_2 and backcross populations showed segregation for stunted and normal plants which suggested a genetical cause for the growth disorder. The data could be explained by assuming that the combination of a dominant gene present in GLP-12 with another dominant gene present in GLP-3 results in the observed stunting and necrosis symptoms. [CIAT]

0310

24877 STASWICK, P.; CHRISPEELS, M.J. 1984. Expression of lectin genes during seed development in normal and phytohemagglutinin-deficient cultivars of Phaseolus vulgaris. Journal of Molecular and Applied

Genetics 2(6):525-535. Engl., Sum. Engl., 34 Refs., Illus. [Dept. of Biology, Univ. of California, San Diego, La Jolla, CA 92093, USA]

Phaseolus vulgaris. Genes. Seed. DNA. RNA. Cultivars. USA.

In vivo labeling of a normal Phaseolus vulgaris cv. (Greensleeves) and a phytohemagglutinin (PHA)-minus cv. (Pinto III) showed that PHA was not synthesized in the latter. To find out whether the lack of synthesis was due to the absence of mRNA for PHA, recombinant cDNA clones for PHA were obtained. Total poly(A)$^+$ RNA was isolated from cotyledons of developing seeds of Greensleeves and used to direct cDNA synthesis. The double stranded cDNA was cloned in pUC8 and transformants of Escherichia coli screened with pPVL134, a recombinant plasmid which contains the complete coding sequence for a PHA-like protein. Two weakly hybridizing clones (pSC1 and pSC2) were selected. Hybrid selection expt. showed that these 2 clones selected mRNAs which could be translated into polypeptides identical in size to PHA and recognized by antibodies to PHA. The recombinant pPVL134 selected mRNA which translated into polypeptides which were slightly smaller than those of PHA, and poorly recognized by antibodies to PHA. The recombinant clones were used to demonstrate that the genes for PHA and for the PHA-like protein are under temporal control during seed development. Cv. Pinto III, which has no detectable PHA, also has greatly reduced levels of mRNA for PHA. However, the gene for the PHA-like protein encoded by pPVL134 is expressed to the same degree in the cv. Greensleeves and Pinto III. [AS]

See also 0001

G01 Breeding, Selection and Germplasm

0311

23902 ADAMS, M.W. 1972. On the quest for quality in the field bean. In Milner, M., ed. Nutritional Improvement of Food Legumes by Breeding, Rome, Italy, 1972. Proceedings of a symposium. New York, Protein Advisory Group of the United Nations System. pp.143-149. Engl., 10 Refs., Illus.

Phaseolus vulgaris. Plant breeding. Proteins. Protein content. Amino acids. Nutritive value. USA.

From the standpoint of human needs, the most urgent problems in dry beans are the necessity of improving their yielding ability across broad geographical regions and improving the biological value of their seed protein. Concerning these 2 breeding aspects, the strategy that should be adopted to achieve both yield and quality could be summarized in 3 major aspects: (1) select for high protein levels; (2) aim for 20-22% protein content; and (3) in this last range of protein, concentrate on the selection for yield and for quality (S-containing amino acids). The expectation is that higher levels of yield and quality could be achieved with less difficulty than by any alternative strategy. [CIAT]

0312

24247 ALEMAN M., V. 1984. Selección de poblaciones segregantes. (Selection of segregating populations). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Frijol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.15-18. Span.

Phaseolus vulgaris. Germplasm. Selection. Yields. Resistance. Colletotrichum lindemuthianum. Mexico.

Results are presented of the selection of segregating populations during 1983 carried out with 805 F_5 plants from crosses made since 1979. Planting took place in Tepatitlán (México) to select plants in advanced generations that showed good characteristics of growth habit, tolerance to diseases, light-colored grain, and good yield. Only 140 F_5 plants were selected with resistance to Colletotrichum lindemuthianum. [CIAT]

0313

15268 ANTONIUS, S.; HAGEDORN, D.J. 1979. New sources of resistance to Pseudomonas syringae in Phaseolus vulgaris. Bean Improvement Cooperative. Annual Report 22:89-90. Engl.

Phaseolus vulgaris. Pseudomonas syringae. Cultivars. Resistance. USA.

A brief report on new sources of resistance to Pseudomonas syringae in beans is presented. Since the release of var. Wis BSR 130 in 1977, 5 additional sources of resistance have been identified: PI 313234, PI 313390, and PI 313416, with a very high level of resistance, and PI 313297 and PI 313404 with moderate resistance. Studies are underway to determine the inheritance of resistance and the allelic relationships among the different sources. [CIAT]

0314

24401 AVALOS Q., F.; LOZANO V., C. 1976. Comportamiento de 93 cultivares de fríjoles amarillos al ataque del gusano picador Elasmopalpus lignosellus Zeller. (Performance of 93 yellow-seeded bean cultivars when attacked by the lesser corn stalk borer Elasmopalpus lignosellus). Avances en Investigación 6(7-8):9-12. Span.

Phaseolus vulgaris. Cultivars. Elasmopalpus lignosellus. Resistance. Plant breeding. Peru.

Ninety-three yellow-seeded bean var. were evaluated at Los Pobres, Peru, for their resistance to the lesser corn stalk borer Elasmopalpus lignosellus. Each bean var. was divided into 2 groups (treated and nontreated) to objectively differentiate the damage caused by this insect on the different var. For the treated var., aldrin (0.3%) was applied twice, 9 and 16 days after planting, allowing easy detection of the tolerant var. in each group. The parameters evaluated were % of damaged plants, % of larval population, and no. of damaged plants/larva of E. lignosellus. [CIAT]

0315

22102 AYLESWORTH, J.W.; TU, J.C.; BUZZELL, R.I. 1983. Sanilac BC6-Are white bean breeding line. HortScience 18(1):115. Engl., 8 Refs. [Research Station, Agriculture Canada, Harrow, Ontario, Canada NOR 1G0]

Phaseolus vulgaris. Plant breeding. Cultivars. Resistance. Colletotrichum lindemuthianum. Bean common mosaic virus. Canada.

Sanilac BC6-Are has the horticultural characteristics of its recurrent parent Sanilac. Like Sanilac, it is resistant to alpha, beta, and gamma races of Colletotrichum lindemuthianum and BCMV race 1. However, it is

unique in that it is resistant to the delta and lambda races of C. lindemuthianum and BCMV race 15. A description is given of its origin. [CIAT]

0316

23352 BAGGET, J.R.; FRAZIER, W.A.; VARSEVELD, G.W. 1984. Oregon Trail green bean. HortScience 19(1):134. Engl., 5 Refs., Illus. [Oregon State Univ., Dept. of Horticulture, Corvallis, OR 97331, USA]

Phaseolus vulgaris. Snap beans. Cultivars. Bean common mosaic virus. Resistance. USA.

Oregon Trail is a determinate bush bean cv., typically 0.4-0.5 m tall. It matures about 75 days after early May planting in western Oregon (USA). Pod color is medium-dark green, similar to that of Blue Lake. Quality of the canned and frozen products has been quite acceptable in panel tests over several seasons. Seeds are green when immature and white when mature-dry; dry seed count is approx. 2450/kg. Oregon Trail is resistant to BCMV-type strain and New York 15 (1A) strain and has intermediate resistance to halo blight. It is recommended primarily for home gardens but may be useful also for processing or fresh market. A description of its origin is included. [CIAT]

0317

25200 BEVERSDORF, W.D. 1984. OAC Rico field bean. Canadian Journal of Plant Science 64(3):753-755. Engl., Sum. Engl., Fr. [Crop Science Dept., Univ. of Guelph, Guelph, Ontario N1G 2W1, Canada]

Phaseolus vulgaris. Cultivars. Dwarf beans. Colletotrichum lindemuthianum. Bean common mosaic virus. Resistance. Yields. Canada.

OAC Rico, a field bean cv. resistant to anthracnose (Colletotrichum lindemuthianum) similar in agronomic performance to Ex Rico 23, was developed by the Crop Science Dept., U. of Guelph (Canada). OAC Rico carries the Are gene that confers resistance to alpha, beta, delta, epsilon, gamma, and lambda races of anthracnose. [AS]

0318

25201 BEVERSDORF, W.P.; BUZZELL, R.I. 1984. OAC Seaforth field bean. Canadian Journal of Plant Science 64(3):757-758. Engl., Sum. Engl., Fr. [Crop Science Dept., Univ. of Guelph, Guelph, Ontario N1G 2W1, Canada]

Phaseolus vulgaris. Cultivars. Dwarf beans. Colletotrichum lindemuthianum. Bean common mosaic virus. Resistance. Yields. Canada.

OAC Seaforth, a field bean cv. resistant to anthracnose (Colletotrichum lindemuthianum) similar in agronomic performance to Seafarer, was developed cooperatively by Agriculture Canada Research Station, Harrow, and the Crop Science Dept., U. of Guelph (Canada). OAC Seaforth carries the Are gene that confers resistance to alpha, beta, gamma, delta, epsilon, and lambda races of anthracnose. [AS]

0319

15464 BURKE, D.W. 1980. Release of five new dry bean cultivars. Bean Improvement Cooperative. Annual Report 23:68-69. Engl.

Phaseolus vulgaris. Cultivars. Fusarium solani phaseoli. Bean common mosaic virus. Resistance. USA.

A brief report is presented of the release of 5 early maturing, short-vine, multiple disease resistant bean cv.: NW-410 and NW-590 (resistant to prevalent strains of BCMV and to Fusarium), NW-59 and NW-63 (resistant to Fusarium and to prevalent type and NY-15 strains of BCMV), and NW-395 (resistant to curly top virus and all known prevalent strains of BCMV). [CIAT]

0320

22686 CAFATI K., C. 1982. Porotos: variedades recomendadas. (Beans: recommended varieties). Investigación y Progreso Agropecuario La Platina (Chile) no.13:16-17. Span., Illus.

Phaseolus vulgaris. Cultivars. Plant anatomy. Plant geography. Planting. Spacing. Maturation. Resistance. Bean common mosaic virus. Bean yellow mosaic virus. Races. Selection. Chile.

Plant and seed characteristics, uses, production area, planting dates, seeding rates and distances, reaction to BCMV and BYMV, and crop cycle are given in table form for Chilean var. Apolo, Blanco-INIA, Tórtola Diana, Tórtola-INIA, Araucano-INIA, Frutilla-INIA, Hallados-Alemanes, Arroz-3, Seaway, Negro-Argel, Orfeo-INIA, and Redkloud. [CIAT]

0321

24280 CARRIJO, I.V.; BANJA, W.H.; MACEDO, A.A. 1983. Feijao-vagem Macarrao Favorito Ag 480. (Snap beans Macarrao Favorito Ag 480). Horticultura Brasileira 1(1):51. Port.

Phaseolus vulgaris. Snap beans. Cultivars. Resistance. Fromyces phaseoli. Erysiphe polygoni. Brazil.

The origin, characteristics, uses, and adaptation of the new high yielding snap bean cv. Macarrao Favorito Ag 480 are briefly described. This cv. is resistant to Fromyces phaseoli and Erysiphe polygoni. [CIAT]

0322

24245 CENTRO DE INVESTIGACIONES AGRICOLAS DE EL BAJIO, MEXICO. PROGRAMA DE FRIJOL. 1984. Informe Anual de Investigación del Grupo Interdisciplinario de Frijol 1983. (1983 Annual Research Report of the Multidisciplinary Bean Team). México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. 200p. Span., Sum. Span.

Phaseolus vulgaris. Intercropping. Zea mays. Plant breeding. Weeding. Fertilizers. Entomology. Mexico.

Results are presented of the research work on beans grown alone and in association with maize carried out during the spring-summer cycle of 1983 at the Los Altos de Jalisco exptl. field, Centro de Investigaciones Agrícolas de El Bajío (Jalisco, Mexico). The research work on beans in monoculture was conducted in the areas of genetic improvement, fertilization, weed control, entomology, plant pathology (evaluation of international nurseries), and genetic resources. Research work on maize and beans in association was conducted in the areas of genetic improvement, fertilization, and entomology. Individual papers are recorded in this publication under the following consecutive no.: 0003, 0004, 0006, 0051, 0066, 0083, 0119, 0124, 0125, 0126, 0140, 0144, 0157, 0158, 0162, 0196, 0197, 0198, 0199, 0200, 0202, 0281, 0282, 0312, 0348, 0349, 0354, 0355, 0356, 0357. [CIAT]

0323

20654 CENTRO DE INVESTIGACIONES FITOECOGENETICAS PAIRUMANI. BOLIVIA. 1982. Sección fríjol. (Bean section). In ____. Informe de actividades 1982. Cochabamba. pp.13-14. Span.

Phaseolus vulgaris. Cultivars. Germplasm. Plant introductions. Resistance. Colletotrichum lindemuthianum. Yields. Dwarf beans. Climbing beans. Selection. Bolivia.

Research activities in beans carried out by the Centro de Investigaciones Fitoecogenéticas Pairumani, Bolivia, during 1982 are reported. Crosses were made to incorporate resistance to Colletotrichum lindemuthianum in high yielding, good quality, anthracnose-susceptible cv. Germplasm introduced from CIAT was evaluated at Pairumani and Chapare with av. yields of 3.0 and 1.5 t/ha, resp. Outstanding early bush cv. were TV-1, Pijao, Pairumani FI-141, and Pairumani FI-27 (av. yield 2 t/ha). Outstanding early climbing cv. were Pairumani FI-132, FI-125, FI-142, and FI-72 (av. yield 1.7 t/ha). Outstanding late climbing cv. were Pairumani FI-122, CF-23, CF-39, and CF-13 (av. yield 2 t/ha). Rhizobium collected from 7 wild plant species improved bean nodulation. Twenty-two demonstration plots were set up to promote bean cultivation. Basic seed of Pairumani FI-141, FI-27, FI-69, FI-125, and CF-39, and ICA-Tui was provided for multiplication. [CIAT]

0324

25339 CONWAY, J.; TAYLOR, J.D.; WALKEY, D.G.A.; INNES, N.L. 1983. Phaseolus bean. In National Vegetable Research Station. Annual Report 1983. Wellesbourne, England. p.56. Engl.

Phaseolus vulgaris. Cultivars. Resistance. Pseudomonas phaseolicola. Colletotrichum lindemuthianum. Plant breeding. Selection. Yields. Adaptation. Bean common mosaic virus. United Kingdom.

Several high yielding, early maturing progenies were identified in a replicated progeny row trial of a wide range of F_6 and F_7 material from diverse crosses aimed at breeding dry, white-seeded beans with resistance to all known strains of BCMV and to Pseudomonas phaseolicola. In another breeding program, parental lines did not contain the Are gene for resistance to the lambda race of Colletotrichum lindemuthianum and were fully susceptible to that race. However, breeding lines showed considerable resistance although not the complete resistance normally conferred by the Are gene. Parental lines were resistant to other races of C. lindemuthianum and it is thought that resistance of the breeding lines may stem from the fortuitous accumulation of different resistance genes from the various parents. [Plant Breeding Abstracts]

0325

25327 DIAZ C., H.; LEON G., J.P.; SANCHEZ, A. 1984. Güira 89: nueva variedad de fríjol para Cuba. (Güira 89: a new bean variety for Cuba). Ciencias de la Agricultura no.19:121. Span., 1 Ref. [Inst. de Investigaciones Fundamentales en Agricultura Tropical Alejandro de Humboldt, Habana, Cuba]

Phaseolus vulgaris. Cultivars. Flowers. Pods. Yields. Spacing. Planting. Timing. Plant breeding. Cuba.

Selected from plants of bean var. Jamapa de Holguín which differed from the rest of the population in height, pod no./plant, and leaf color among other traits, Güira 89 is an erect, indeterminate var., with purple flowers, green pods with purple splashes at maturity, black seeds, and a 100-seed

wt. of 19-20 g. It takes 40-44 days to flowering and 100-103 days to harvest. Nov. is the best time to sow. Yields are in the region of 3 t/ha at 12% seed moisture. [Plant Breeding Abstracts]

0326

15476 DICKSON, M.H.; BOETTGER, M.A. 1979. Release of 12 root rot tolerant snap bean lines. Bean Improvement Cooperative. Annual Report 22:102. Engl.

Phaseolus vulgaris. Plant breeding. Cultivars. Selection. Resistance. Fusarium. Pythium ultimum. USA.

A brief report is presented on the release of 12 snap bean lines selected for their tolerance to Fusarium sp. and Pythium ultimum: G767, G6708, G6725, G6726, G6754, and G6802 (green pods and white seed); G6716, G6717, G6723, and G6854 (green pods and off-white seed); and G6754 and G6794 (wax pods and white seed). [CIAT]

0327

23525 EMPRESA BRASILEIRA DE PESQUISA AGROPECUARIA. 1985. Feijao. (Beans). In _____. Relatório Científico do Centro Nacional de Pesquisa de Arroz e Feijao 1984. Goiania-GO, Brasil. pp.128-196. Port., Illus.

Phaseolus vulgaris. Germplasm. Cultivars. Adaptation. Seed characters. Selection. Intercropping. Harvesting. Mechanization. Resistance. Drought. Bean common mosaic virus. Bean golden mosaic virus. Colletotrichum lindemuthianum. Isariopsis griseola. Uromyces phaseoli. Xanthomonas phaseoli. Empoasca kraemeri. Brazil.

Results are extensively presented of research carried out by the Centro Nacional de Pesquisa de Arroz e Feijao, Goiania (GO, Brazil), on bean breeding. Aspects on bean germplasm evaluation for the selection and adaptation to local conditions, mechanized harvest, intercropping, winter cultivation, drought, low P levels, and high exchangeable Al in the soil are included. Selection was also done for preferred grain color, form, and size, and for tolerance to diseases (BCMV, BGMV, anthracnose, angular leaf spot, rust, and bacterial blight) and insects (Empoasca kraemeri). [CIAT]

0328

24872 FLESCH, R.D. 1985. Recomendacao da cultivar de feijao Carioca 80 para cultivo no oeste catarinense - safra 1985/85. (Recommendations for cultivation of bean cultivar Carioca 80 in western Catarina - 1985-86 crop year). Florianópolis-SC, Brasil, Empresa Catarinense de Pesquisa Agropecuária. Comunicado Técnico no.91. 11p. Port., 6 Refs., Illus. [Empresa Catarinense de Pesquisa Agropecuária, Centro de Pesquisa de Pequenas Propriedades, Caixa Postal 151, Chapecó-SC, Brasil]

Phaseolus vulgaris. Cultivars. Plant introductions. Seed characters. Adaptation. Yields. Brazil.

Bean cv. Carioca 80, derived from the cross Carioca x Cornell 49-242, was developed by the Instituto Agronomico de Campinas (Brazil). Introduced into Santa Catarina in 1981, it was evaluated in 5 different regions for its agronomic, morphological, and sanitary characteristics. A description is given on its main characteristics, adequate zones for cultivation, yields, and reaction to the most important diseases occurring in the region. [CIAT]

0329

21151 FLOOR, E. 1983. Investigations on drought-resistance of beans developed by the Grain Legume Project. Phaseolus Beans Newsletter for Eastern Africa no.1:8-9. Engl. [Grain Legume Project, National Horticultural Research Station, P.O. Box 220, Thika, Kenya]

Phaseolus vulgaris. Cultivars. Selection. Resistance. Drought. Plant breeding. Kenya.

A selection of drought-tolerant bean var. has been recently initiated by the Grain Legume Project at the National Dryland Farming Research Station (Kutumani, Kenya). Expt. consisted of yield trials in the semiarid Eastern Province and a trial under sprinkler irrigation in Thika, planted at the end of the rainy season. Some of the var. tested have already been released with GLP-1004 (Mwezi Moja type) being recommended for dry areas. [CIAT]

0330

25355 FULLER, P.A.; COYNE, D.P.; STEADMAN, J.R. 1984. Inheritance of resistance to white mold disease in a diallel cross of dry beans. Crop Science 24(5):929-933. Engl., Sum. Engl., 19 Refs., Illus. [Pioneer Hi-Bred Int., Inc., Box 667, Napoleon, OH 43545, USA]

Phaseolus vulgaris. Inheritance. Resistance. Whetzelinia sclerotiorum. Cultivars. Crossbreeding. USA.

The parents of 15 F_1 populations from a nonreciprocal diallel of 6 lines of Phaseolus vulgaris were evaluated for resistance to Sclerotinia sclerotiorum in the greenhouse and field (Scottsbluff, Nebraska, USA). Within each environment, the genotypic mean squares were highly significant and accounted for 74 and 76% of the total variation in the greenhouse and field, resp. Partitioning the genotypic variation revealed that the line effects were highly significant, accounting for 89 and 94% of the genotypic variation in the greenhouse and field, resp. Disease severity was greater in the greenhouse than in the field, but neither the environment x hybrid, nor the environment x line interactions were significant. Resistance was quantitatively inherited and due primarily to additive gene action. It is concluded that recurrent selection should lead to improvements in resistance. [AS]

0331

19091 GARCIA, R.M.; DIAZ C., H.; PIVOVAROV, V.F.; LEO[illegible], J.P. 1982. Güira 12: nueva variedad de frijol para Cuba. (Güira 12: a new bean variety for Cuba). Ciencias de la Agricultura (Cuba) 13:123. Span.

Phaseolus vulgaris. Cultivars. Yields. Maturation. Seed characters. Cuba.

The origin and characteristics of bean var. Güira 12 for Cuba are briefly described. Var. Druzhva was selected from among germplasm from different countries. Individual plants were selected from Druzhva for single-row plantings from which line 12 was selected to originate the black-seeded, indeterminate Güira, with yields of 2.0-2.2 t/ha (14% MC). [CIAT]

0332

24881 GARCIA B., C.M. 1985. Interacción genotipo x ambiente en el frijol común (Phaseolus vulgaris L.). (Genotype x environment interaction in beans). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 98p. Span., Sum. Span., 57 Refs., Illus.

Phaseolus vulgaris. Genotypes. Adaptation. Cultivars. Relay crops. Planting. Timing. Selection. Yields. Central America. Colombia.

Twenty-seven bean cv. from Central America (native and selected) and from Colombia (selected) were evaluated in 15 environments (7 in Central America and 8 in Colombia) during 2 periods of the year and under 2 cultivation systems (monocrop and relay cropped with maize). Objectives were to study cv. adaptability and stability, define the influence of planting time and systems on cv. evaluation and selection, determine the most adequate environment to evaluate and make selections among early-maturing generations, identify the combinations (systems/times/locations) that ensure stability, and determine the position occupied by groups and cv. in the localities. Data on days to flowering, physiological maturity, no. of plants harvested, and yield were collected. The environments of Ahuachapán (Central America) and Restrepo (Colombia), during the 1st planting season and in monoculture, apparently the best to select and evaluate bean lines in early generations. Planting times and systems for conditions under which this study was conducted did not influence yields or adaptability and stability of bean cv. Native cv. had better stability and improved cv. better adaptability. The group of cv. selected in Colombia was the most outstanding and var. Desarrural 1, Centa Izalco, BAT 1215, BAT 41, and BAT 1514 occupied 1st places; Centa Izalco and BAT 1215 gave a better response to all environments. The methodology used at CIAT for the selection and evaluation of lines is correct, but it is necessary to make certain modifications, mainly in the selection for growth habit, maturity, and planting system, as well as in other environments. [AS (extract)-CIAT]

0333

23381 GARCIA M., J.C. 1972. Evaluación de la resistencia de fríjol hacia la conchuela Epilachna varivestis Muls. (Coleoptera:Coccinelidae). [Evaluation of bean resistance to the Mexican bean beetle Epilachna varivestis Muls. (Coleoptera:Coccinelidae)]. Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. Escuela Nacional de Agricultura. 60p. Span., Sum. Span., 32 Refs., Illus.

Phaseolus vulgaris. Cultivars. Germplasm. Resistance. Epilachna varivestis. Mexico.

An expt. was carried out to search for sources of bean resistance to the Mexican bean beetle (Epilachna varivestis) and to determine the factors responsible for these resistance mechanisms. In field and greenhouse trials 93 var. were evaluated. During the preliminary phase of research, 16 var. were selected. Trials were carried out with some of these selected var. to observe the behavior of 10 larvae of E. varivestis feeding on them. Larvae were found to not be significatively attracted by any of the var. included; instead, significative differences were found in the amount of leaf surface consumed. This indicated that once E. varivestis larvae started to feed, they were stimulated to continue feeding; this indicates the presence of a stimulating factor in plants showing a more severe attack. In another trial where the no. of larvae was increased to 20, attraction was not statistically significative for any of the var. evaluated; the same was true for leaf surface consumed. Trials on eating preference and nonpreference under field conditions showed certain var. are preferred by E. varivestis and others are not; trials on preference and nonpreference for oviposition in cages under field conditions indicated that females need a mechanism of attraction to oviposit. Of the 16 var. initially selected, 4 rated as susceptible, 3 as resistant, and the rest as tolerant. It was concluded that this resistance was due to the antibiosis mechanism. [AS (extract)-CIAT]

0334

15213 HAGEDORN, D.J.; RAND, R.E. 1980. Release of Wis. (RRR) 46 bush bean breeding line. Bean Improvement Cooperative. Annual Report 23:125-126. Engl.

Phaseolus vulgaris. Cultivars. Fusarium solani phaseoli. Pythium. Rhizoctonia solani. Plant breeding. Resistance. Selection. USA.

A description is given of the origin and characteristics of the bush bean breeding line Wis. (RRR) 46, intended only for use in breeding programs. It shows a high level of resistance to Fusarium solani sp. phaseoli, Pythium spp., and Rhizoctonia solani. Av. yields calculated for 1977 and 1978 were 3070 kg/ha compared with 2453 kg/ha for the susceptible control, 83. [CIAT]

0335

14346 HAGEDORN, D.J.; RAND, R.E. 1979. Wisconsin (BBSR) 17 and 28 snap bean breeding lines resistant to Pseudomonas syringae. HortScience 15(2):208-209. Engl., 2 Refs., Illus.

Phaseolus vulgaris. Cultivars. Pseudomonas syringae. Selection. Resistance. Plant breeding. USA.

Information is given on the development and release of the 2nd and 3rd breeding lines of bush snap beans with resistance to the bacterial brown spot disease caused by Pseudomonas syringae. These prolific new snap bean breeding lines have been designated Wisconsin (BBSR) 17 and Wisconsin (BBSR) 28, and are intended for use as parental materials in breeding programs. A description of these 2 var. and their origin is also included. [CIAT]

0336

15452 HAGEDORN, D.J.; RAND, R.E. 1979. Release of new Phaseolus vulgaris germ plasm resistant to bacterial brown spot (Pseudomonas syringae). Bean Improvement Cooperative. Annual Report 22:54. Engl.

Phaseolus vulgaris. Germplasm. Resistance. Pseudomonas syringae. Plant breeding. Cultivars. USA.

A description is given of the origin, characteristics, and reaction to Pseudomonas syringae of Wis. (BBSR) 17 and Wis. (BBSR) 28 beans, released as parental materials intended for use in bean breeding programs. They differ in that Wis. 28 is not quite as resistant to P. syringae, especially in the greenhouse where after artificial inoculation both grains and pods showed a few regular-sized lesions, and that its pods have a more acceptable shape than those of Wis. 17. [CIAT]

0337

15451 HAGEDORN, D.J.; RAND, R.E. 1979. Release of new Phaseolus vulgaris germ plasm resistant to Wisconsin's bean root rot disease complex. Bean Improvement Cooperative. Annual Report 22:53. Engl.

Phaseolus vulgaris. Cultivars. Resistance. Fusarium solani phaseoli. Pythium. Selection. USA.

The origin, characteristics, and reaction to the bean root rot disease complex (Fusarium solani f. sp. phaseoli, Pythium spp., and Rhizoctonia solani) of Wis. (RRR) 46 beans are described. This material was released for use as parental material in bean breeding programs. Calculated av.

yields for 1977 and 1978 were 3070 kg/ha for Wis. (RRR) 46 with resistance, compared with 2453 kg/ha for the susceptible check. [CIAT]

0338

24873 HOOVER, E.E. 1982. Regulation of fruit set of Phaseolus crosses by pollen source and environment. Ph.D. Thesis. Minneapolis, University of Minnesota. 124p. Engl., Sum. Engl., 119 Refs., Illus.

Phaseolus vulgaris. Phaseolus coccineus. Hybridizing. Crossbreeding. Pollination. USA.

Preabortion seed development of Phaseolus coccineus x P. vulgaris (PC x PV) was compared with normal seed development in selfed P. coccineus (PC). Compared with PC selfed, the PC x PV showed: (1) slower seed development, (2) reduced pod length, (3) a higher pod length:no. of seeds/pod ratio, (4) slower embryo development, and (5) increased vol. of liquid endosperm. High amounts of zeatin riboside and dihydrozeatin riboside and relatively low amounts of IAA and ABA in the PC selfed embryo suggest functions for these compounds in normal embryo development. Imbalances of IAA and ABA in PC x PV embryos may function in regulating embryo abortion. [Plant Breeding Abstracts]

0339

24153 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1971. Haricots. (Beans). In _____. Rapport Annuel 1971. Rubona. pp.21-36. Fr., Illus.

Phaseolus vulgaris. Cultivars. Germplasm. Yields. Adaptation. Technology evaluation. Rwanda.

Lists and charts are presented on the bean var. evaluated during the 1st and 2nd seasons of 1971 in Rubona, Rwanda. Vegetative cycle, yields/plot, and observations are included. Bean var. Wulma intercropped every 5 plots was used as check. A no. of var., among them no. 37 (1060 kg/ha), outyielded the check which was highly susceptible to viral diseases. [CIAT]

0340

23329 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1966. Multiplications de haricots. (Bean multiplication). In _____. Rapport Annuel 1966. Rubona. pp.L.7-L.8,L.10,L.15. Fr.

Phaseolus vulgaris. Yields. Planting. Timing. Adaptation. Plant introductions. Technology evaluation. Rwanda.

Over 20 ha were planted for crop multiplication during the 2 seasons of 1966 in Rubona, Rwanda. Yields of the different crops are tabulated. Bean yields were 1574 and 970 kg dry seed/ha in the 2 seasons, resp. Early drought produced the lower yields during the 2nd season. The yields of various bean var. planted in Oct. 1965 and in March 1966 are included; these ranged between 1167-2411 and 785-1447 kg/ha, resp., and the highest yielding var. were Wulma and Nyiramahoro, resp. Eleven bean var. were evaluated in comparative trials; some of them were introductions from South America, Uganda, and Belgium, with yields that ranged between 1215-1790 kg/ha. The highest yielding var. was Nyiramahoro with 1790 kg/ha. [CIAT]

0341

23325 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1963. Cultures vivrieres: haricot. (Food crops: beans). In _____. Rapport Annuel 1964. Rubona. pp.149-151. Fr.

Phaseolus vulgaris. Plant introductions. Germplasm. Cultivars. Cultivation. Rwanda.

A list is presented on bean introductions, var. collection and multiplication in Rubona, Rwanda, during 1964. Data included are locality, area planted to beans, planting time and spacing, harvest time, wt. of harvested beans, yields, and observations on yellow-seeded and red-seeded bean types, Kicaro types (locally preferred), and var. Wulma, Bataaf, Mixed Mexico, Cuarentino, and Bayo. This last var. is the most widespread in rural areas because of its high yields. [CIAT]

0342

24190 INSTITUT NATIONAL POUR L'ETUDE AGRONOMIQUE DU CONGO BELGE. 1960. Haricots. (Beans). In _____. Rapport Annuel 1960. Zaire, Station de Mulungu. pp.89-96. Fr.

Phaseolus vulgaris. Germplasm. Plant introductions. Selection. Cultivars. Adaptation. Hybridizing. Zaire.

Information is presented on collection, var. selection, and comparative bean trials at Mulungu Station, Zaire, during 1960. Fifteen var. from southern Kivu and Rwanda were introduced. Disease resistance is a priority criterion in selection, and stable yields are considered more important than increased av. yield. The most outstanding selections are those presenting higher yields without fungicide application (A), followed by those with higher yields with fungicide application (B). Crosses will be made between A and B selections. In comparative trials, only S.G. 44 (black) showed acceptable performance under unfavorable conditions (Melanagromyza phaseoli and rust) and was the most outstanding when the fungicide zineb was applied. A total of 185 pedigree lines were kept. Successful interspecific hybridization resulted only when the female parent was Phaseolus vulgaris. The best genetic sources are black var., but these are rejected by consumers. It is recommended to anticipate the selection of sources in the hybridization program to reduce crop areas. [CIAT]

0343

24175 INSTITUT NATIONAL POUR L'ETUDE AGRONOMIQUE DU CONGO BELGE. 1946. Haricots. (Beans). In _____. Rapport Annuel 1946. Zaire, Station de Mulungu. pp.108-110. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Phaseolus lunatus. Phaseolus coccineus. Dwarf beans. Climbing beans. Zaire.

A list is presented of the Phaseolus vulgaris (203), P. lunatus (38), P. coccineus (12), and P. angularis (2) var. conforming the collection of 245 Phaseolus var. at Mulungu Station, Zaire, in 1946. The list of bush var.—all of them attacked by rust and anthracnose—and the list of climbing var. are included. Plans for 1947 included some cultural trials with bush bean var. at different exptl. centers of Mulungu; these var. were already in seed multiplication plots. [CIAT]

0344

24174 INSTITUT NATIONAL POUR L'ETUDE AGRONOMIQUE DU CONGO BELGE. 1945. Haricots. (Beans). In _____. Rapport Annuel 1945. Bruxelles. v.63,pp.80-82,147. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Resistance. Colletotrichum lindemuthianum. Fromyces phaseoli. Dwarf beans. Climbing beans. Maturation. Phaseolus coccineus. Phaseolus angularis. Zaire.

A list is presented of the var. of Phaseolus vulgaris (198 species), P. lunatus (40 species), P. coccineus (2 species), and P. angularis (2 species) conforming the Phaseolus spp. collection at the Mulungu Station, Zaire, and evaluated during 1945. Resistance to anthracnose and rust, earliness, and growth were observed. Among the bean var., 36 were bush var., of which 9 were early maturing and 1 (Idaho Refugee) resistant to anthracnose; all were susceptible to rust. There were 162 climbing var., out of which 15 were early maturing, 58 resistant to anthracnose, and 20 apparently resistant to rust. [CIAT]

0345

22162 INSTITUTO COLOMBIANO AGROPECUARIO. 1982? Cultivos transitorios: fríjol. (Transient crops: beans). In _____. Catálogo de semillas. pp.15-16. Span., illus.

Phaseolus vulgaris. Cultivars. Cultivation. Plant habit. Seed characters. Diseases and pathogens. Resistance. Yields. Colombia.

Bean var. Diacol-Calima, ICA-Palmar, ICA-Pijao, ICA-Tui, and ICA-Viboral, developed by the Instituto Colombiano Agropecuario (ICA) are briefly described in terms of adaptation, exptl. yields, growth habit, vegetative cycle, plant and seed characteristics, recommended planting rates, and disease resistance. [CIAT]

0346

22692 INSTITUTO NACIONAL DE INVESTIGACIONES AGRICOLAS. MEXICO. 1982. Fríjol. (Beans). In _____. Diagnóstico de la investigación realizada por el INIA en 1981. México, Secretaría de Agricultura y Recursos Hidráulicos. pp.63-65. Span.

Phaseolus vulgaris. Plant breeding. Cultivars. Fertilizers. Drought. Resistance. Diseases and pathogens. Weeding. Intercropping. Mycoses. Mexico.

Advances in bean research conducted by the Instituto Nacional de Investigaciones Agrícolas in Mexico during 1981 are presented. Eleven new var. were released for commercial production in different regions: Negro Nayarit, Sinaloa, Azabache, Pinto Mexicano 80, Pinto Norteño, Negro Veracruz, Negro Chiapas, Negro Fraylesca, Flor de Mayo RMC, Bayo Los Llanos, and Bayo Durango. Fertilization x var. x plant density trials were conducted in different regions. Herbicides alone or in mixtures were identified as appropriate for monocropped beans or bean/maize associations. Chlorothalonil effectively controlled Fromyces phaseoli, Colletotrichum lindemuthianum, and Isariopsis griseola. Promising lines were obtained from the breeding program. Improved technology (improved var., complete fertilization, and weed and disease control) increases bean production at the farm level. [CIAT]

0347

24158 LE MARCHAND, M.G. 1969. Annexe 5. Sélection des papilionacées comestibles. (Annex 5. Selection of edible papilionaceous plants: beans). In _____. Situation alimentaire générale et problemes particuliers posés par les cultures vivrieres au Rwanda. Gembloux, Belgique, Faculté des Sciences Agronomiques de l'Etat. pp.48-50. Fr.

Phaseolus vulgaris. Plant breeding. Phaseolus coccineus. Hybridizing. Rwanda.

Data are presented on breeding of Phaseolus vulgaris in Rwanda during 1963. This is the most cultivated species and occupies the place previously occupied by Vigna unguiculata. It has been established that the best bean selections are closely related to the best known classical cv. Through selection, only new ecotypes are obtained, adapted to specific conditions. It is not necessary, therefore, to evaluate local cv. which are very heterogeneous, but the offspring of the best materials found. Foreign introductions are selected and pedigree selection is done (intraspecific hybrids, selections, and wild materials). Research on interspecific hybridization (P. vulgaris x P. coccineus) continues and good results are expected in spite of the many unuseful F_1 and F_2 progenies. [CIAT]

0348

24267 LEDESMA G., L.A. 1984. Avance y selección de material segregante voluble y semivoluble. (Advance and selection of segregating climbing and semiclimbing materials). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigaciones del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.127-128. Span.

Phaseolus vulgaris. Climbing beans. Germplasm. Selection. Yields. Intercropping. Zea mays. Mexico.

In Los Altos de Jalisco, Mexico, 115 F_2 populations, 51 F_4 selections, and 10 F_7 selections from the hybridization program were sown to select segregating climbing and semiclimbing bean materials with adequate agronomic characteristics for the association with maize and good yield potential. The no. of selections decreased due to the strong selection pressure applied and 44 selections were obtained at different degrees of homozygosis. [CIAT]

0349

24268 LEDESMA G., L.A. 1984. Parcelas preliminares de rendimiento. (Preliminary yield plots). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.129-131. Span.

Phaseolus vulgaris. Germplasm. Cultivars. Adaptation. Yields. Resistance. Colletotrichum lindemuthianum. Selection. Climbing beans. Mexico.

In 2 expt. carried out in Los Altos de Jalisco (Mexico) in 1983, 17 and 97 climbing bean materials, resp., from CIAT were evaluated for their resistance to diseases (especially anthracnose), adaptation, and yields in association with maize. Four selections were obtained which will be transferred to the preliminary or regional trials. The materials ACV-8344 and ACV-8364 were outstanding for their good agronomic characteristics and yield. [CIAT]

0350

22207 LLANO G., A. 1983. Ensayos de fitomejoramiento de fríjol en 1982. (Breeding trials with beans in 1982). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L.

en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.26-34. Span.

Phaseolus vulgaris. Cultivars. Selection. Yields. Adaptation. Nicaragua.

Trials were conducted in different localities of Nicaragua with red, black, and white beans from the IBYAN, which collects the best selections from CIAT. Other trials involved red and black bean selections from the VICAR (Central American Yield Nursery). Outstanding var. from both the IBYAN and the VICAR are listed. Additionally, 2 trials were conducted to evaluate the performance of cowpea germplasm. [CIAT]

0351

22227 LLANO G., A. 1983. Epidemiología de enfermedades del fríjol común negro. (Epidemiology of black bean diseases). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.81-85. Span.

Phaseolus vulgaris. Cultivars. Xanthomonas phaseoli. Bean chlorotic mottle virus. Epidemiology. Resistance. Plant development. Nicaragua.

Nineteen black bean var. were planted in Santa Marta (León, Nicaragua) in 1981 to evaluate their reaction to viral and bacterial diseases. Sixteen other bean var. were planted in Rivas to evaluate their resistance to common blight. The only viral disease present in the León trials was the bean chlorotic mottle virus, var. Jamapa being the less affected by this disease. For the same locality, var. Quetzal and Bat-270 were the most resistant to common blight. In Rivas, var. Cueto 25-9 and Tela-46 showed intermediate-to-resistant reaction to common blight. [CIAT]

0352

22211 LLANO G., A. 1983. Evaluación de la resistencia de germoplasma de fríjol común a mustia hilachosa Tanatephorus cucumeris. (Evaluation of bean germplasm for resistance to web blight Thanatephorus cucumeris). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.42-44. Span.

Phaseolus vulgaris. Cultivars. Selection. Rhizoctonia solani. Resistance. Nicaragua.

Field trials were conducted to evaluate the resistance of 24 bean var. to the web blight disease caused by Rhizoctonia solani. The best lines were Bat-1220, Bat-1231, and Bat-1235. [CIAT]

0353

25229 MANSHARDT, R.M.; BASSETT, M.J. 1984. Inheritance of stigma position in Phaseolus vulgaris x P. coccineus hybrid populations. Journal of Heredity 75(1):45-50. Engl., Sum. Engl., 18 Refs., Illus. [Dept. of Horticulture, Univ. of Hawaii, Honolulu, HI 96822, USA]

Phaseolus vulgaris. Phaseolus coccineus. Cultivars. Hybridizing. Stigma. Inheritance. Genes. USA.

Stigma positions in generations derived from interspecific crosses of Phaseolus vulgaris (introrse stigma position) and P. coccineus (extrorse stigma position) were determined quantitatively by measurement of stigma dimensions. Inheritance of stigma position was found to be quantitative, involving more than 6 genes, as indicated by the proportion of plants with parental stigma phenotypes in a test cross progeny. Genes determining the introrse stigma of P. vulgaris showed incomplete dominance over those determining the extrorse stigma of P. coccineus in 4 of 5 crosses. The remaining cross showed essentially additive gene action for stigma position. In the F_3 generation of one of the former crosses, evidence suggesting selective elimination of genes conditioning the extrorse stigma position of P. coccineus was observed. Stigma position heritability estimates, based on the correlation between F_3 progeny means and the resp. F_2 parents, averaged 0.59. [AS]

0354

24260 MARTINEZ R., J.L. 1984. Evaluación de material genético contra enfermedades del fríjol presentes en Tepatitlán, Jal. (Evaluation of genetic material against bean diseases occurring in Tepatitlán, Jalisco). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.98-101. Span.

Phaseolus vulgaris. Germplasm. Cultivars. Resistance. Selection. Chaetoseptoria wellmanii. Erysiphe polygoni. Xanthomonas phaseoli. Colletotrichum lindemuthianum. Isariopsis griseola. Pseudomonas phaseolicola. Fromyces phaseoli. Mexico.

In 1983, 124 bean materials were evaluated in Tepatitlán, Mexico, for their resistance to the diseases prevalent in the region. These were, in order of incidence, those caused by Chaetoseptoria wellmanii, Erysiphe polygoni, Xanthomonas phaseoli, Colletotrichum lindemuthianum, Isariopsis griseola, Pseudomonas phaseolicola, and Fromyces phaseoli. Many materials were defoliated by C. wellmanii and no material immune to this pathogen was found. Eighteen materials were selected that showed equal or higher yields than that of var. Guero Alubia. [CIAT]

0355

24260 MARTINEZ R., J.L. 1984. Evaluación del vivero del CIAT de fuentes de resistencia a la antracnosis en Tepatitlán, Jal. (Evaluation of the CIAT nursery of sources of resistance to anthracnose in Tepatitlán, Jalisco). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.91-94. Span.

Phaseolus vulgaris. Germplasm. Cultivars. Adaptation. Selection. Mexico.

The nursery of sources of resistance to anthracnose was evaluated in 1983 in Tepatitlán, Mexico. Early occurrence of Chaetoseptoria wellmanii and Erysiphe polygoni hindered the advance of Colletotrichum lindemuthianum; therefore the resistance to this pathogen was not effectively evaluated. To increase disease incidence and diminish the competition of other diseases, it is necessary to make artificial inoculations. However, 8 var. with good adaptation and promising agronomic characteristics were detected for use in breeding programs. [CIAT]

0356

24259 MARTINEZ R., J.L. 1984. Evaluación del vivero internacional de fríjol con tolerancia a la antracnosis del CIAT en Tepatitlán, Jal. (Evaluation of CIAT's international bean nursery with tolerance to anthracnose in Tepatitlán, Jalisco). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.87-90. Span.

Phaseolus vulgaris. Germplasm. Cultivars. Resistance. Colletotrichum lindemuthianum. Adaptation. Selection. Mexico.

In 1983, 124 var. were evaluated in the International Bean Anthracnose Test (CIAT) in Tepatitlán (Jalisco, Mexico). Colletotrichum lindemuthianum began to appear in the 1st stages of the crop, but it only affected a few var. Chaetoseptoria wellmanii appeared later on, restraining the advance of C. lindemuthianum and other foliar diseases, except powdery mildew (Erysiphe polygoni). Therefore the resistance to anthracnose could not be effectively evaluated; however, 21 var. that showed good agronomic characteristics (adaptation and resistance to this and other diseases) were detected for their inclusion in the breeding program. [CIAT]

0357

24261 MARTINEZ R., J.L. 1984. Inoculaciones artificiales de antracnosis bajo condiciones de invernadero. (Artificial inoculations with anthracnose under greenhouse conditions). In Centro de Investigaciones Agrícolas de El Bajío. México. Programa de Fríjol. Informe Anual de Investigación del Grupo Interdisciplinario de Fríjol 1983. México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. pp.95-97. Span.

Phaseolus vulgaris. Germplasm. Cultivars. Resistance. Colletotrichum lindemuthianum. Selection. Mexico.

A total of 805 bean selections were artificially inoculated with Colletotrichum lindemuthianum under greenhouse conditions in Jalisco, Mexico, to evaluate their resistance to the pathogen. Only 122 materials showed an acceptable degree of resistance, which indicates that by controlling the conditions of infection, a greater selection pressure can be obtained. The combined evaluation, greenhouse-field, is the best alternative for the selection of genetic material with resistance to anthracnose, without neglecting agronomic aspects. [CIAT]

0358

15445 MEINERS, J.P. 1979. Sources of resistance to U.S. bean rust—update. Bean Improvement Cooperative. Annual Report 22:62-63. Engl.

Phaseolus vulgaris. Cultivars. Resistance. Uromyces phaseoli. Selection. Plant breeding. USA.

In 1977 and 1978, 170 entries of the International Bean Rust Nursery (IBRN) were evaluated under greenhouse conditions at Beltsville (Maryland, USA) for their reaction to 4 collections of Uromyces phaseoli, collected in different geographic areas of the USA. Costa Rica 1031, Negro Jalpatagua, and NEP-2 were rated as immune or hypersensitive (no spores produced). The following materials were rated as resistant (pustules 300 micra or less in diameter): Actolac, Colorado, Compuesto Chimaltenango 2 and 3, Cuva 168-N, Mexico 309, Pinto Serrano, PI 163372, PI 310878, PI 313525, PR-1, PR-2,

PR-6, Puebla 3-A-2, Ricopardo, San Pedro Pinula, and Zamorano 2. Apparently many entries in the IBRN possess general rather than vertical resistance. [CIAT]

0359

21980 MOHAN, S.T.; MOHAN, S.K. 1983. Breeding for common bacterial blight resistance in beans. Bean Improvement Cooperative. Annual Report 26:14-15. Engl., 2 Refs. [Inst. Agronomico do Paraná, Caixa Postal 1331, 86.100 Londrina-PA, Brasil]

Phaseolus vulgaris. Cultivars. Selection. Resistance. Xanthomonas phaseoli. Crossbreeding. Plant breeding. Brazil.

A breeding project was initiated to incorporate common blight resistance into local bean cv. of Paraná, Brazil. Approx. 1000 Phaseolus vulgaris accessions (indigeneous and introduced germplasm) were screened in the field by artificial inoculation with the inoculum of a virulent local isolate of Xanthomonas campestris pv. phaseoli, 822 A-1, at a concn. of approx. 10^6 cells/ml. None of the materials showed immunity or a high level of resistance; Great Northern Nebraska 1. Sel. 27 and P.I. 207-262 showed moderate levels of resistance. Crossings were made between several commercial var. and Great Northern Nebraska 1. Sel 27. Evaluations were made on a scale of 1-5. Several of the selections showed improved levels of foliage resistance as compared with the commercial parent var. used in the crossing. The advanced lines were designated as IAPAR BAC series and the 1st set of lines is being used in several breeding programs within and outside the country. [CIAT]

0360

19955 MOHAN, S.T. 1982. Evaluation of Phaseolus coccineus Lam. germplasm for resistance to common bacterial blight of bean. Turrialba 32(4): 489-490. Engl., Sum. Engl., Span., Port., 3 Refs. [Inst. Agronomico do Paraná, Caixa Postal 1331, 86.100 Londrina-PR, Brasil]

Phaseolus coccineus. Germplasm. Cultivars. Resistance. Xanthomonas phaseoli. Brazil.

Eleven materials of Phaseolus coccineus were evaluated for resistance to common blight caused by Xanthomonas campestris pv. phaseoli. Accessions M 7701, G 35044, N.I. 520, and N.I. 15 were highly resistant and can serve as sources of resistance in breeding dry beans for common blight resistance. [AS]

0361

24885 NIENHUIS, J.; SINGH, S.P. 1985. Effects of location and plant density on yield and architectural traits in dry beans. Crop Science 25:579-584. Engl., Sum. Engl., 15 Refs., Illus.

Phaseolus vulgaris. Cultivars. Determinate cultivars. Indeterminate cultivars. Plant anatomy. Planting. Spacing. Yields. Plant architecture. Plant breeding. Colombia.

Six dry bean exptl. lines of growth habits I, II, and III, bred for one or more plant architectural traits, were compared at 3 locations in Colombia with 6 other cv. which were conventionally developed exptl. lines of similar growth habits. At each location plant densities of 5, 13, 22, and 30 plants/m^2 were established. The objectives were to examine (1) whether lines bred for architectural traits outyielded cv. and exptl. lines bred

conventionally, (2) the effects of environment and plant density on architectural traits and seed yield, and (3) the associations between architectural traits and yield. No genotype of any growth habit bred for specific architectural traits outyielded the commercial check cv. Indeterminate, postrate type III, and type II cv., in that order, were among the highest yielding, regardless of environment and plant density. These also offer the best opportunity for the development of broadly adapted, high yielding dry bean cv. for monoculture. Locations, seasons within locations, and plant densities each affected yield and architectural traits. Significant interactions were observed between environment, growth habit, and plant density, and these factors affected yield and all architectural traits. Differences were greatest between determinate and indeterminate growth habits (type I vs. types II and III). For plant density the shape of the response curves for yield was parabolic, whereas the shape for type I beans was asymptotic. Curvilinear (types I and II) and linear (type III) increases in nodes/m^2 were observed as plant density increased. Branch and node no./plant decreased linearly with increasing plant density for genotypes of all 3 growth habits. Linear reductions in node no. on the main stem were observed in indeterminate types II and III with increasing plant density, but internode length did not change. In contrast, the no. of nodes on the main stem of determinate type I remained unchanged but internode length increased linearly as plant density increased. Nodes/m^2 and branches/plant were positively correlated with yield, regardless of environment or plant density. In contrast, nodes/branch and internode length on the main stem were positively correlated with yield over the range of plant densities used, but showed variable correlation over environments. Therefore, development of bean plant ideotypes with enhanced expression of certain architectural traits can result in limited adaptation and reduced yield potential in some environments. [AS]

0362

24287 PRATT, R.C. 1983. Gene transfer between tepary and common beans. Desert Plants 5(1):57-63. Engl., 49 Refs., Illus. [Dept. of Horticulture, Purdue Univ., West Lafayette, IN 47907, USA]

Phaseolus vulgaris. Phaseolus acutifolius. Crossbreeding. Hybridizing. USA.

The genetics of interspecific crossbreeding between Phaseolus acutifolius and P. vulgaris is reviewed. Aspects regarding the process of speciaton and genetic isolation, interspecific hybridization between these 2 species, strategies for successful gene transfer, and the authentication of interspecific hybrids are discussed. The barriers which once prevented successful interspecific hybridization between these 2 species are no longer insurmountable. With the transfer of specific P. acutifolius characters to the common bean accomplished, researchers may then be able to ascertain the most valuable traits necessary for improved drought tolerance or water use efficiency of common beans in desert environments. Heat tolerant, pest and disease resistant lines have also been produced. [CIAT]

0363

15217 RAO, Y.P.; EDJE, O.T.; MUGHOGHO, L.K.; MSUKU, W.A.B. 1980. Field evaluation of bean (Phaseolus vulgaris) germplasm for disease resistance. Bean Improvement Cooperative. Annual Report 23:72-74. Engl.

Phaseolus vulgaris. Cultivars. Pseudomonas phaseolicola. Colletotrichum lindemuthianum. Sclerotium rolfsii. Selection. Resistance. Malawi.

A total of 1621 indeterminate and 758 determinate bean lines were evaluated for disease resistance under field conditions for a period of 4 seasons in Malawi. The diseases which attained severe proportions were mainly those caused by Pseudomonas phaseolicola, Colletotrichum lindemuthianum, and Sclerotium rolfsii. About 87 of the lines were resistant to P. phaseolicola, especially those of the indeterminate group. About 12% of the lines were rated as resistant to C. lindemuthianum, also among the indeterminate ones. None of the lines were resistant to S. rolfsii; however, a few indeterminate lines showed a moderate degree of resistance. [CIAT]

0364

24298 ROMAN V., A.; DAVIS, J. 1981. Informe de trabajos 1981: programa de fríjol. (1981 work report: bean program). La Selva, Antioquia, Convenio ICA-CIAT. 37p. Span., Sum. Span. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Germplasm. Technology evaluation. Selection. Cultivars. Crossbreeding. Intercropping. Zea mays. Relay crops. Resistance. Colletotrichum lindemuthianum. Isariopsis griseola. Ascochyta. Colombia.

A summary is presented of results of trials conducted as part of the collaborative agreement between the Instituto Colombiano Agropecuario and CIAT on bean research during 1981 in La Selva, Antioquia (Colombia). During germplasm evaluation, 112 promising materials were identified for their adaptation and healthiness; 67 of these are of interest for Colombia and the Andean zone. Two medium red materials were selected as outstanding in the preliminary screening trial of the germplasm bank. In addition, 33 materials were identified as having desirable characteristics to be used as parents in the breeding program. In crosses carried out in 1981, incorporation of resistance to the most limiting diseases (anthracnose, angular leaf spot, and Ascochyta) was considered for the following materials: ICA-Viboral, Calabozo, Radical, Liborino Voluble, and Línea 32980 M-8. From the F_2 to F_6 selection nurseries, 1167 materials of interest for Colombia and the Andean zone were selected; these had Colombian materials combined with disease-resistant sources as parents. The following materials were more frequently used in the crosses: Cargamanto, Línea 32980 M-8, Antioquia 48, Liborino Voluble, Línea 32980 M-4, and ICA-Viboral. Advanced lines were included in regional trials planned for 1982 in the municipalities of El Carmen de Viboral, Marinilla, and San Vicente (Antioquia). In a maize x bean intercropping trial, it was found that beans yield more in double rows, 0.23 m apart, with maize intercropped at 0.92 x 0.30 m. In the maize x bean relay trial, it was found that the best treatment was 2 maize plants x 3 bean plants/hill, spaced 0.46 m apart, and rows separated by a distance of 0.92 m. In a preliminary herbicide trial, metolachlor provided the best control during preemergence. In the maize x bean relay trial, the mixture metolachlor + glyphosphate was promising during bean preemergence. [AS (extract)-CIAT]

0365

22212 RUIZ B., F. 1983. Evaluación del vivero internacional de roya del fríjol común. (Evaluation of the international bean rust nursery). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.45-46. Span.

Phaseolus vulgaris. Cultivars. Selection. Uromyces phaseoli. Resistance. Nicaragua.

One hundred bean introductions which included several advanced selections from CIAT were evaluated in 1981 at Campos Azules (Masatepe, Nicaragua) for their resistance to Uromyces phaseoli. Var. Bat-41, which was released under the name of Revolución-75, showed resistance to the disease. [CIAT]

0366

24221 SALINAS P., R.A.; LEPIZ I., R. 1983. Mejoramiento genético y variedades. (Plant breeding and varieties). In Lepiz I., R.; Navarro S., F.J. Fríjol en el noroeste de México (Tecnología de producción). México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. Centro de Investigaciones Agrícolas del Pacífico Norte. pp.45-69. Span., 24 Refs., Illus.

Phaseolus vulgaris. Selection. Cultivars. Hybridizing. Plant habit. Yields. Yield components. Mexico.

Background information of plant breeding in northwestern Mexico is given, and the problems of regional var., objectives of breeding, and methods used in the selection of native var. and in derived applications of hybridization are described. Agronomic characteristics and improved var. and the advantages of their use in regional agriculture are given. [CIAT]

0367

15220 SCHWARTZ, H.F. 1980. The International Bean Rust Nursery format. Bean Improvement Cooperative. Annual Report 23:25-26. Engl.

Phaseolus vulgaris. Cultivars. Uromyces phaseoli. Selection. Resistance. Colombia.

A description is given of the format of the International Bean Rust Nursery (IBRN) established during a 1974 workshop of research workers from various countries. The objectives of the IBRN are to (a) identify cv. and breeding lines resistant to a wide spectrum of the pathogenic potential inherent to Uromyces phaseoli; (b) determine the stability of different types of plant resistance by time and location; (c) detect new and more virulent rust race complexes before they, or bean cv. susceptible to them, become widely disseminated; and (d) obtain information on race patterns present in bean growing regions. The IBRN entries are evaluated for their resistance 20-40 and 40-60 days after germination. [CIAT]

0368

22103 SILBERNAGEL, M.J.; DRAKE, S.R. 1983. Blue Mountain bush snap bean. HortScience 18(1):111. Engl., Illus. [Washington State Univ., Irrigated Agriculture Research and Extension Center, Prosser, WA 99350, USA]

Phaseolus vulgaris. Snap beans. Cultivars. Resistance. Bean common mosaic virus. Curly top virus. Plant breeding. USA.

Snap bean cv. Blue Mountain is a bush Blue Lake-type developed for commercial processing, home gardens, and market garden use. The plants are upright (51-56 cm) and narrow (46-56 cm). Most of the pods are borne in the mid-to-upper part of the bush. In western USA, time from planting to optimum harvest is 65-70 days. Under irrigated conditions, yields range between 3.6-5.4 t/ha. It is resistant to BCMV, I gene, and curly top virus. A description of its origin is presented. [CIAT]

0369

23893 SINGH, A.K.; SAINI, S.S. 1982. A note on combining ability in French bean (Phaseolus vulgaris L.). Haryana Journal of Horticultural Science 11(3-4):270-273. Engl., 4 Refs.

Phaseolus vulgaris. Snap beans. Hybrids. Cultivars. Crossbreeding. Selection. Yields. Yield components. Protein content. India.

The combining ability in a 7 x 7 diallel cross of French beans was studied. Plant height, pod length, pod diameter, pods/plant, seeds/pod, 100 seed wt., seed yield/plant, and protein content were measured. Analysis of variance showed significant differences in the progeny and hybrids for all the characters, except pod diameter in hybrids. Both the general and specific combining ability variances were highly significant for all the characters, suggesting the involvement of both types of gene actions. However, in general, the general combining ability variances were higher in magnitude than the specific combining ability for all the characters except protein content. This indicates the importance of non-additive gene action. Out of 21 crosses, the best specific combinations were PLB x Premier for pod length and protein content, PLB x FC 10016 for plant height and seed yield/plant, Premier x FC 10016 for plant height, and FC 10016 x Local for seeds/pod, seed yield/plant, and protein content. The results demonstrated that favorable additive genes are present in the parents involved in these crosses for yield and yield components and could be used for obtaining desirable genotypes through hybridization and selection breeding programs. [CIAT]

0370

15224 SINGH, S.P.; WHITE, J.W.; GUTIERREZ, J.A. 1980. Male sterility in dry beans. Bean Improvement Cooperative. Annual Report 23:55-57. Engl., 5 Refs.

Phaseolus vulgaris. Germplasm. Plant fertility. Plant breeding. Pollination. Colombia.

Thirteen male sterile plants were identified in a yield trial of bean germplasm accession G08063 grown at CIAT-Palmira in 1977. Line G08063 is indeterminate, type III with postrate growth; it is relatively early and produces small white seeds. A fertility score (less than 1.3 sterile, 1.3-2.5 partially sterile, and more than 2.5 fertile) and the amount of pod set were used to validate the male sterility of the 13 plants, and to determine their progeny fertility. Selected male sterile plants were crossed with several fertile parents; data on the F_1 are presented. [CIAT]

0371

15287 SMARTT, J. 1979. Authentication of interspecific hybrids in Phaseolus. Bean Improvement Cooperative. Annual Report 22:12-14. Engl., 9 Refs.

Phaseolus vulgaris. Hybridizing. Phaseolus lunatus. Phaseolus coccineus. Phaseolus acutifolius. Hybrids. Crossbreeding. United Kingdom.

Factors that must be considered when verifying the authenticity of interspecific hybrids in Phaseolus (P. vulgaris, P. coccineus, P. acutifolius, and P. lunatus) are briefly discussed: (1) Emasculation may not be 100% effective. (2) A rigorous examination of the morphology of hybrids and their parents is needed. (3) Expression of marker characters from the male parent is useful. (4) Interspecific hybrids are usually less fertile than their parents. It is desirable to know whether fertilization

has occurred and approx. the timing of abortion. When interspecific hybridization is attempted between F_1 intraspecific hybrids, F_1 interspecific hybrids must be compared with the F_2 of the intraspecific cross used as seed parent. [CIAT]

0372

23700 SOBRAL, F.S.G.; THUNG, M.; GUAZZELLI, R.J. 1984. Adaptabilidade de linhagens e cultivares de feijao (Phaseolus vulgaris L.) em Rondonia e resistencia a mela (Thanatephorus cucumeris (Frank.) Donk). (Adaptability of bean lines and cv. in Rondonia and resistance to Thanatephorus cucumeris). Porto Velho-RO, Brasil, Empresa Brasileira de Pesquisa Agropecuária. Unidade de Execucao de Pesquisa de Ambito Estadual. Pesquisa em Andamento no.70. 7p. Port., 4 Refs. [Empresa Brasileira de Pesquisa Agropecuária, Unidade de Execucao de Pesquisa de Ambito Estadual, Caixa Postal 406, 78.900 Porto Velho-RO, Brasil]

Phaseolus vulgaris. Cultivars. Germplasm. Plant introductions. Resistance. Rhizoctonia solani. Selection. Brazil.

A total of 370 bean lines and cv. from CIAT and 242 from Brazilian agricultural research institutes were evaluated for resistance to Thanatephorus cucumeris at Ouro Preto D'Oeste (Rondonia, Brazil). Visual evaluations were made at 41, 61, and 75 days after planting based on a 1-5 scale (1 = immune, 2 = resistant, 3 = moderately resistant, 4 = susceptible, 5 = highly susceptible). CNF 476, A 266, A 367, A 254, A 373, A 83, and BAC 117 were rated 3 in the 1st evaluation. BAC 41, G-2005, BAC 76, A 154, and A 156 were susceptible in the 1st evaluation but recovered and were rated 3 in the last evaluation. A greater no. of lines from Brazil showed good adaptability compared with CIAT germplasm. [CIAT]

0373

15484 STOFFELLA, P.J.; KUEHEMAN, F.; SANDSTED, R.F.; WALLACE, D.H. 1980. Selection for a large root biomass in dry beans. Bean Improvement Cooperative. Annual Report 23:37-40. Engl., 2 Refs.

Phaseolus vulgaris. Cultivars. Selection. Lodging. Biomass production. Roots. Resistance. Yields. Plant breeding. USA.

The results of research conducted to obtain bean selections with a large root biomass and resistant to lodging are briefly presented. Data are presented on mean root and shoot wt., shoot:root ratio, seed yield, biological yield, HI, and lodging ratings for 21 F_6 (Tui x Guali) selections and the cv. 70001, CAL 39, and Black Turtle Soup. Several selections showed significantly higher root wt. and lower shoot:root ratios than CAL 39 and Black Turtle Soup. All selections showed lower lodging scores than CAL 39 or Black Turtle Soup during flowering and before harvesting. [CIAT]

0374

22201 TAPIA B., H., ed. 1983. Dos años de cooperación para el mejoramiento del frijol común Phaseolus vulgaris L. en Nicaragua. (Two years of cooperation for the improvement of common beans in Nicaragua). Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. 122p. Span.

Phaseolus vulgaris. Plant breeding. Agricultural projects. Diseases and pathogens. Adaptation. Injurious insects. Insect control. Fertilizers. Weeds. Cultivars. Selection. Planting. Spacing. Harvesting. Nicaragua.

Research work on beans carried out during 1981-82 by the National Bean Breeding Program of Nicaragua, in collaboration with the Swiss Agency for Development, is reported. Research covered the evaluation of local and introduced var. for disease and insect resistance, yield trials, and trials on fertilization and fertilizer assessment, determination of optimum plant densities, pest control, mechanized harvest, seed production, and determination of bean organoleptic properties. Individual papers are recorded in this publication under the following consecutive no.: 0044, 0056, 0065, 0072, 0095, 0096, 0097, 0106, 0107, 0114, 0117, 0156, 0169, 0170, 0171, 0201, 0204, 0217, 0222, 0224, 0247, 0285, 0286, 0295, 0296, 0350, 0351, 0352, 0365, 0379, 0384, and 0385. [CIAT]

0375

25228 THOMAS, C.V.; WAINES, J.G. 1984. Fertile backcross and allotetraploid plants from crosses between tepary beans and common beans. Journal of Heredity 75(2):93-98. Engl., Sum. Engl., 11 Refs., Illus. [Dept. of Botany & Plant Sciences, Univ. of California, Riverside, CA 92521, USA]

Phaseolus vulgaris. Cultivars. Phaseolus acutifolius. Crossbreeding. Hybridizing. Plant fertility. Pollination. Hybrids. USA.

Crosses were made between 14 lines of tepary beans (Phaseolus acutifolius) and 15 lines of common beans in an attempt to transfer characters from teparies to common beans. Pods with hybrid embryos remained on common bean plants 6 days longer than on teparies before aborting. Twenty-nine of the 39 mature F_1 hybrid plants reared by embryo culture had either or both the common bean, Masterpiece, or tepary PI32 1638 as one parent. Among 16 mature F_1 genotypes, 5 produced BC_1 and/or allotetraploid progeny. Fertility of some backcross and allotetraploid lines increased with selfing or a 2nd backcross generation. [AS]

0376

24294 THOMAS, C.V.; MANSHARDT, R.M.; WAINES, J.G. 1983. Teparies as a source of useful traits for improving common beans. Desert Plants 5(1):43-46. Engl., 29 Refs., Illus. [Dept. of Botany & Plant Sciences, Univ. of California, Riverside, CA 92502, USA]

Phaseolus vulgaris. Crossbreeding. Phaseolus acutifolius. Hybridizing. USA.

Tepary bean (Phaseolus acutifolius) is a crop with desirable traits (heat and drought resistance; tolerance to high salt and B concn. in the soil and to Elasmopalpus lignosellus, Macrophomina phaseoli, and Xanthomonas phaseoli) to be transferred to P. vulgaris through interspecific hybridization. Enzymes of tepary bean extracts exposed to heat showed higher heat stability than untreated enzymes. There are 2 major problems that must be overcome in any interspecific hybridization program for both species: (1) the difficulty of producing hybrid seed on the plant, since hybrid embryos typically abort before seed is fully developed unless embryo culture is used; (2) the sterility of the F_1 hybrid, which has been overcome only by backcrossing to the parental species or by production of partially fertile allotetraploids through colchicine treatment. [CIAT]

0377

15230 THOMAS, C.V.; WAINES, J.G. 1980. Interspecific hybridization between Phaseolus vulgaris and P. acutifolius. Bean Improvement Cooperative. Annual Report 23:75-77. Engl., 1 Ref.

Phaseolus vulgaris. Phaseolus acutifolius. Cultivars. Hybridizing. Plant breeding. Drought. Temperature. Resistance. USA.

Fifteen different Phaseolus vulgaris and 22 P. acutifolius lines were crossed in diverse combinations to transfer resistance to heat and drought into P. vulgaris. Embryos were cultured 2 wk. after pollination using the method of Mok et al. with no hormones included in the medium. Embryos were transferred to fresh medium at 7 to 14-day intervals until root and shoot development was judged adequate to transfer the plantlets to soil in pots. From 1200 pollinations, over 500 embryos were cultured but most of them did not grow. The cross was successful in both directions. Twenty-one F_1 hybrid plants were obtained, all of which were highly sterile. Cv. Masterpiece was the bean parent in 15 F_1 hybrids. Backcrossing with commercial Californian cv. will continue and progeny will be tested afterwards. [CIAT]

0378

19886 VANDERBORGHT, T. 1983. Increasing seed of Phaseolus coccineus L. Plant Genetic Resources Newsletter no.53:17-18. Engl., Sum. Span., Fr.

Phaseolus coccineus. Pollination. Belgium.

A detailed description is given of the basic methodology to increase Phaseolus coccineus germplasm. This methodology was used to increase seed of P. coccineus in the CIAT collection, which presently amounts to 1069 accessions. [CIAT]

0379

22236 VANEGAS, J.A. 1983. Fomento del uso de semilla de variedades mejoradas de fríjol común. (Promotion of the use of seed of improved bean varieties). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.112-115. Span.

Phaseolus vulgaris. Cultivars. Plant breeding. Adaptation. Yields. Selection. Nicaragua.

Three local and 2 introduced red bean var. (Revolución-79, Revolución-81, Revolución-82, Rojo Nacional, and Orgulloso) were promoted for commercial use in the states of Boaco, Estelí, Somoto, Jinotega, Matagalpa, and Zelaya (Nicaragua). Insect and disease incidence, as well as grain yield, were recorded. Chrysomelids were the most important insect pests followed by whiteflies and loopers. Bean rust was the most frequent disease followed by angular leaf spot, anthracnose, bacterial blight, and BCMV. Var. Orgulloso, Rojo Nacional, and Revolución-79 presented the highest yields. Condega (Estelí) and San Luís (Somoto) were the best zones for bean production. [CIAT]

0380

21977 WILKINSON, R.E. 1983. Incorporation of Phaseolus coccineus germplasm may facilitate production of high yielding P. vulgaris lines. Bean Improvement Cooperative. Annual Report 26:28-29. Engl. [Dept. of Plant Pathology, Cornell Univ., Ithaca, NY 14853, USA]

Phaseolus vulgaris. Phaseolus coccineus. Resistance. Yields. Germplasm. Plant breeding. USA.

Advances made in the incorporation of high yield and root rot resistance in Phaseolus vulgaris lines from P. coccineus are briefly reported. At first the high yield of the hybrid was associated with the P. coccineus-like seed shape (broad, flat, and curved), but it may now be possible to obtain high yielding lines without this seed shape since some high yielding materials with plump straight seed have been found. This indicates that the association of P. coccineus-like seed shape with high yield may have been broken. It is proposed that the incorporation of P. coccineus germplasm into the breeding program offers promising alternatives for the production of beans with improved yielding ability, especially when it is combined with root rot resistance. [CIAT]

0381

20684 WYATT, J.E.; FASSULIOTIS, G.; HOFFMAN, J.C.; DEAKIN, J.R. 1983. NemaSnap snap bean. HortSience 18(5):776. Engl., 2 Refs., Illus. [U.S. Vegetable Laboratory, Agricultural Research Service, U.S. Dept. of Agriculture, Charleston, SC 29407, USA]

Phaseolus vulgaris. Snap beans. Cultivars. Resistance. Meloidogyne incognita. USA.

NemaSnap is the 1st bush snap bean cv. with resistance to the southern root knot nematode, Meloidogyne incognita. This resistance of NemaSnap was derived from PI 165426. Nematode reproduction was reduced to less than 2 egg masses/root system on NemaSnap compared with more than 50 egg masses/root system on susceptible cv. Astro. NemaSnap is resistant to most races of bean rust and to the type strain and NY 15 strain of BCMV. [CIAT]

0382

21971 YOSHII, K; RODRIGUEZ R., J.R. 1983. The release of Negro Huasteco 81, a new Mexican bean variety tolerant to golden mosaic virus. Bean Improvement Cooperative. Annual Report 26:114-115. Engl.

Phaseolus vulgaris. Cultivars. Bean golden mosaic virus. Resistance. Plant breeding. Mexico.

The development and release of Negro Huasteco 81, a black-seeded bush bean var., are described. This line was consistently the most tolerant from a total of 25 BCMV-tolerant lines and var. introduced from a collaborative project between CIAT and the Instituto de Ciencia y Tecnología Agrícolas, Guatemala. Trials were carried out in the state of Veracruz in 1980 and throughout the tropics of Mexico in 1981. Negro Huasteco 81 is a selection from the cross of ICA-Pijao x Porrillo 70; it also shows reasonably wide adaptation and resistance to BCMV, rust, and angular leaf spot. [CIAT]

0383

21974 ZACORCHEVA, L.; PORIAZOV, I. 1983. Hybrid development and fertility in Phaseolus vulgaris x Phaseolus coccineus. Bean Improvement Cooperative. Annual Report 26:92-93. Engl. [Maritsa Inst. of Vegetable Crops, Plovdiv, Bulgaria]

Phaseolus vulgaris. Phaseolus coccineus. Hybridizing. Agronomic characters. Cultivars. Genes. Bulgaria.

Expt. were conducted to study the possibility of transferring the genes for resistance to bacterial and viral diseases from Phaseolus coccineus to P. vulgaris. The material used was cv. Amboy (P. vulgaris) and PI 165421 (P. coccineus). Flowers of cv. Amboy were emasculated 2 days before opening;

the following day they were pollinated with pollen taken from PI 165421. The fertility of F_1 was poor; segregation was 9:1 in F_1, 3:1 in F_2, and 11:1 in F_3. The hybrids in F_1, F_2, and F_3 had indeterminate, semi-indeterminate, and determinate growth habits. The segregation of the following characters were also defined: size of cotyledons; stem, flower, and seed color; length and no. of the inflorescence internodes; and pod shape. [CIAT]

See also 0004 0006 0008 0053 0097 0105 0157 0160 0163 0165 0169 0171 0174 0177 0178 0179 0184 0186 0187 0189 0191 0192 0197 0198 0199 0200 0201 0203 0206 0214 0226 0228 0233 0234 0255 0259 0263 0264 0277 0384 0385 0419

H00 NUTRITION

0384

22232 HERRERA D., G.E. 1983. Determinación de la calidad de consumo en fríjol común. (Determination of consumer quality in beans). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.100-102. Span.

Phaseolus vulgaris. Cultivars. Seed characters. Seed color. Cooking. Timing. Organoleptic properties. Nicaragua.

The organoleptic properties of 11 exptl. and commercial bean var. were determined. Measured parameters included grain color and luster (for uncooked seeds), cooking time, flavor, cotyledon and seed coat textures, broth thickness and color, and time before seed fermentation. [CIAT]

0385

22233 HERRERA D., G.E. 1983. Determinación de las cualidades organolépticas en fríjol común Phaseolus vulgaris L. líneas establecidas y variedades comerciales. (Determination of organoleptic properties of established bean lines and commercial varieties). In Tapia B., H., ed. Dos años de cooperación para el mejoramiento del fríjol común Phaseolus vulgaris L. en Nicaragua. Managua, Nicaragua, Ministerio de Desarrollo Agropecuario y Reforma Agraria. Dirección General de Técnicas Agropecuarias. SIT-1. pp.103-106. Span.

Phaseolus vulgaris. Cultivars. Cooking. Timing. Seed characters. Selection. Organoleptic properties. Nicaragua.

Fifty-five bean var. were grouped according to their organoleptic properties. Parameters evaluated included cooking time, flavor, grain texture, and broth thickness. White-seeded types Bat-1198 and Bat-1280 and red-seeded types Retinto and Revolución-79 were outstanding. [CIAT]

0386

23046 KELLY, J.D.; HOSFIELD, G.L. 1983. Navy bean seed quality comparisons. Michigan Dry Bean Digest 8(1):10-11. Engl., illus. [Michigan State Univ., Dept. of Crop & Soil Sciences, East Lansing, MI 48824, USA]

Phaseolus vulgaris. Seed characters. Seed color. Cultivars. Organoleptic properties. USA.

An organoleptic (sensory) triangle test was conducted at the Agricultural Exposition (Michigan, USA) to distinguish between seed of different bean var. on a visual basis; the preference or acceptability of seeds was rated on a hedonic (liking) scale. A total of 52 visitors participated in the triangle test and 25% of these also participated in the hedonic test. The information collected in these different tests supports the conclusion that navy bean seed size and color should be major quality characters considered in breeding programs to meet industry quality standards. [CIAT]

See also 0183 0311 0338 0339

H01 Foods and Nutritive Value

0387

24705 BRESSANI, R.; NAVARRETE, D.A.; ELIAS, L.G. 1984. The nutritional value of diets based on starchy foods and common beans. Qualitas Plantarum Plant Foods for Human Nutrition 34(2):109-115. Engl., Sum. Engl., 18 Refs. [Inst. of Nutrition of Central America & Panama, P.O. Box 1188, Guatemala City, Guatemala]

Phaseolus vulgaris. Nutritive value. Laboratory animals. Diets. Proteins. Guatemala.

Feeding trials were carried out to determine the min. amount of common beans, with and without met. supplementation, needed to obtain positive wt. gains of rats fed cassava, sweet potato, plantain, and potato flours. The protein content of these materials was 1.4, 3.8, 3.1, and 9.5% on a dry wt. basis compared with 22.8% in common beans. The amount of beans added varied from 0 to 40.0%, without and with 0.3% met. Without met. addition, the amount of beans required to maintain body wt. was 24.8, 19.3, 20.0, and 40.1% for plantain, cornstarch, cassava, and sweet potatoes, resp. With just potato flour in the diet, the animals gained wt. With met. addition, the amount of beans required for body wt. maintenance was 20.1, 10.1, 14.5, 14.6, and 29.3% for plantain, cornstarch, cassava, potato, and sweet potatoes, resp. Mixtures of potatoes with as little as 10% beans with met. gave excellent protein quality values. The results confirm previous findings on S amino acid contents of beans. It is of interest to point out that factors other than a low level of protein in the starchy food tested are influencing the level of beans needed in the presence or absence of met. supplementation. [AS]

0388

25207 BRESSANI, R.; ELIAS, L.G. 1984. Relación entre la digestibilidad y el valor proteínico del fríjol común (Phaseolus vulgaris). (Relationship between digestibility and protein value of common beans). Archivos Latinoamericanos de Nutrición 34(1):189-197. Span., Sum. Span., Engl., 14 Refs. [Inst. de Nutrición de Centro América y Panamá, Apartado Postal 1188, Guatemala, Guatemala]

Phaseolus vulgaris. Digestibility. Proteins. Amino acids. Seed color. Methionine. Guatemala.

Fifty-seven bean samples of different color (23 red, 21 black, 10 white, and 3 brown) were analyzed and no relationship was found between protein

digestibility and its quality as measured by NPR. Nevertheless, white beans have a higher protein digestibility than black, red, and brown beans. The greater digestibility of white beans, however, does not increase the protein quality when mixed with cereal grains above that observed with black and red beans, probably because the protein that gives the higher digestibility is highly deficient in S containing amino acids. [AS]

0389

23468 MARTINEZ R., E.R. 1977. Fríjol extruído en la alimentación de las aves. (Extruded beans in poultry feeding). Tesis Ing.Agr. Chapingo, México, Escuela Nacional de Agricultura. 38p. Span., Sum. Span., 34 Refs.

Phaseolus vulgaris. Animal nutrition. Cooking. Nutritive value. Diets. Mexico.

Two expt. were conducted with chickens fed on beans subjected to different extrusion levels. In the 1st expt. 240 28-day-old chickens were fed with levels of 5, 15, and 25% extruded beans with treatments of 10 and 15 lb/in^2 for 30 min. Although there was no significative difference (P = 0.05), greater wt. gains were obtained at low levels of autoclaved beans. In the 2nd expt. 147 8-day-old chickens were fed with levels of 25, 50, and 75% extruded beans with different energy contents (2832 to 2432 kcal). As the bean content in the diet increased, wt. gains were lower, becoming more critical when the amount of energy was deficient. Even though beans underwent extrusion, the toxic factors persisted and were more evident at high levels. [AS (extract)-CIAT]

0390

23382 MORALES G., V.M. 1976. Evaluación biológica de cinco variedades de fríjol (Phaseolus vulgaris sp) producidas en México. [Biological evaluation of five bean varieties grown in Mexico]. Tesis Ing.Agr. Chapingo, México, Escuela Nacional de Agricultura. 41p. Span., Sum. Span., 23 Refs.

Phaseolus vulgaris. Animal nutrition. Diets. Nutritive value. Cultivars. Mexico.

Three expt. were conducted using 3 different biological methods to determine the nutritive value of 5 bean var. (Mecentral, Jamapa, Canario, Villa Guerrero, and Cacahuate) grown in Mexico. During the initiation phase, 195 fryers were used and accommodated in electric battery brooders. The PER method was used in the 1st expt., which had a duration of 13 days; the NPR method was used in the 2nd expt. with a duration of 7 days; and the gross protein value method was used in the 3rd expt. with a duration of 20 days. In the 1st expt., it was observed that chickens fed a casein-based diet had wt. gains statistically superior to chickens fed beans. Wt. gain of poultry receiving bean-based diets was variable, best results being obtained with var. Mecentral and Jamapa. Casein again showed higher PER values than beans. The lowest PER value was obtained with var. Mecentral. No statistical wt. gain differences were found between poultry fed with casein and those fed beans. NPR values obtained with Villa Guerrero and casein were similar between each other and superior to those observed with the rest of the bean var. In the 3rd expt., chickens fed Mecentral beans showed higher protein consumption than those fed var. Jamapa, Villa Guerrero, or Cacahuate, and less consumption than those fed Canario beans and casein. No significative differences were observed for the PER and gross protein values. [CIAT]

0391

24235 SANCHEZ, W.K.; CHEEKE, P.R.; PATTON, N.M. 1983. Utilization of raw and heat-treated pinto beans by weanling rabbits. Journal of Applied Rabbit Research 6(4):139-141. Engl., Sum. Engl., 15 Refs., Illus. [Oregon State Univ., Rabbit Research Center, Corvallis, OR 97331, USA]

Phaseolus vulgaris. Animal nutrition. Diets. USA.

Raw and autoclaved pinto beans were evaluated as protein sources in diets for weanling New Zealand White rabbits. These feedstuffs were unpelleted in trial 1 and pelleted in trial 2. Rabbits given control, raw bean, or autoclaved bean diets (unpelleted) took 139.3, 87.2, and 93.8 g daily, gained an av. 35.7, 14.4, and 21.9 g body wt./day, and used feed 3.9, 6.1, and 4.3 g/g gain. Of the same diets pelleted they took 122.9, 68.7, and 72.8 g, gained 38.6, 10.1, and 20.2 g, and used feed 3.2, 6.8, and 3.6 g/g gain. Feed efficiency (feed/gain) was poorer ($P < 0.05$) for raw pinto beans than for the other groups. Results indicated severe growth depression with raw pinto beans, which was partially overcome by autoclaving. Pelleting the diets did not increase their feeding value. [AS]

0392

25305 SATHE, S.K. 1981. Investigations on the Great Northern beans (Phaseolus vulgaris L.): protein functionality, antinutrients, flatus factors, fermentation, and carbohydrates. Ph.D. Thesis. Logan, Utah State University. 219p. Engl., Sum. Engl., 218 Refs., Illus.

Phaseolus vulgaris. Cultivars. Proteins. Protein content. Amino acids. Starch content. Fermentation. Dietary value. USA.

The bean flour proteins, albumins, globulins, protein concentrates, and protein isolates were evaluated for several functional properties including electrophoretic properties, water and oil absorption, foaming and emulsion, gelation, viscosity, sorption isotherms, buffer capacity, dielectric property, adhesive strength, trypsin and chymotrypsin inhibitory activities, and phytohemagglutinating activity. Protein concentrates had the highest water absorption, oil absorption, and emulsion capacity (5.93, 4.12, and 72.6 g/g, resp.), significantly reduced trypsin and chymotrypsin inhibitory activities, and no hemagglutinating and flatulence activities. Baking expt. indicated that wheat flour could be replaced by bean flour and protein concentrates up to 30 and 20%, resp., in cookie preparation with corresponding figures of 10 and 10% for breadmaking. Fermentation of bean-rice blends suggested that beans have a potential for developing fermented foods. [Dissertation Abstracts International (extract)]

0393

23689 ZABIK, M.F.; UEBERSAX, M.A.; PENZINGER, J.; AGBO, G. 1983. Edible bean flour research progress report: bean starch extrusion potential. Michigan Dry Bean Digest 8(1):12-13. Engl., Illus. [Dept. of Food Science & Human Nutrition, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Food products. Processing. Human nutrition. USA.

The possibility of using various bean starches in food products was investigated. High starch bean flours (navy, pinto, and black) were fed into an extruder with various levels (0 to 20% total dry wt.) of ground and unground hulls. After the extrusion process, vegetable oil, salt, and flavor powder (either onion, hickory, barbecue, or cheese) were added. All

bean starches yielded good expansion (3.1- to 3.8-fold increase in diameter). The presence of hulls up to 20% did not adversely affect expansion. The puffs themselves were bland and flavorless, thus making them compatible with any flavored product. Properly balanced levels of bean starch, bean hulls, and high protein bean flours could yield an acceptable nutritious food product. [CIAT]

See also 0129 0402

100 MICROBIOLOGY

0394

24286 AGUIRRE M., J.F. 1985. Componentes morfológicos y fisiológicos del rendimiento en fríjol Phaseolus vulgaris L. al inocularse con micorriza vesicular-arbuscular (V-A) y dinámica de las estructuras del hongo. (Morphological and physiological yield components in beans after inoculation with vesicular-arbuscular (VA) mycorrhizas and dynamics of fungous structures). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 145p. Span., Sum. Span., 119 Refs., Illus.

Phaseolus vulgaris. Inoculation. Mycorrhizae. Yields. Yield components. Mineral content. P. Roots. Mexico.

The effect of inoculation with vesicular-arbuscular (VA) mycorrhizas on yield and some yield components, as well as on P content, of bean var. Michoacán 12-A-3 was studied. Treatments used were absolute control, inoculation with VA mycorrhizas, 30 or 60 kg P/ha without inoculation. A completely randomized exptl. design with 4 replications was used. Samples were taken at 10-day intervals, but at 10-, 80-, and 100-day intervals in treatments with P. After harvest, 2 treatments (with and without irrigation) were evaluated with VA mycorrhizas. Mycorrhizal infection was assessed and morphological and physiological patterns of the bean root and aerial parts were determined. A decrease in root vol. and dry wt. was registered in the treatment with inoculation. Thirty days after planting, the treatment with VA mycorrhizas started to register values superior to those of the control in terms of no. of nodes of main stem, total nodes, leaf area, flowers, total pods, seed, and seed dry wt.; the same was true for the shoot:root ratio, specific leaf area, av. wt./seed, mean growth rate, and NAR. Mycorrhizal infection increased up to 50-60 days. Occurrence of arbuscles was greatest at 50 days; afterwards vesicle occurrence was greater. The 1st third of the root was the most infected. Twenty days after harvest, without irrigation, a reduction in the presence of arbuscles was recorded but not of vesicles. The no. of spores increased from the 1st sampling until the end of the expt. P content in inoculated beans was higher than in uninoculated beans during most of the crop cycle. [AS (extract)-CIAT]

101 Rhizobium spp., Nitrogen Fixation and Nodulation

0395

25196 BOIARDI, J.L.; ARRARAS, E.A.; MAZZA, L.A.; BALATTI, A.P. 1983. Falta de respuesta a la inoculación de poroto alubia con cepas de Rhizobium phaseoli en el noroeste argentino. (Lack of response to

inoculation of alubia-type beans with Rhizobium phaseoli strains in northwestern Argentina). Revista de la Facultad de Agronomía (Argentina) 4(3):263-270. Span., Sum. Span., Engl., 25 Refs.

Phaseolus vulgaris. Inoculation. Rhizobium phaseoli. Nitrogen fixation. Argentina.

Since inoculation is not frequently used in alubia-type bean crops in NW Argentina, the behavior of 4 Rhizobium phaseoli strains was evaluated with that legume. Competition between native and introduced strains for nodule infection sites was also studied. Expt. were performed in a controlled climate chamber and in the field (Cerrillos, Salta). Under controlled climatic conditions, strains F 45, F 48, and 492 showed efficient symbiosis. Although strain 4012 was infective, it was inefficient in N fixation. Strains F 48 and F 45 had higher % of nodules, this value varying with the presence of potassium nitrate in the jars. No response to nodulation was observed in the field and nodulation was poor. Introduced strains formed over 80% of the nodules with respect to the native ones; F 45 was the most competitive for the infection sites. [AS]

0396

24290 GAUR, Y.D.; RAO, N.S.S. 1984. The need for Rhizobium phaseoli inoculation to establish American beans in India. Current Science 53(8):430-431. Engl., 3 Refs. [Division of Microbiology, Indian Agricultural Research Inst., New Delhi 110012, India]

Phaseolus vulgaris. Rhizobium phaseoli. Inoculation. Nodulation. India.

Studies were carried out to show that rhizobia specific to the introduced temperate beans of the Phaseolus group are virtually absent from Indian soils, and that inoculation with specific strains of Rhizobium phaseoli is necessary to overcome one of the limitations in the establishment of American beans in India. Thirteen types of soils collected from various agroclimatic zones of India were used for nodulation tests in pots. Phaseolus coccineus, P. lathyroides, P. lunatus, and P. vulgaris were planted. Results indicated that nodulation was absent in plants grown in all the soils. A 2nd set of pot trials included seeds of P. vulgaris inoculated with 3 different strains of R. phaseoli (local strain VPKAS, CIAT 166 and 255 strains). Observations made after 8 wk. revealed effective nodulation and symbiosis with the 2 introduced strains only. [CIAT]

0397

21790 HUU HAI, V.; ANDRIAMANANTENA, S. 1970. Inoculation des légumineuses résultats de l'expérimentation 1968. (Legume inoculation. Results of 1968 experiments). L'Agronomie Tropicale 25(6-7):596-603. Fr., Sum. Fr., Engl., Span., Illus.

Phaseolus vulgaris. Inoculation. Strains. Rhizobium. Nodulation. Yields. Fertilizers. N. Madagascar.

In Madagascar, groundnuts, soybeans, and beans were inoculated with Rhizobium strains and fertilized with N. Bean and soybean inoculations highly increased nodulation and yield. Rhizobium together with manure gave the most significant increases. [AS]

0398

23317 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1974. Essais orientatifs (1968-1970). [Experimental trials (1968-70)]. In _____.

La symbiose Rhizobium-legumineuses au Rwanda. Rubona. Note Technique no.6 pp.4-8. Fr.

Phaseolus vulgaris. Rhizobium. Strains. Nodulation. Yields. Protein content. Rwanda.

Several exptl. trials were carried out in Rubona, Karama, and Rwerere (Rwanda) during 1974 to (1) evaluate Rhizobium sources from Gembloux (Belgium), (2) demonstrate the practical use of inoculation, and (3) choose between a liquid or a solid inoculum. For the 1st, seeds were imbibed in the inoculum and then air-dried or dried under shade; for the 2nd, seeds were placed in the planting hole and peat or rice balls with inoculum were applied before its closure. Data were taken on the no. of nodules at flowering, color of the nodules and leaves, yield, and DM protein content. In Karama, but not in Rubona, inoculation increased seed yields and protein content, attributed to the fact that legumes had not been cultivated before in these tropical black-clayey soils; thus, competition did not exist for the inoculum sources used. [CIAT]

0399

24240 VELASQUEZ G., P.E. 1983. Estudio en fríjol del daño causado a la nodulación por insectos rhizobiófagos y del efecto de la inoculación de Rhizobium phaseoli con dos niveles de encalado al suelo. (Study on the damage caused to bean nodulation by rhizobiophage insects and the effect of Rhizobium phaseoli inoculation with two levels of soil liming). Tesis Ing.Agr. Guatemala, Universidad de San Carlos de Guatemala. 70p. Span., Sum. Span., 17 Refs., Illus.

Phaseolus vulgaris. Agricultural lime. Inoculation. Rhizobium phaseoli. Fertilizers. N. Chemical control. Nodulation. Dry matter. Yields. Nitrogen fixation. Guatemala.

The damage caused by rhizobiophage insects to bean nodulation and N fixation efficiency of 3 Rhizobium phaseoli strains in mixture under normal and soil-liming conditions was evaluated in the exptl. fields of the College of Agronomy, U. de San Carlos, Guatemala. Factors studied were soil liming, seed inoculation with R. phaseoli, and soil application of mineral N and insecticides. Parameters evaluated were % of efficient nodules, no. and wt. of total nodules, % nodules damaged by rhizobiophage insects, dry wt. of aerial part, and yield. The application of lime to soils of the Guatemala series did not influence bean production; therefore there is no significative difference. Highest % of damaged nodules occurred in subtreatments where carbofuran was not applied; in subtreatments where it was applied, damage was significantly lower. A high % of damaged nodules reduced yields significantly in relation to the control. The inoculant employed increased the no. of nodules and the % of efficient nodules in relation to the control, and therefore resulted in higher yields. The economic analysis of the subtreatments demonstrated that additional profit is greater with the application of N, but the additional profit/quetzal is 19 times greater with the application of inoculants instead of N. [AS (extract)-CIAT]

See also 0045 0081 0141 0207

0400

24202 BAUDELET, P. 1969. La commercialisation des produits vivriers au Mosso. (Commercialization of food products in Mosso). In Institut des Sciences Agronomiques du Burundi. Rapport Annuel 1969. Bujumbura. pp.15, 22-23,26-28,30-31,35-39,41-42,48-49. Fr.

Phaseolus vulgaris. Prices. Income. Plant introductions. Cultivars. Yields. Burundi.

Tables are presented on some economic parameters for various food crops grown during 1969 in Mosso (Burundi). Overall, beans represented 20% of rural income. Min., mean, and max. prices of this crop are presented for 4 regional markets (Bukemba, Muzye, Butare, and Gitanga). Fluctuations and regional differences in prices were attributed to abundance of some crops and lack of transportation means. Other data indicated that min. bean prices were lower in Mosso, where these are sold at retail and there are no regulations on transport prices. The highest max. price was found in Matana. Growing beans represented a high valuation of labor compared with other crops. Regional nutrition tendencies present protein imbalance caused by the almost exclusive consumption of beans. Yields of introduced var. Mixed Mexico, Colorado, Cuarentino, and Wulma are outstanding compared with those of local var. Factors affecting regional commercialization and their economic equilibrium are analyzed. [CIAT]

0401

24936 BERGEN, D. 1982. Aspects de la commercialisation des produits vivriers, des légumes et des fruits au Burundi. Observations sur le Marché Central de Bujumbura. (Aspects of commercialization of food products, legumes and fruits in Burundi. Observations on the Bujumbura Central Market). Bujumbura, Institut des Sciences Agronomiques du Burundi. Departement de Socio-Economie Rurale. Note Technique no.8. 42p. Fr., Sum. Fr., Kirundi, Engl., 8 Refs., Illus.

Phaseolus vulgaris. Marketing. Distribution. Prices. Burundi.

Data was collected from May to July, 1982, to acquire better knowledge and understanding of a no. of aspects concerning the marketing of staple crops, vegetables, and fruit at the Central Market of Bujumbura, the most important market in Burundi. A list is given of all the products offered, as well as a qualitative appraisal of their supply and information on prices. The analysis of the origin of most offered products showed the relationship of the different natural regions of Burundi with the capital city, the latter being a deficiency area by definition of agricultural products. Specific marketing procedures were studied for the Central Market and price fixation mechanisms are analyzed in detail. [AS]

0402

23908 BITTENBENDER, H.C.; BARRETT, R.P.; INDIRE-LAVUSA, B.M. 1984. Beans and cowpeas as leaf vegetables and grain legumes. East Lansing, Michigan State University. Bean/Cowpea Collaborative Research Support Program. Monograph no.1. 24p. Engl., Sum. Engl., 84 Refs.

Phaseolus vulgaris. Research. Consumption. Production. USA.

Of the more than 185 legume species consumed as leaf vegetables, cowpea leaves are commonly cooked in the drier and warmer regions of west, east,

and southern Africa and bean leaves are more prevalent in the cooler highlands of east and southern Africa. The leaves of both species are frequently dried for use during seasons when vegetables are scarce. The inclusion of dried leaves in the local diet is an important cultural adaptation, since losses in leaf vegetable quality is a common postharvest problem throughout the world. Bean and cowpea leaves retain greater amounts of essential vitamins after drying than other locally popular leaf vegetables. Considering the nutritional value on a cooked and on a kg/ha/day basis, both bean and cowpea leaves are competitive with their seeds. Production research on both crops as leaf vegetables is limited. Results indicate that there is sufficient genetic variation and physiological potential to permit successful development of cv. for leaf and seed or leaf production systems. [AS]

0403

19749 BRASIL. SECRETARIA DA AGRICULTURA. 1983. Produtos agrícolas; área colhida, producao, rendimento e valor real da producao Bahía, Nordeste e Brasil, 1973-75 a 1980: feijao em grao. (Agricultural products; area harvested, production, yield, and market value of produce in Bahía, the northeastern region, and Brazil, 1973-75 to 1980: beans). In _____. A producao agrícola da Bahía no contexto regional e nacional 1973-1975 a 1980. Salvador-BA, Comissao Estadual de Planejamento Agrícola da Bahía. Série Subsídios ao Planejamento Agrícola no.4. pp.51-52. Port., Illus.

Phaseolus vulgaris. Production. Yields. Brazil.

Bean area harvested, production, yield, and market value data for Bahía, the northeastern region, and Brazil are given as tables and graphics for the period 1973-75 to 1980. [CIAT]

0404

18547 DOSSA, D. 1981. Abastecimento e comercializacao do feijao. (Bean supply and commercialization). Lavoura 84:14-17. Port., Illus.

Phaseolus vulgaris. Marketing. Consumption. Production. Brazil.

Bean supply and commercialization problems in Brazil during the 1970's are analyzed. Bean supply decreased and hence, per capita consumption at the expense of increased consumption of wheat bread due to reduced bean productivity. Factors involved in this reduced productivity include the lack of improved high-yielding bean seed with resistance to unfavorable climatic conditions, pests, and diseases; low input use (fertilizers); displacement to lower fertility soils; and the lack of crop rotations. The bean marketing situation during 1980 is analyzed. Projections for 1981 and policies to be applied in order to promote bean production are presented. [CIAT]

0405

22343 FEDERACION NACIONAL DE CAFETEROS DE COLOMBIA. PROGRAMA DE DESARROLLO Y DIVERSIFICACION DE ZONAS CAFETERAS. 1983. Fríjol verde. (Fresh beans). In _____. Productos agrícolas perecederos: bases de análisis, proyecciones 1984. Bogotá, Departamento de Mercadeo. Series de Precios 1979-1983. Boletín no.12. pp.175-182. Span., Illus.

Phaseolus vulgaris. Economics. Prices. Marketing. Statistical data. Colombia.

Monthly wholesale prices paid for fresh beans in 3 main cities of Colombia (Bogotá, Cali, and Medellín) from 1979 to 1983 are analyzed, including

projections for 1984. Fluctuations are shown in graphics and tables. [CIAT]

0406

22344 FEDERACION NACIONAL DE CAFETEROS DE COLOMBIA. PROGRAMA DE DESARROLLO Y DIVERSIFICACION DE ZONAS CAFETERAS. 1983. Habichuela. (Snap beans). In _____. Productos agrícolas perecederos: bases de análisis, proyecciones 1984. Bogotá, Departamento de Mercadeo. Series de Precios 1979-1983. Boletín no.12. pp.183-190. Span., Illus.

Phaseolus vulgaris. Snap beans. Economics. Prices. Marketing. Statistical data. Colombia.

Monthly wholesale prices paid for snap beans in 3 main cities of Colombia (Bogotá, Cali, and Medellín) from 1979 to 1983 are analyzed, including projections for 1984. Fluctuations are shown in graphics and tables. [CIAT]

0407

18026 FUNDACAO GETULIO VARGAS. INSTITUTO BRASILLIRO DE ECONOMIA. CENTRO DE ESTUDOS AGRICOLAS. 1983. Feijao: estimativa da disponibilidade interna para consumo humano nos anos de 1975 a 1980. (Beans: estimates of domestic availability for human consumption from 1975 to 1980). In _____. Balanco e disponibilidade interna de generos alimentícios de origem vegetal 1975 a 1980. Rio de Janeiro-RJ, Brasil. p.37. Port.

Phaseolus vulgaris. Production. Consumption. Statistical data. Brazil.

Data are tabulated on bean production, imports and exports, and consumption in Brazil for the period 1975-80. [CIAT]

0408

23319 GABRIEL, F. 1975. Haricots. (Beans). In _____. Evaluation de la valeur de production de différentes cultures vivrieres au Rwanda. Rubona, Institut des Sciences Agronomiques du Rwanda. Note Technique no.4. pp.3-4. Fr., Illus.

Phaseolus vulgaris. Prices. Costs. Income. Rwanda.

Bean production in Rwanda during 1975 is assessed. The official production cost/ha is 14,200 Fr, which includes 40 kg seed (1000 Fr) and labor (13,200 Fr). The regional cost is 7600 Fr due to the differential cost of labor (6600 Fr) The av. production for the period 1970-72 was 884 kg/ha. If the official buying price is 20 Fr/kg, the clear profit for the farmer is 17,680 Fr, with a net margin of 3480 (17,680 - 14,200) or 10,080 Fr (17,680 - 7600). The producer can cover his costs with a production of 710 kg. With cheaper labor a production of 380 kg is sufficient to cover costs. [CIAT]

0409

23186 HAILI, A. 1984. Linkages between research and extension in Ethiopia. In Eirkby, R.A., ed. Crop Improvement in Eastern and Southern Africa: Research Objectives and On-Farm Testing; a regional workshop, Nairobi, Kenya, 1983. Ottawa, Canada, International Development Research Centre. pp.109-112. Engl., Illus. [Inst. of Agricultural Research, P.O. Box 2003, Addis Ababa, Ethiopia]

Phaseolus vulgaris. Transfer of technology. Development. Ethiopia.

In 1974 the Institute of Agricultural Research and the Agricultural Development Department established a joint research and extension program in Ethiopia, to cover different parts of the country. The low productivity in Ethiopia could be improved through extension by introducing modern agricultural technologies that have been developed by research institutes. Different aspects concerning organizational responsibilities, coordination of the program, site selection, types of trials, trial modifications, and future plans are discussed. [CIAT]

0410

24291 KING, R.P.; LYBECKER, D.W. 1983. Flexible, risk-oriented marketing strategies for pinto bean producers. Western Journal of Agricultural Economics 8(2):124-133. Engl., Sum. Engl., 16 Refs.

Phaseolus vulgaris. Marketing. Prices. Economics. USA.

A model designed to identify preferred postharvest marketing strategies for pinto bean producers is presented. The model evaluates flexible strategies that use current market information to determine whether or not storage should continue. Explicit consideration is given to price uncertainty and risk preferences. Results indicate that nearly all decision makers prefer flexible strategies to fixed strategies that call for a predetermined pattern of sales. They also show that the choice of a marketing strategy is sensitive to risk preferences. Initial experiences in making the model available to producers are also discussed. [AS]

0411

18739 MOURA, P.A.M. DE 1982. Aspectos económicos da cultura do feijão. (Economic aspects of bean production). Informe Agropecuário 8(90):4-6. Port., 11 Refs., Illus.

Phaseolus vulgaris. Marketing. Prices. Storage. Production. Brazil.

Economic aspects of bean commercialization in Brazil are analyzed for the period 1979-82, with emphasis on the situation of the state of Minas Gerais regarding bean prices and stocks. In 1982, total bean production, area harvested, and yields increased considerably compared with the previous 5 yr as a result of farmer incentives. [CIAT]

0412

23656 MUÑOZ P., G. 1979. Estimación de las funciones de demanda, de semillas mejoradas en México, para los cultivos de: arroz, fríjol, maíz, sorgo, soya y trigo. (Estimation of demand functions in Mexico for improved seed of rice, beans, maize, sorghum, soybean, and wheat). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. Escuela Nacional de Agricultura. 156p. Span., 16 Refs., Illus.

Phaseolus vulgaris. Economics. Seed production. Statistical analysis. Mexico.

A study was carried out in Mexico to estimate the demand functions, and the factors that influence this demand, for improved seed of beans, rice, maize, sorghum, soybeans, and wheat in order to improve seed production programming. The process of seed formation and improvement for planting is summarized, and factors influencing the demand of inputs in agricultural production are identified. After revising the economic theory, the theoretic model and hypotheses are proposed. Data used as well as the target area are described and the econometric models used for the

statistical analysis of the data are defined. Variations in prices of improved bean seeds generate changes in the demand for seeds in the opposite direction; changes are higher in irrigated regions. Credit availability for bean planting slightly influences the adoption of improved seed; this influence is relatively smaller in rainfed areas. The use of agricultural machinery during bean planting implies a reduction in the amount of seed planted/ha. [CIAT]

0413

24219 NAVARRO S., F.J. 1984. Marco de referencia del área. In Lepiz I., F.; Navarro S., F.J. Fríjol en el noroeste de México (Tecnología de producción). México, Secretaría de Agricultura y Recursos Hidráulicos. Instituto Nacional de Investigaciones Agrícolas. Centro de Investigaciones Agrícolas del Pacífico Norte. pp.1-27. Span., 15 Refs., Illus.

Phaseolus vulgaris. Production. Climatic requirements. Yields. Mexico.

The importance of beans in Mexico is discussed, and production calendars and systems, limiting factors such as diseases and insects, cultural practices, and harvest losses are described. Tables with data on cultivated area, bean production and yields by states for 1981 and 1982 are presented. Types of beans preferred by Mexicans are enumerated. The geographical location is given, including area description, bean producing regions, physiography, climate, and soils. [CIAT]

0414

19780 PAREDES C., M.; TAY C., J. 1980. Análisis de la producción de las leguminosas de grano en Chile 1970-1979. (Analysis of grain legume production in Chile, 1970-79). Investigación y Progreso Agropecuário (Chile) 4:3-9. Span., Illus.

Phaseolus vulgaris. Production. Consumption. Yields. Chile.

The evolution and projections of grain legume production in Chile during 1976-79 are analyzed. Beans rank 1st among the grain legumes in terms of area planted; however, this area decreased from 60.9% in 1970-72 to 54.7% in 1979. Data on bean area planted, production, and yields during 1976-79 in different regions (Central North, Central South, and Southern Chile) are given; 67.6% of the area planted to beans was concentrated in Ñuble, Talca, Linares, Curicó, Bío Bío, and O'Higgins. Per capita consumption of beans increased from 5.51 kg/yr in 1970-72 to 6.69 kg/yr in 1976-78. [CIAT]

0415

24415 QUIROGA Z., R.; CUCALON S., H. 1984. Metodología del plan de fomento de fríjol en la Unidad de Manejo Cuenca Hidrográfica Riosucio-Ortega (Cauca). [Methodology of bean promotion used by the management unit of the Riosucio-Ortega basin (Cauca)]. Palmira, Colombia, Corporación Autónoma Regional del Cauca. Programa Ensayos Agropecuarios. 33p. Span., 7 Refs., Illus.

Phaseolus vulgaris. Agricultural projects. Technology evaluation. Development. Colombia.

A description is given on the methodology followed by the Corporación Autónoma Regional del Cauca, Colombia, to promote cultivation of beans in the Riosucio-Ortega basin. The project has been structured to be carried out in 2000 ha potentially productive, over a 5 yr period, as consumption and trade alternatives for the small- and medium-scale farmer. The studies

conducted include a diagnosis of social (family, land ownership, health, road network, and rural electrification), technical (land preparation, planting, var., crop rotation, inputs, and diseases), and economical factors (production and marketing). [CIAT]

0416

23929 RUIZ DE LONDOÑO, N.; SANDERS, J.H.; PACHICO, D.H.; HERRERA D., O. 1985. Evaluación de nueva tecnología de fríjol a nivel de finca sur de Huila, Colombia, 1978-1980. (Evaluation of new bean technology at the farm level, southern Huila, Colombia, 1978-80). Cali, Colombia, Centro Internacional de Agricultura Tropical. Documento de Trabajo no.4. 28p. Span., 10 Refs. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Technology evaluation. Technological package. Spacing. Fertilizers. Cultivars. Intercropping. Zea mays. Colombia.

On-farm research results of 3 yr evaluating new bean technology (var. and cultural practices) at Pitalito, Suaza, and Timana in southern Huila, Colombia, are presented. Clean seed, insecticides, increased plant density, fertilizers, and new var. for both monocropped and associated (maize) beans were the components evaluated. No response was observed to the use of fertilizers, especially P. Farmer seed produced yields as high as those obtained from clean seed. Increased yields and net income/ha were obtained with the use of pesticides together with higher plant densities and intensive weed control. Yields increased 66-85% compared with farmer technology; however, returns to investments did not increase significantly since total costs also increased with improved technology. Var. ICA L-24 outyielded the local var. Calima with insecticides and fungicides. The net income/ha was 2-3 times higher for the bean/maize association than for monocropped beans. [CIAT]

0417

20704 SMIT, J.J. 1983. CIAT's Phaseolus bean research network development in Eastern Africa. Phaseolus Beans Newsletter for Eastern Africa no.1:3-5. Engl. [Grain Legume Project, National Horticultural Research Station, P.O. Box 220, Thika, Kenya]

Phaseolus vulgaris. Development. Agricultural projects. Africa.

The development of a regional center for bean research in Eastern Africa to increase small farmers' bean production is described. The project would be executed by CIAT in collaboration with national agricultural institutions involved in bean research in Eastern Africa. The region-wide responsibilities of the project staff are described. [CIAT]

0418

20920 SMIT, J.J. 1983. Prospects for exporting beans and bean seeds from Kenya. Phaseolus Beans Newsletter for Eastern Africa no.1:17-20. Engl. [Grain Legume Project, National Horticultural Research Station, P.O. Box 220, Thika, Kenya]

Phaseolus vulgaris. Trade. Kenya.

The prospects for exporting beans produced in Kenya to other countries in Eastern Africa are discussed. Some shipments of the very successful GLP-2 (Roko) have already gone from Kenya to neighboring Uganda. This bean var. could well yield up to 3000 kg/ha if the recommended cultivation practices are followed. The smaller-seeded var. GLP-24 (Canadian Wonder type) would

be an acceptable bean var. in many parts of Eastern Africa due to its uniform seed color. For small-scale farmers who grow beans as a cash crop for export, var. of the Canadian Wonder type, pinto beans, and small-seeded red haricots might be of interest as there are known foreign markets for these types of beans. [CIAT]

0419

20841 SMIT, J.J. 1983. The USAID bean collaborative research support program for Kenya. Phaseolus Beans Newsletter for Eastern Africa no.1:20-22. Engl. [Grain Legume Project, National Horticultural Research Station, P.O. Box 220, Thika, Kenya]

Phaseolus vulgaris. Plant breeding. Agricultural projects. Drought. Temperature. Diseases and pathogens. Resistance. USA. Kenya.

A 5-yr collaborative program on improvement of drought and heat tolerance of disease-resistant beans in semiarid zones was started in 1982 between the U. of California at Davis and Riverside (USA), and the U. of Nairobi (Kenya). The program was designed to develop cv. tolerant to water and temp. conditions which characterize the semiarid lands of Kenya. Screening trials to determine tolerance to drought and high temp. in Phaseolus vulgaris cv. will be carried out both in California and in Kenya. Field and greenhouse screening for disease resistance will take place in Kenya but more comprehensive surveys will be needed to determine which diseases are prevalent under dry conditions. As a final step, crossing of disease resistant and drought/heat tolerant lines may have to be carried out to overcome disease susceptibility. [CIAT]

0420

24549 SUPERINTENDENCIA DO PLANO DE VALORIZACAO ECONOMICA DA REGIAO DA FRONTEIRA SUDOESTE DO PAIS. BRASIL. 1966. Mato Gresso: agricultura-pecuaria. (Mato Grosso: agriculture and animal husbandry). Brasil, Servico de Estatistica. 82p. Port.

Phaseolus vulgaris. Production. Yields. Brazil.

Statistical data are presented on the main 5 food crops (rice, sugar cane, beans, cassava, and maize), cultivated in 3 regions of the state of Mato Grosso, Brazil: Regiao do Pantanal, Regiao Encosta Sul Mato-grossense, and Regiao de Beirades. Data include cultivated area, production, and av. yields/produc. and per municipality for the years 1950-65. [CIAT]

0421

23131 VEGA V., D. 1982. Estructura y proyecciones de demanda en México para alimentos básicos 1980-1982: maíz, arroz, frijol y trigo. (Demand structure and projections in Mexico for basic foodstuffs 1980-82: maize, rice, beans, and wheat). Tesis Ing.Agr. México, Universidad Autónoma de Chapingo. 191p. Span., 40 Refs., Illus.

Phaseolus vulgaris. Prices. Trade. Statistical analysis. Consumption. Mexico.

A demand structure for maize, rice, beans, and wheat grains was studied and defined in Mexico, allowing the expected consumption in the near future to be projected. The influence of guarantee prices on the prices paid by consumers was measured and marketing margins and price ratios found at different market levels were identified. Population growth rates were applied to per capita consumption and linear regression models were used.

The overall model of intermediate demand was the most complete of the 3 models used. Changes in prices must be introduced, given certain expected production levels, to avoid overestimating consumption. [CIAT]

0422

21088 VENEZUELA. MINISTERIO DE AGRICULTURA Y CRIA. 1982. Leguminosas. (Legumes). In _____. Memoria y Cuenta 1981. Caracas. pp.II-118-II-119,II-125,II-130,III-19-III-22,III-80. Span., Illus.

Phaseolus vulgaris. Production. Yields. Prices. Venezuela.

Data and graphs are presented on bean production, cultivated area, and yields of beans during the period 1977-81 in Venezuela. Information on commercialization of agricultural products and inputs, and agricultural research projects for 1983 is also included. [CIAT]

0423

20759 ZOEBL, D. 1983. Beans in the Kenya press. Phaseolus Beans Newsletter for Eastern Africa no.1:36-40. Engl. [Grain Legume Project, National Horticultural Research Station, P.O. Box 220, Thika, Kenya]

Phaseolus vulgaris. Development. Kenya.

The role of the Kenyan press concerning beans as a commodity or crop is briefly discussed. [CIAT]

See also 0086 0116 0127 0155

E00 FIELD PLOT TECHNIQUE

0424

23400 PEREZ T., H. 1983. Determinación del tamaño y la forma de la parcela experimental para frijol, Phaseolus vulgaris L., de temporal. (Determination of size and form of the experimental plot on rainfed beans). Agricultura Técnica en México 9(2):141-150. Span., Sum. Span., 12 Refs., Illus.

Phaseolus vulgaris. Experiment design. Statistical analysis. Plot size. Mexico.

During the 1977 cycle, in the area of influence of the Pabellón agricultural exptl. field (Aguascalientes, Mexico), the effects of size and shape of the exptl. bean plot on the C.V. were evaluated when different treatments were combined. The statistical methodology of max. curvature was used to define the best useful plot size based on this coefficient. Furthermore, the C.V. of all treatment combinations were obtained, including one 1-m-long furrow up to a plot with twelve 12-m-long furrows. Significant differences among C.V. were determined by plot size. Likewise, it was found that plot shape does not help reduce this coefficient. Finally, it was concluded that 9.12 m^2 areas can be used efficiently since they give more reliability and precision to rainfed bean expt. [AS-CIAT]

0425

23640 BASEL, R.M. 1983. Technical note: the improvement of green colour of green beans by acidified bulk storage. Journal of Food Technology 18(6):797-799. Engl., 1 Ref. [Dept. of Horticulture, 2001 Fyffe Court, Ohio State Univ., Columbus, OH 43210, USA]

Phaseolus vulgaris. Snap beans. Storage. Canned beans. Seed color. USA.

Green bean cv. Tendercrop, Stretch, and Eagle were stored (a) after blanching, (b) after canning into standard tin cans under normal processing with a cover solution of 36 ml HCl/l distilled water to a final wt. of 454 g, and (c) canning of neutralized blanched green beans to determine the color of the final product. With raw blanched green beans, a dramatic visual change in color from bright green to olive green occurred upon acidification. When green beans were removed from storage, they had a dark green color with approx. the same green intensity of the canned product. After neutralization and canning, the product became lighter colored and greener than the conventionally canned product. The canned product had a typical olive green color, and after storage for 5 days the color improved statistically. Significant changes were observed in green beans during bulk storage mainly due to the shift in green color (a value) during storage and a shift in the L value (visual lightness) after canning. Although shifts in color are not as marked in the storage of conventionally canned beans, it is obvious that chemical changes occur in the pheophytins and pheophorbides. This is an important discovery because it gives the processor a method of storing green beans with better color attributes than that of conventional canned green beans. [CIAT]

0426

24882 GRAJALES A., W.; RACINES S., L.F. 1985. Utilización de la energía solar y eólica en el secado de semilla de fríjol a nivel rural. (Use of solar and eolian energy for drying bean seeds at the rural level). Tesis Ing.Agr. Cali, Colombia, Universidad del Valle. Universidad Nacional de Colombia. 143p. Span., Sum. Span., Engl., 29 Refs., Illus.

Phaseolus vulgaris. Seed. Drying. Solar drying. Seed characters. Germination. Colombia.

Four drying trials were carried out with seed of bean var. Calima to evaluate a solar dryer using wind energy designed and constructed at CIAT's Seed Unit. In the 1st trial, 200 kg bean seed were used with air passing through the trays. The total amount of water evaporated during 11 h of effective drying was 15.4 kg; av. air temp. at exhaust of collector and plenum were 47.5 and 37.7 C, resp. In the 2nd trial with 400 kg seed and the same type of flow, 25.67 kg of water were extracted in 19.5 h of effective drying with av. air temp. at exhaust of collector and plenum of 45 and 40 C, resp. During trials 3 and 4, air circulated around the trays. For trial 3, 210 kg seed were used and 11.87 kg of water were extracted in 11 h of effective drying; av. air temp. at exhaust of collector and plenum were 41 and 40 C, resp. For trial 4, 500 kg seed were used extracting 28.65 kg water in 23 h of effective drying, with av. temp. at exhaust of collector and plenum of 49.5 and 37 C, resp. Germination and accelerated ageing tests were applied before, during, and after the drying process and no reduction in seed quality was observed. [AS (extract)]

0427

23698 HESSE, S.R. 1984. Armazenamento de feijao (Phaseolus vulgaris L.) cv. Carioca em diferentes embalagens. (Bean cv. Carioca storage in different types of packings). Porto Velho-RO, Brasil, Empresa Brasileira de Pesquisa Agropecuária. Unidade de Execucao de Pesquisa de Ambito Estadual de Porto Velho. Pesquisa em Andamento no.68. 4p. Port. [Empresa Brasileira de Pesquisa Agropecuária, Unidade de Execucao de Pesquisa de Ambito Estadual, Caixa Postal 406, 78.900 Porto Velho-RO, Brasil]

Phaseolus vulgaris. Storage. Seed. Water content. Germination. Brazil.

Bean cv. Carioca seeds were oven-dried to 8% MC and stored in (1) tin cans with silica gel at -10 and -5 C, (2) cotton bags, (3) braided plastic bags, (4) polyethylene bags, and (5) underground polyethylene silos. The storage period was 1 yr with samples taken at bimonthly intervals for moisture and germination tests. At 12 mo. storage, bean seeds showed no variation in germination (90%) when packed in (1), (4), and (5), but germination was reduced by 5-6% in permeable packings (2) and (3). Seed MC remained constant at 8% in (1) all year round, but in polyethylene packings it increased slowly every 2 mo. when they were opened for sampling. Seed MC in permeable packings (2) and (3) increased 4.5% during the 1st 2 mo. and reached the equilibrium point with the environment (14%). Polyethylene bags appear to be the most advantageous storage media in terms of use and cost. [CIAT]

0428

25231 LAMCUIMEY, P. 1984. Conservación de semilla de frejol (Phaseolus vulgaris L.) en diferentes envases; El Vallecito 1982-83. (Conservation of bean seeds in different containers; El Vallecito 1982-83). Revista Boliviana de Investigación 2:181-182. Span., Sum. Span., Engl., 9 Refs., Illus. [Univ. Gabriel René Moreno, Casilla 702, Santa Cruz de la Sierra, Bolivia]

Phaseolus vulgaris. Storage. Stored grain pests. Insect control. Chemical control. Bolivia.

The conservation of bean seeds was tested in 5 different containers, with and without insecticide under noncontrolled conditions of humidity and temp. The seed maintained without insecticide lost its viability very rapidly (6 mo. of storage) due to the attack of Acanthoscelides sp. and Zabrotes sp. The best results were obtained with the bean seeds receiving insecticide treatment and conserved in jute or cotton bags. [AS]

0429

23909 LAZZARI, F.A.; EIZARDI, C.F. 1984. Levantamento das classes, tipos e defeitos predominantes em feijao armazenado, (Phaseolus vulgaris, L.) classificado pela CLASPAR no Estado do Paraná. (Identification of stored bean classes, types, and predominant problems, as classified by CLASPAR in the state of Paraná). Curitiba-PR, Brasil, Empresa Paranaense de Classificacao de Produtos. Boletim Técnico no.1. 3p. Port., 1 Ref., Illus. [Empresa Paranaense de Classificacao de Produtos, Rua Presidente Carlos Cavalcanti, no.[illegible], 80.000 Curitiba-PR, Brasil]

Phaseolus vulgaris. Storage. Seed. Deterioration. Brazil.

Stored bean quality was determined for the 1981-82, 1982-83, and 1983-84 cropping seasons of Paraná, Brazil, by identifying prevailing classes, types, and problems. A total of 1500 samples were taken per cropping

season. Black beans increased throughout the year and predominate in the southwest, west, and central south regions of Paraná, while mottled and colored beans are mainly produced in the north. On the av., the predominating problems detected throughout the period were broken seeds (2.01%), germinated (1.95%), damaged by rains (1.75%), other bean classes (1.74%), other var. (1.72%), damaged by bruchids/other insects (1.60%), stained (1.39%), scorched (1.16%), moldy (1.02%), discolored (0.90%), mechanically damaged (0.55%), impurities (0.51%), and immature (0.38%). [CIAT]

0430

24242 LEON M., D. 1983. Evaluación de resultados del almacenamiento de fríjol negro en silos familiares en la Ciudad de Guatemala. (Evaluation of results of stored black beans in family silos in Guatemala City). Tesis Ing.Agr. Guatemala, Universidad de San Carlos de Guatemala. 171p. Span., Sum. Span., 30 Refs., Illus.

Phaseolus vulgaris. Storage. Seed. Water content. Cooking. Timing. Seed vigor. Germination. Guatemala.

At the Instituto Nacional de Comercialización Agrícola, Guatemala City, Guatemala, a study was conducted to compare results of black beans stored in family silos (Guatemala type) with those obtained with storage in bags in open storehouses. In family silos, beans were stored with 12, 14, and 16% MC and received doses of 0, 1, 2, or 4 tablets of phosphine (PH_3) at the beginning of storage for pest control. Beans stored in storehouses hardened faster, lost faster their germinating power, and were invaded more rapidly by storage fungi. In the silos, grain with MC between 12-14% hardened less and lost less germinating power than grain ensiled with 16% MC. Furthermore, in the case of grains with 16% MC, the dose of 4 tablets of PH_3 interacted with grain MC and produced greater hardening and larger loss of germinating power. Among treatments used in the silos the treatment consisting of 12% MC and 2 tablets of PH_3 resulted in better grain conservation. [AS (extract)-CIAT]

0431

23026 PIMENTEL, M. DE L.; MIRANDA, P.; REIS, O.V. DOS; MAFRA, R.C. 1980. Maturacao fisiológica e conservacao da semente de feijao (Phaseolus vulgaris L.). (Physiological maturity and conservation of bean seeds). In Empresa Pernambucana de Pesquisa Agropecuária. Projeto feijao. Relatorio Anual de Pesquisa 1979. Recife-PE, Brasil. pp.67-69. Port., Illus.

Phaseolus vulgaris. Seeds. Maturation. Germination. Harvesting. Timing. Storage. Brazil.

Two expt. were conducted to determine the physiological maturity of seeds of bean cv. IPA 74-19 and the effect of different harvest times on bean seed storage (50% RH and 15°C). Twelve harvests were made, the 1st 60 days after emergence and then at 3-day intervals. Physiological maturity was attained 69 days after emergence (74 days after planting). Seeds harvested 69-93 days after emergence showed germination and vigor values over 95% (4 mo. storage), while these parameters were only 60-78% and 21-33%, resp., for seeds harvested between 60-66 days after emergence. Thus bean seeds harvested at physiological maturity and stored under controlled conditions (11% MC) for 4 mo. retain their germination and vigor. [CIAT]

0432

25326 BARRETO, R.A.; BERTOLDO, N.G.; CAETANO, W. 1983. Efeito de inseticidas, material inerte e óleo comestível no controle do caruncho do feijao (Acanthoscelides obtectus) (Coleoptera:Bruchidae). [Effects of insecticides, inert material, and edible oil on the control of the bean weevil (Acanthoscelides obtectus) (Coleoptera:Bruchidae)]. Agronomia Sulriograndense 19(1):71-76. Port., Sum. Port., Engl., 4 Refs. [Inst. de Pesquisas Agronomicas, Secretaria da Agricultura-RS, Goncalves Dias, 570, 90.000 Porto Alegre-RS, Brasil]

Phaseolus vulgaris. Acanthoscelides obtectus. Chemical control. Cultural control. Insect control. Stored grain pests. Brazil.

The effects of different dosages of insecticides, inert material, and edible vegetable oil on the population development of Acanthoscelides obtectus in stored beans were compared. The exptl. units were cotton bags each containing 3 kg of bean. The products were used in the following doses: etrintos, 2.5 and 5.0 ppm; deltamethrine, 0.1 and 0.2 ppm; permethrin, 2.5 and 5.0 ppm; malathion, 20.0 and 40.0 ppm; dolomite (particles with diameter up to 0.3 mm), 2.0 and 4.0 g/kg of grains. Four evaluations were performed-June 26, Aug. 26, Oct. 26 (1981) and Jan. 1 (1982). Etrinfos, deltamethrine, permethrin, and malathion showed highest efficiency. [AS]

0433

23377 LOYA R., J.G. 1977. Efecto de los rayos gamma sobre Zabrotes subfasciatus Boh. (Coleoptera:Bruchidae) y algunas observaciones sobre su comportamiento biológico. [Effect of gamma rays on Zabrotes subfasciatus (Coleoptera:Bruchidae) and some observations on its biological behavior]. Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. Escuela Nacional de Agricultura. 44p. Span., Sum. Span., 22 Refs., Illus.

Phaseolus vulgaris. Zabrotes subfasciatus. Irradiation. Insect biology. Mexico.

Effects of Co-60 radiations on eggs, pupae, and adults of the Mexican bean weevil (Zabrotes subfasciatus) were studied; likewise, the biology and behavior of this insect were observed. The following doses of gamma rays were applied: 0.5, 1.0, 2.0, and 4.0 krad on 24 to 48-h-old eggs; 2.0, 5.0, 10.0, 15.0, and 25.0 krad on pupae; and 5.0, 9.0, 12.0, 15.0, and 18.0 krad on 24 to 48-h-old adults. Eggs were more susceptible to gamma rays with LD 99 being 1.918 krad. On the other hand, the pupa was the development stage most resistant to Co-60 radiations, with LD 99 being 43.944 krad (extrapolated value). The treatment also affected the reproductive activity of adults coming from irradiated pupae; adults emerging from pupae with 10.0 krad or higher doses failed to reproduce. Adults were more susceptible to gamma rays than pupae; their LD 99 after 5 days of treatment was 21.994 krad (extrapolated value). Co-60 radiations also affected the reproductive capacity of adults; except for the 5.0 krad dose, all treatments inhibited reproduction of adult insects. The incubation period lasted 8.6 days, larval and pupal stages together 30.9 days, and male adult longevity 14.3 days vs. 9.1 days for female adult. Females laid an av. of 12.4 eggs during their life cycle, ranging from 0 to 47 eggs. [AS (extract)-CIAT]

0434

24888 POUZAR, J. 1983. La répartition des oeufs pondus par Acanthoscelides obtectus entre des graines identiques de Phaseolus vulgaris. (Egg distribution by Acanthoscelides obtectus on identical seeds of Phaseolus vulgaris). Biology of Behaviour 8(3):215-230. Fr., Sum. Engl., Fr., 28 Refs., Illus. [Inst. de Biocénotique Expérimentale des Agrosystemes, La C.N.R.S. 340, Université F. Rabelais, Faculté des Sciences, Parc de Grandmont, F 37200 Tours, France]

Phaseolus vulgaris. Acanthoscelides obtectus. Insect biology. France.

The egg distribution by the ovipositing bean weevil female was studied in a simple exptl. situation of choice between 6 identical and evenly disposed bean seeds. The mated females of the strain examined did not oviposit if not given host plant parts (pods, seeds). They produced, within the 1st 8 days of imaginal life, a no. of mature oocytes which were stored in the lateral oviducts and amounted to 40-50% of their max. production. Four randomized groups were constituted among mated females of the same generation. Half of the 1st group was dissected at the age of approx 60 h, giving the av. no. of stored mature oocytes, and the 2nd half was presented with the 6 seeds for several days. The same was done for the 3 other groups at the resp. ages of 5, 8, and 1. days. At the end of the oviposition period, the no. of eggs laid by each female under each seed and the relative position of the seeds were recorded (all the eggs were laid under the seeds or very close to them). The resulting values show that, irrespective of the age at which seeds were given, there was a conspicuous concn. of eggs: the distribution is much more uneven than if it was at random, shown by suitable statistical methods. But the relative position of the seeds was at random: the most loaded seed was not always between the 2 following ones. This behavior could not be reliably accounted for by a difference in the attractivity among each of the 6 seeds given each female. It seems more sound to relate this to what is known of the natural oviposition behavior, in which tactile stimulation of the ovipositor is of extreme importance. An egg laid under a seed increases the amount of potential tactile stimulation the ovipositor may receive. The adaptive value of this behavior is discussed; the larvae eat seeds and in all probability, the amount consumed by one generation may determine the quantity of food (seeds) which will be available for the next generation. The necessity to preserve the food source is thus questioned and this oviposition behavior might be regarded as adaptive, as far as it leaves a part of the seed yield uncontaminated. The highly hypothetical character of these speculations is emphasized. [AS]

0435

22930 ZOROGASTUA C., P.E. 1981. Protección del fríjol almacenado del ataque de Zabrotes subfasciatus Boh. (Coleoptera-Bruchidae). [Protection of stored beans from Zabrotes subfasciatus (Coleoptera:Bruchidae) attack]. Tesis Ing.Agr. Lima, Perú, Universidad Nacional Agraria La Molina. 67p. Span., Sum. Span., 45 Refs.

Phaseolus vulgaris. Zabrotes subfasciatus. Insect control. Chemical control. Stored grain pests. Peru.

The effectiveness of the insecticides diflubenzuron, dichlorvos, phoxim, and malathion to protect stored beans from weevil (Zabrotes subfasciatus) attack was evaluated under noncontrolled environmental conditions. Diflubenzuron in concn. of 5, 10, and 20 ppm, and dichlorvos, phoxim, and malathion in concn. of 20 ppm, were sprayed onto the grain. A control, to which only water was added, was included. At each infestation date, 100 g of beans were extracted and infested with 50 weevils coming from a mass

breeding at 1, 13, 30, 60, and 90 days after insecticide application. One wk. after infestation, the no. of dead insects was registered; 50 days after infestation, F_1 progeny, % of dead insects, and no. of eggs/grain were counted. Diflubenzuron was not effective, showing a low % of reduction in progeny and laid eggs, and the grain reinfested rapidly. Furthermore, it presented an erratic performance toward this pest. Malathion, phoxim, and dichlorvos showed good initial effect since they controlled 100% of the weevils 24 h after application. Malathion was the best insecticide, occupying 1st place and protecting the grain during 120 days, followed by phoxim which protected the grain during 100 days; dichlorvos was effective only during 45 days, rapidly losing its effectiveness. [AS (extract)-CIAT]

See also 0278 0291

M00 USES, INDUSTRIALIZATION AND PROCESSING

See 0094 0108 0114 0115 0160 0393

ABBREVIATIONS AND ACRONYMS

A	Angstrom(s)
ABA	Abscisic acid
ac	Acre(s)
Afr.	Afrikaans
a.i.	Active ingredient
alt.	Altitude
AMV	Alfalfa mosaic virus
approx.	Approximate(ly)
atm.	Atmosphere
ATP	Adenosine 5'-triphosphate
av.	Average
BAP	6-Benzylaminopurine
BBMV	Broad bean mosaic virus
BCMV	Bean common mosaic virus
BGMV	Bean golden mosaic virus
BGYMV	Bean golden yellow mosaic virus
BOD	Biochemical oxigen demand
BPMV	Bean pod mottle virus
BRMV	Bean rugose mosaic virus
BSMV	Bean southern mosaic virus
BV	Biological value
BYMV	Bean yellow mosaic virus
°C	Degrees Celsius (centigrade)
ca.	About (circa)
CAMD	Cassava African mosaic disease
CMV	Cassava African mosaic virus
CBB	Cassava bacterial blight
CBSD	Cassava brown streak disease
CEC	Cation exchange capacity
CER	CO_2 exchange rate
CF	Cassava flour
CGR	Crop growth rate
CLM	Cassava leaf meal
CLV	Cassava latent virus
CM	Cassava meal
cm	Centimeter(s)
COD	Chemical oxigen demand
concn.	Concentration
CP	Crude protein
CSL	Calcium stearyl lactylate
CSW	Cassava starch wastes
C.V.	Coefficient of variation
cv.	Cultivar(s)
2,4-D	2,4-dichlorophenoxyacetic acid
DM	Dry matter
DNA	Deoxyribonucleic acid
EC	Emulsifiable concentrate
EDTA	Ethylenediaminetetraacetic acid
EEC	European Economic Community
e.g.	For example
ELISA	Enzyme-linked immunosorbent assays
EMS	Ethyl methane sulfonate
Engl.	English
EP	Preliminary Trials, CIAT
expt.	Experiment(s)
exptl.	Experimental
°F	Degrees Fahrenheit
Fr.	French
ft-ca	Foot candles (10.76 lux)
FYM	Farmyard manure
g	Gram(s)
G	Giga (10^9)
GA	Gibberellic acid
gal	Gallon(s)
GE	Gross energy
Germ.	German
GERs	Glucose entry rates
GLC	Gas-liquid chromatography
h	Hour(s)
ha	Hectare(s)
HCN	Hydrocyanic acid
HDP	Hydroxypropyl distarch phosphate (modified cassava starch)
HI	Harvest index
hp	Horsepower
IAA	Indoleacetic acid
IBA	Indolebutyric acid
IBYAN	International Bean Yield and Adaptation Nursery, CIAT
Illus.	Illustrated
in.	Inches
Ital.	Italian
IU	International unit
J	Joule
Jap.	Japanese
kat	Katal(amount of enzymatic activity that converts 1 mole of substrate/s)
kcal	Kilocalorie(s)
kg	Kilogram(s)
kJ	Kilojoule
km	Kilometer(s)
KNap	Potassium naphthenate
kR	Kiloroentgen(s)
l	Liter(s)
LAD	Leaf area duration
LAI	Leaf area index
lat.	Latitude
lb	Pound(s)
LD_{50}	Mean lethal dose
LER	Land efficiency ratio

LPC	Leaf protein concentrate
lx	Lux
M	Mega
M	Molar
m	Meter(s)
Mal.	Malay
max	Maximum
MC	Moisture content
ME	Metabolizable energy
meq	Milliequivalent(s)
met.	Methionine
mg	Milligram(s)
mho	Reciprocal ohm
min.	Minimum
min	Minute(s)
ml	Milliliter(s)
mm	Millimeter(s)
mo.	Month
mol. wt.	Molecular weight
m.p.	Melting point
NAA	Alpha-naphthalene acetic acid
NAD	Nicotinamide adenine dinucleotide
NADH	Nicotinamide adenine dinucleotide, reduced form
NAR	Net assimilation rate
NCE	Net CO_2 exchange
NE	Northeast
NER	Net energy ratio
nm	Nanometer(s) (10^{-9} m)
no.	Number(s)
NPFs	Negative production factors
NPR	Net protein ratio
NPU	Net protein utilization
NW	Northwest
OM	Organic matter
oz	Ounce(s)
p.	Page
P	Probability
Pa	Pascal(s)
PAN	Peroxyacetic nitrate
PCNB	Pentachloronitrobenzene
PDA	Potato dextrose agar
PER	Protein efficiency ratio
pH	Hydrogen ion concentration
pp.	Pages
pphm	Parts per hundred million
PPI	Pre planting incorporation
ppm	Parts per million
PSA	Potato sucrose agar
pv.	Pathovar
Ref(s).	Reference(s)
resp.	Respective(ly)
Rf	Retardation factor-chromatography
RGR	Relative growth rate
RH	Relative humidity
RNA	Ribonucleic acid
Rom.	Romanian
rpm	Revolutions per minute
Russ.	Russian
s	Second
SBM	Soybean meal
SCN	Thiocyanate
SCP	Single cell protein
SDS	Sodium dodecyl sulfate
Sk.	Slovak
sp.	Species
Span.	Spanish
spp.	Species
SSL	Sodium stearyl-2-lactylate
Sum.	Summary
t	Ton(s)
TDN	Total digestible nutrients
temp.	Temperature
TIA	Trypsin inhibitor activity
TIBA	2,3,5-Triiodobenzoic acid compound with N-methylmethanamine
TLC	Thin-layer chromatography
TMV	Tobacco mosaic virus
TSH	Thyroid-stimulating hormone
UDPG	Uridine diphosphate glucose
UMS	Unmodified cassava starch
UV	Ultraviolet
var.	Variety(ies), varietal
VEF	Bean Team Nursery, CIAT
VFA	Volatile fatty acids
vol.	Volume
VPD	Vapor pressure deficit
vpm	Volume per million
vs.	Versus
W	West, watt
wk.	Week
WP	Wettable powder
wt.	Weight
yr	Year(s)
/	Per
%	Percent(age)
>	More than, greater than
<	Less than
≤	Equal to or less than
≥	Equal to or greater than
±	Plus or minus

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HARVESTING
0093 0094 0114
PLANTING
0148

AGRICULTURAL LIME
FERTILIZERS
0069 0078* 0399

AGRICULTURAL PROJECTS
0374 0415 0417 0419

AGRONOMIC CHARACTERS
0006 0008 0029 0030 0062 0064 0098
0125 0127 0131 0132 0140 0149 0162
0166 0167 0168 0172 0174 0176 0177
0178 0180 0184 0186 0190 0194 0196
0199 0205 0206 0210 0323 0343 0344
0345 0348 0366 0372 0383

AGROTIS IPSILON
INSECT CONTROL
0278

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0273
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0273
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0269

ALTERNARIA ALTERNATA
CHEMICAL CONTROL
0242

AMINO ACIDS
0037 0223 0236 0311 0388 0392
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0039
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0039

ANIMAL NUTRITION
0387 0389 0390 0391

APHIS FABAE
PLANT INJURIES
0211 0212

APION GODMANI
0161
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0290

ARGENTINA
0395

ASCOCHYTA PHASEOLORUM
DISEASE CONTROL
0211 0212
EPIDEMIOLOGY
0243
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0243

BACTERIOSES
0161 0222 0223
DISEASE CONTROL
0079 0100 0211 0212 0213 0215 0219
0221 0224
DISEASE TRANSMISSION
0215 0227
EPIDEMIOLOGY
0100 0213 0215 0351
ETIOLOGY
0213
INOCULATION
0220
PLANT INJURIES
0100 0145 0211 0212
RESISTANCE
0207 0217 0218 0225 0226 0313 0324
0327 0335 0336 0351 0354 0359 0360
0363
SYMPTOMATOLOGY
0100 0213

BEAN CHLOROTIC MOTTLE VIRUS
DISEASE CONTROL
0248
CHEMICAL CONTROL
0215
DISEASE TRANSMISSION
0215 0248
EPIDEMIOLOGY
0215 0248 0351

ETIOLOGY
0248
RESISTANCE
0351
SYMPTOMATOLOGY
0248

BEAN COMMON MOSAIC VIRUS
0161
DISEASE CONTROL
0248 0261 0263 0264
CHEMICAL CONTROL
0100 0215
DISEASE TRANSMISSION
0215 0248 0261 0262
EPIDEMIOLOGY
0100 0215 0248
ETIOLOGY
0248
RESISTANCE
0105 0159 0201 0261 0262 0264 0315
0316 0317 0318 0319 0320 0324 0327
0368
SYMPTOMATOLOGY
0100 0248 0261

BEAN GOLDEN MOSAIC VIRUS
0256
DISEASE CONTROL
0248
CHEMICAL CONTROL
0215
DISEASE TRANSMISSION
0215 0248
EPIDEMIOLOGY
0215 0248
ETIOLOGY
0248
RESISTANCE
0327 0382
SYMPTOMATOLOGY
0248

BEAN GOLDEN YELLOW MOSAIC VIRUS
DISEASE CONTROL
0248
DISEASE TRANSMISSION
0248
EPIDEMIOLOGY
0248
ETIOLOGY
0248
SYMPTOMATOLOGY
0248

BEAN RUGOSE MOSAIC VIRUS
RESISTANCE
0308

BEAN YELLOW MOSAIC VIRUS
DISEASE CONTROL
0261
CHEMICAL CONTROL
0100 0215
DISEASE TRANSMISSION
0215 0261
EPIDEMIOLOGY
0100 0215
RESISTANCE
0261 0320
SYMPTOMATOLOGY
0100 0261

BEAN YELLOW STIPPLE VIRUS
ETIOLOGY
0256

BEMISIA TABACI
INSECT CONTROL
0278
CHEMICAL CONTROL
0293

BIOCHEMISTRY
0011 0271

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0428
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0323
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0323

BORON
0060
MINERAL DEFICIENCIES
0018 0022
TOXICITY
0018 0055

BRAZIL
0023 0047 0049 0050 0057 0060 0103
0115 0116 0134 0143 0144 0147 0148
0151 0152 0153 0154 0209 0328 0427
0429 0431
DISEASES AND PATHOGENS
0141 0207 0214 0215 0242 0245 0250
0256 0308 0321 0327 0359 0360 0372
GERMPLASM
0327 0360 0372
INJURIOUS INSECTS
0292 0327 0432
MARKETING
0404 0411
PRODUCTION
0141 0403 0404 0407 0411 0420

BURUNDI
0137 0400
DISEASES AND PATHOGENS
0165 0172
GERMPLASM
0164 0165 0172 0173
MARKETING
0401

CADMIUM
0019

CALCIUM
0015 0070 0078 0251
MINERAL DEFICIENCIES
0020

CANNED BEAN
0160 0425

CARBOHYDRATE CONTENT
0079 0292
LEAVES
0270

CARIBBEAN
0034 0043 0076 0113 0225 0331

DISEASES AND PATHOGENS
0257 0258

CELL STRUCTURE
0005 0251

CEROTOMA TRIFURCATA
0289

CHAETOSEPTORIA WELLMANII
DISEASE CONTROL
0213
EPIDEMIOLOGY
0213
ETIOLOGY
0213
RESISTANCE
0354
SYMPTOMATOLOGY
0213

CHILE
0068 0108 0109 0110 0208
DISEASES AND PATHOGENS
0216 0261 0320
INJURIOUS INSECTS
0040 0216
PRODUCTION
0414

CHLOROPLASTS
0035

CLIMATIC REQUIREMENTS
0041 0042 0058 0080 0173 0203 0208
0413
TEMPERATURE
0026 0033 0062 0071 0110 0419

CLIMBING BEANS
0064 0098 0125 0127 0132 0140 0149
0162 0167 0168 0172 0174 0176 0177
0178 0180 0184 0186 0190 0194 0196
0199 0205 0206 0323 0343 0344 0348
0349

COBALT
0060

COLEOPTERA
0161 0277 0278 0289 0290 0292 0298
0300 0303 0333 0432 0433 0434 0435

COLLETOTRICHUM LINDEMUTHIANUM
0145 0161
DISEASE CONTROL
0211 0212 0213 0252
CHEMICAL CONTROL
0215 0242 0246
DISEASE TRANSMISSION
0215 0232
EPIDEMIOLOGY
0213 0215 0230 0242
ETIOLOGY
0213 0231 0232
INOCULATION
0230 0252
RESISTANCE
0165 0200 0207 0217 0230 0312 0315
0317 0318 0323 0324 0327 0344 0349
0354 0356 0357 0363 0364
SYMPTOMATOLOGY
0213 0243 0246

COLOMBIA
0029 0054 0069 0075 0127 0268 0332
0361 0415 0416 0426
DISEASES AND PATHOGENS
0228 0232 0233 0345 0364 0367
GERMPLASM
0210 0233 0364 0370
MARKETING
0405 0406

COMPOSITION
0277
CARBOHYDRATE CONTENT
0079 0270 0392
DRY MATTER
0014 0030 0036 0052 0054 0057 0069
0078 0111 0399
MINERAL CONTENT
0016 0022 0045 0055 0068 0070 0078
0079 0394
PROTEIN CONTENT
0033 0037 0166 0236 0369 0392 0398
WATER CONTENT
0427 0430

CONSUMPTION
0402 0404 0407 0414 0421

COOKING
0384 0385 0430
NUTRITIVE VALUE
0389

COPPER
LEAVES
0021

CORYNEBACTERIUM FLACCUMFACIENS
CHEMICAL CONTROL
0100
DISEASE TRANSMISSION
0227
EPIDEMIOLOGY
0100
SYMPTOMATOLOGY
0100

COSTA RICA
0136 0142
DISEASES AND PATHOGENS
0255

COSTS
0086 0408

COTYLEDONS
0009

CROP LOSS
0256
PLANT INJURIES
0145 0211 0212 0231 0269 0270 0275
0284 0294

CUBA
0024 0043 0325 0331
DISEASES AND PATHOGENS
0257 0258

CULTIVARS
0024 0026 0030 0034 0037 0040 0042
0044 0046 0053 0054 0058 0062 0064
0065 0072 0075 0081 0088 0092 0095

0098 0100 0101 0103 0104 0106 0107
0109 0110 0118 0137 0138 0149 0150
0156 0166 0170 0171 0196 0201 0204
0205 0214 0217 0220 0222 0224 0225
0226 0228 0236 0238 0239 0244 0255
0256 0259 0261 0262 0271 0277 0285
0288 0290 0295 0304 0305 0306 0308
0309 0310 0313 0314 0315 0316 0317
0318 0319 0320 0321 0325 0326 0329
0330 0331 0334 0335 0337 0345 0346
0351 0352 0353 0358 0359 0361 0363
0365 0366 0367 0368 0369 0373 0375
0377 0381 0382 0383 0384 0385 0386
0390 0392 0416
ADAPTATION
0082 0096 0097 0157 0158 0159 0161
0163 0164 0165 0168 0169 0173 0174
0175 0176 0177 0179 0180 0181 0183
0185 0186 0187 0188 0189 0190 0192
0193 0195 0197 0198 0202 0203 0206
0207 0208 0209 0210 0253 0324 0327
0328 0332 0339 0342 0349 0350 0355
0356 0374 0379
GERMPLASM
0004 0006 0105 0125 0140 0157 0158
0159 0160 0163 0164 0165 0167 0172
0173 0174 0175 0176 0177 0178 0179
0180 0181 0182 0183 0184 0185 0186
0187 0189 0190 0191 0192 0193 0194
0195 0197 0198 0202 0206 0210 0233
0234 0240 0322 0327 0333 0336 0339
0341 0342 0343 0344 0349 0354 0355
0356 0357 0360 0364 0372
PLANT INTRODUCTIONS
0164 0168 0172 0174 0179 0180 0206
0234 0323 0328 0341 0342 0372 0400

CULTIVATION SYSTEMS
0113 0121 0122 0123 0124 0125 0126
0127 0128 0129 0130 0131 0132 0133
0134 0135 0136 0137 0138 0139 0140
0141 0142 0143 0144 0145 0146 0147
0148 0149 0150 0151 0152 0153 0154
0155 0162 0163 0196 0199 0300 0322
0327 0332 0346 0348 0364 0416

CULTURE MEDIA
0032

CYTOLOGY
0005 0008 0251

DELIA PLATURA
0287
INSECT CONTROL
0040

DETERIORATION
0429
MECHANICAL DAMAGE
0108

DEVELOPMENTAL STAGES
0002 0027 0029 0033 0050 0270 0290
FLOWERING
0096 0030 0052 0054 0062 0084 0102
0165
GERMINATION
0024 0026 0046 0084 0426 0427 0430
0431

MATURATION
0028 0431
PODDING
0030 0052 0062 0102

DIABROTICA BALTEATA
INSECT CONTROL
0278

DIETARY VALUE
0129 0183 0388 0392

DIGESTIBILITY
0388

DIPTERA
0192 0193 0195 0211 0212 0246 0275
0287
INSECT CONTROL
0040 0276 0278 0283 0293 0301

DISEASE CONTROL
0104 0216 0280
BACTERIOSES
0079 0100 0211 0212 0213 0215 0219
0221 0224
MYCOSES
0211 0212 0213 0215 0241 0242 0244
0246 0248 0250 0252 0253 0254 0255
0261 0264
VIROSES
0100 0213 0215 0248 0261 0263 0264

DISEASE TRANSMISSION
0232
SEED TRANSMISSION
0227 0254 0262
VIROSES
0215 0248 0259 0261 0262 0265

DNA
0310

DOMINICAN REPUBLIC
0076 0113 0123

DROUGHT
0046 0082 0180 0200 0327 0329 0346
0377 0419

DRY MATTER
0014 0030 0036 0052 0054 0057 0069
0078 0111 0399

DWARF BEANS
0014 0017 0020 0062 0064 0098 0149
0167 0168 0172 0174 0176 0177 0178
0180 0184 0186 0190 0194 0205 0317
0318 0323 0343 0344
SPACING
0127 0165 0206

ECOLOGY
0396 0398

ECONOMICS
0086 0127 0155 0167 0400 0401 0403
0404 0405 0406 0407 0408 0410 0411
0412 0414 0421 0422

ELASMOPALPUS LIGNOSELLUS
INSECT CONTROL
0278
RESISTANCE
0314

EMPOASCA FABAE
0161

EMPOASCA FRAEMERI
RESISTANCE
0327

ENZYMES
0011 0260 0271

EPILACHNA VARIVESTIS
0161
INSECT CONTROL
0290 0298
CHEMICAL CONTROL
0300
RESISTANCE
0277 0333

ERYSIPHE POLYGONI
0161
DISEASE CONTROL
0248
CHEMICAL CONTROL
0215 0253
DISEASE TRANSMISSION
0215 0248
EPIDEMIOLOGY
0215 0248
ETIOLOGY
0248
RESISTANCE
0253 0321 0334
SYMPTOMATOLOGY
0248

ESTIGMENE ACREA
INSECT CONTROL
0278

EXPERIMENT DESIGN
0194 0424

FERTILIZERS
0001 0014 0017 0018 0040 0045 0049
0050 0051 0054 0055 0056 0060 0061
0065 0066 0069 0071 0072 0073 0074
0076 0078 0079 0080 0081 0088 0100
0104 0109 0116 0118 0120 0121 0122
0124 0131 0135 0139 0141 0144 0149
0150 0206 0207 0300 0322 0346 0374
0397 0399 0416

FLOWERING
0006 0030 0052 0054 0062 0084 0102
0165

FOOD ENERGY
0129

FUSARIUM OXYSPORUM
DISEASE CONTROL
0213
CHEMICAL CONTROL
0215
DISEASE TRANSMISSION
0215
EPIDEMIOLOGY
0213 0215 0243
ETIOLOGY
0213
SYMPTOMATOLOGY
0213 0243

FUSARIUM SOLANI PHASEOLI
DISEASE CONTROL
0213
CHEMICAL CONTROL
0215
DISEASE TRANSMISSION
0215
EPIDEMIOLOGY
0213 0215
ETIOLOGY
0213
RESISTANCE
0319 0334 0337
SYMPTOMATOLOGY
0213

GENES
0039 0264 0305 0310 0353 0383

GEOGRAPHICAL DISTRIBUTION
0002 0003 0306 0320

GERMINATION
0028 0046 0084 0431
SEED
0024 0426 0427 0430

GERMPLASM
0004 0006 0105 0125 0140 0157 0158
0159 0160 0162 0163 0164 0165 0167
0172 0173 0174 0175 0176 0177 0178
0179 0180 0181 0182 0183 0184 0185
0186 0187 0189 0190 0191 0192 0193
0194 0195 0197 0198 0199 0200 0202
0206 0210 0223 0224 0240 0312 0323
0327 0333 0336 0339 0341 0342 0343
0344 0348 0349 0354 0355 0356 0357
0360 0364 0370 0372 0380

GIBBERELLINS
0131

GREEN MANURES
0049

GROWTH
0007 0009 0012 0025 0028 0029 0031
0032 0048 0082 0132 0266
MINERALS AND NUTRIENTS
0020 0022 0045 0149
NUTRIENT SOLUTION
0020 0022 0036
PLANTING
0026
SOLAR RADIATION
0026
TEMPERATURE
0026 0033

GUATEMALA
0086 0132 0367 0388 0399 0430
DISEASES AND PATHOGENS
0244

HARVESTING
0001 0026 0042 0087 0093 0094 0100
0102 0104 0114 0115 0120 0168 0327
0374 0431

HERBICIDES
0083 0085 0089 0090 0092 0113 0117
0119 0142
DISEASES AND PATHOGENS
0280

HETEROSIS
0306

HOMOPTERA
0161 0211 0212 0327
INSECT CONTROL
0278 0293 0298

HONDURAS
0274

HUMAN NUTRITION
0311 0387 0393

HYBRIDIZING
0304 0305 0338 0342 0347 0353 0362
0366 0371 0375 0376 0377 0383

HYBRIDS
0008 0187 0369 0371 0375

INCOME
0086 0127 0400 0408

INDIA
0019 0021 0027 0078 0307 0369 0396
DISEASES AND PATHOGENS
0229 0249 0265
INJURIOUS INSECTS
0275

INHIBITORS
0270

INJURIOUS INSECTS
0001 0041 0100 0126 0216 0280 0281
0282 0284 0285 0286 0288 0296 0299
0374
COLEOPTERA
0277 0278 0289 0290 0292 0298 0300
0303 0333 0432 0433 0434 0435
DIPTERA
0040 0192 0193 0195 0211 0212 0246
0275 0276 0278 0283 0287 0293 0301
HOMOPTERA
0211 0212 0278 0293 0298 0327
LEPIDOPTERA
0278 0279 0294 0297 0314
THYSANOPTERA
0278

INSECT BIOLOGY
0275 0276 0278 0289 0294 0301 0303
0433 0434

INTERCROPPING
0113 0122 0128 0130 0141 0149 0151
0206 0327 0346
ZEA MAYS
0121 0123 0124 0125 0126 0127 0129
0131 0132 0133 0134 0135 0136 0139
0140 0142 0143 0144 0145 0147 0148
0150 0152 0153 0154 0155 0162 0163
0196 0199 0290 0300 0322 0348 0364
0416

IRON
0015 0070
LEAVES
0016
ROOTS
0016 0233

IRRADIATION
0024 0034 0433

IRRIGATION
0001 0042 0048 0057 0063 0100 0112
0116 0179 0180

ISARIOPSIS GRISEOLA
DISEASE CONTROL
0211 0212 0213
CHEMICAL CONTROL
0215 0242
DISEASE TRANSMISSION
0215
EPIDEMIOLOGY
0213 0215 0243
ETIOLOGY
0213
INOCULATION
0228
RESISTANCE
0217 0228 0327 0354 0364
SYMPTOMATOLOGY
0213 0243

KENYA
0081 0120 0155 0309 0329 0423
DISEASES AND PATHOGENS
0238 0240 0263 0264 0419
GERMPLASM
0240
MARKETING
0418

LAND PREPARATION
0043 0076 0087 0100 0150

LATIN AMERICA
DISEASES AND PATHOGENS
0234
GERMPLASM
0234

LEAF AREA
0030 0036 0054 0070 0099 0111 0122
0285

LEAVES
0002 0013 0016 0030 0035 0036 0048
0054 0111 0269 0270 0271 0272
DISEASES AND PATHOGENS
0260
MINERALS AND NUTRIENTS
0021 0022 0045 0055

LEPIDOPTERA
0297 0314

INSECT CONTROL
0278 0279 0294

LIGHT
0035 0038

LODGING
0373

MACROPHOMINA PHASEOLI
DISEASE CONTROL
0213
CHEMICAL CONTROL
0215
DISEASE TRANSMISSION
0215
EPIDEMIOLOGY
0213 0215 0243
ETIOLOGY
0213
SYMPTOMATOLOGY
0213 0243

MAGNESIUM
0020 0078
PLANT ASSIMILATION
0015

MALAWI
0128 0129
DISEASES AND PATHOGENS
0363

MANURES
0049 0068 0121 0131 0137 0144 0205

MARKETING
0042 0401 0404 0405 0406 0410 0411
0418 0421

MARULA TESTULALIS
PLANT INJURIES
0211 0212

MATURATION
0026 0028 0166 0170 0191 0320 0331
0344 0431

MECHANICAL DAMAGE
0108

MECHANIZATION
0086 0093 0094 0108 0113 0114 0115
0148 0327

MELANAGROMYZA PHASEOLI
0193 0246
BIOLOGICAL CONTROL
0301
CHEMICAL CONTROL
0276 0283 0301 0302
PLANT INJURIES
0211 0212 0275 0301
RESISTANCE
0192 0195

MELOIDOGYNE INCOGNITA
RESISTANCE
0381

METABOLISM
0032

METHIONINE
0037 0388

MEXICO
0002 0003 0007 0010 0022 0030 0031
0032 0036 0045 0046 0051 0061 0063
0064 0066 0067 0070 0073 0074 0080
0082 0083 0088 0091 0094 0101 0104
0111 0112 0118 0119 0121 0122 0124
0130 0131 0133 0135 0139 0149 0150
0166 0196 0322 0366 0389 0390 0394
0424
DISEASES AND PATHOGENS
0001 0145 0159 0161 0200 0230 0231
0248 0254 0262 0312 0346 0349 0354
0356 0357 0382
GERMPLASM
0004 0006 0125 0140 0157 0158 0159
0162 0197 0198 0199 0200 0202 0312
0333 0346 0349 0354 0355 0356 0357
INJURIOUS INSECTS
0001 0126 0277 0278 0281 0282 0290
0293 0300 0333 0433
MARKETING
0421
PRODUCTION
0413
SEED PRODUCTION
0412

MICRONUTRIENTS
0015 0018 0020 0021 0055 0060

MINERAL CONTENT
0015 0068 0070 0078 0079 0394
LEAVES
0016 0022 0045 0055
PODS
0022
STEMS
0022

MINERAL DEFICIENCIES
0018 0020 0022 0061

MINERALS AND NUTRIENTS
0061
BORON
0018 0022 0055 0060
CALCIUM
0015 0020 0070 0078
COPPER
0021
IRON
0015 0070
MAGNESIUM
0015 0020 0078
MOLYBDENUM
0060
NITROGEN
0015 0017 0045 0049 0051 0056 0060
0066 0068 0069 0072 0073 0078 0079
0080 0081 0088 0109 0118 0120 0121
0122 0124 0131 0135 0139 0144 0149
0207 0297 0399
PHOSPHORUS
0014 0015 0049 0050 0051 0056 0060
0065 0066 0068 0069 0070 0072 0073
0078 0079 0080 0088 0118 0120 0121
0122 0124 0131 0135 0139 0144 0149
0394
POTASSIUM
0015 0020 0049 0060 0066 0068 0069

0072 0073 0078 0079 0120 0122 0124
0131
ZINC
0060

MOLYBDENUM
0060

MYCOSES
0001 0105 0145 0161 0165 0168 0200
0201 0207 0211 0212 0217 0222 0229
0232 0234 0235 0236 0237 0238 0239
0240 0241 0242 0244 0245 0246 0247
0249 0250 0253 0254 0255 0261 0264
0266 0312 0315 0317 0318 0319 0321
0323 0324 0326 0330 0334 0337 0344
0346 0349 0352 0354 0356 0357 0358
0363 0364 0365 0367 0372
EPIDEMIOLOGY
0213 0215 0230 0243 0248
INOCULATION
0228 0230 0252
ISOLATION
0228
SEED
0188 0220 0231 0327
SEEDLINGS
0251
ROOTS
0232

NEMATODES
0266 0268 0381
NEMATODE CONTROL
0267

NICARAGUA
0044 0056 0065 0071 0072 0089 0095
0096 0097 0106 0107 0114 0117 0169
0170 0171 0204 0295 0350 0379 0384
0385
DISEASES AND PATHOGENS
0201 0217 0222 0224 0247 0351 0352
0365 0374
INJURIOUS INSECTS
0285 0286 0296 0374
SEED PRODUCTION
0156

NITROGEN
0068
FERTILIZERS
0017 0045 0049 0051 0056 0060 0066
0069 0072 0073 0078 0079 0080 0081
0088 0109 0118 0120 0121 0122 0124
0131 0135 0139 0144 0149 0207 0397
0399
PLANT ASSIMILATION
0015 0017 0122

NITROGEN FIXATION
0045 0141 0395 0399

NODULATION
0396 0398
NITROGEN
0045 0397 0399

NUCLEIC ACID
DNA
0310
RNA
0310

NUTRIENT SOLUTION
0014 0015 0016 0020 0022 0036

NUTRIENT TRANSPORT
0015 0016 0019 0021

NUTRITIONAL REQUIREMENTS
0001 0014 0017 0018 0040 0042 0045
0049 0050 0051 0054 0055 0056 0060
0061 0065 0066 0069 0071 0072 0073
0075 0076 0078 0079 0080 0081 0088
0104 0109 0116 0118 0120 0121 0122
0124 0131 0135 0139 0141 0144 0149
0206 0207 0300 0322 0346 0374 0397
0399 0416

NUTRITIVE VALUE
0311 0387 0389 0390

OZONE
AIR POLLUTION
0272
HOST-PLANT RESISTANCE
0271
PLANT INJURIES
0270

PALATABILITY
0183

PERU
0085 0203 0205
DISEASES AND PATHOGENS
0105 0168 0253
GERMPLASM
0105
INJURIOUS INSECTS
0279 0314 0435

PH
0046 0068 0071

PHASEOLLINS
ANALYSIS
0039

PHASEOLUS ACUTIFOLIUS
0003 0065 0254 0362 0371 0375 0376
0377

PHASEOLUS COCCINEUS
0003 0008 0182 0184 0190 0191 0290
0304 0338 0343 0344 0347 0353 0371
0380 0383

PHASEOLUS LUNATUS
0254 0343 0371

PHENOLOGY
0026

PHOSPHORUS
0049 0050 0051 0056 0060 0065 0066
0068 0069 0072 0073 0078 0079 0080
0088 0118 0120 0121 0124 0131 0135
0139 0144 0149 0394

PLANT ASSIMILATION
0014 0015 0054 0070 0122
TRANSLOCATION
0054

PHOTOSYNTHESIS
0025 0048

PHYTOALEXINS
0029

PLANT ANATOMY
0002 0004 0006 0007 0012 0013 0024
0028 0035 0050 0077 0269 0272 0320
0325 0353 0361 0377 0394 0431

PLANT ASSIMILATION
0010 0014 0015 0016 0017 0019 0021
0022 0023 0054 0070 0074 0077 0122

PLANT BREEDING
0001 0006 0207 0211 0214 0215 0222
0225 0236 0246 0361 0368 0370 0380
0382 0419
CROSSBREEDING
0204 0278 0359 0362 0364 0371 0375
0376
HYBRIDIZING
0204 0205 0238 0242 0247 0252 0262
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Information and conclusions reported herein do not necessarily reflect the position of any of the aforementioned entities.

Abstracts on Field Beans
(*Phaseolus vulgaris* L.)

Vol. XI No. 2 August, 1986

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INTRODUCTION

This journal of analytical abstracts is designed to provide a specialized guide to the world's literature on field beans (*Phaseolus vulgaris* L.), disseminating research results and ongoing activities related to the crop.

The abstracts present condensed information from journal articles, booklets, reports, theses, manuals, and other conventional and nonconventional material, categorized into broad disciplinary fields. These are complemented with author and subject indexes to enable more comprehensive consultation.

When information is required on a specific topic, CIAT's Bean Information Center can carry out bibliographic searches of its entire document collection. As part of this service, users receive a set of abstracts of the articles related to the topic of their interest. The full text of these articles is available through the Photocopy Service of the Communication and Information Support Unit.

The Specialized Information Centers on cassava (*Manihot esculenta* Crantz) and on tropical pastures also publish abstract journals in their respective areas.

COMPONENTS OF AN ABSTRACT

Accession number (for photocpy requests)

Authors

Year of publication

Sequential number in the journal (for use of indices)

[19421 ABATE, T.; NEGASI, A. 1981. 0118 Chemical control of American bollworm (Heliothis armigera) (Hubner) with ultra-low-volume sprays. Ethiopian Journal of Agricultural Science 3(1):49-55. Engl., Sum. Engl., 11 Refs. [Inst. of Agricultural Research, P.O. Box 2003, Addis Ababa, Ethiopia]

Original title

Additional notes

Author address

Source

Pages

Language of paper

Language of summary

Phaseolus vulgaris. Injurious insects. Lepidoptera. Heliothis armigera. Insect control. Chemical control. Ethiopia.

Descriptors

Expt. consisting of ultralow vol. formulations of endosulfan (500 and 750 g a.i./ha), cypermethrin (150 g a.i./ha), fenitrothion (960 g a.i./ha), profenofos (750 g a.i./ha), and an untreated check were conducted for 2 consecutive yr against Heliothis armigera on haricot beans at the Awassa and Nazareth Expt. Stations of the Institute of Agricultural Research (IAR), Ethiopia. The treatments were replicated 5 times in a randomized complete block design on 20 x 20 m plots. Of the insecticides used, single application of cypermethrin gave a more consistent and significant control than the check in both seasons at both stations. A new product, cypermethrin/profenofos 166[R], substituted for fenitrothion at Nazareth in the 1980 season, gave promising results to warrant further testing. Endosulfan, a recommended insecticide against the American bollworm in the past, was not as satisfactory as cypermethrin in its control of H. armigera on haricot beans. [AS]

Abstract

Abstractor and/or translator

HOW TO USE THE INDEXES

The numbers listed under each entry in the author and subject indexes correspond to the abstract's sequential number, found above each abstract within the journal.

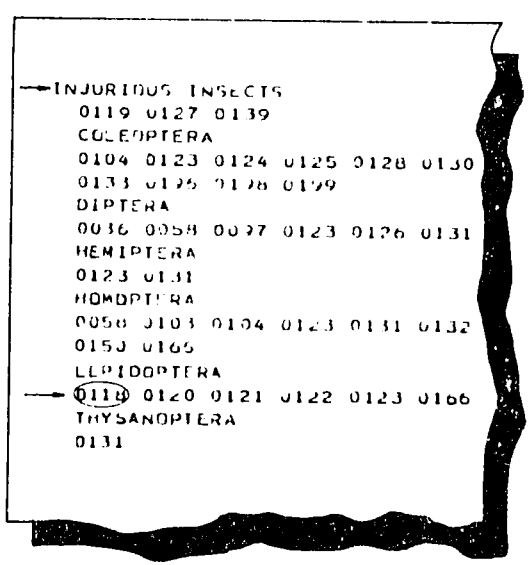
The last issue of the year contains cumulative author and subject indexes for the year.

Author Index

The Author Index can be used to find abstracts when the personal or corporate authors are known. The Author Index, which is alphabetically arranged, lists *all* author and co-author names cited in the publication.

Subject Index

The Subject Index presents an alphabetical list of descriptors used in beans research, many of which are combined with other descriptors, allowing the identification of more specific topics.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6. UNESCO coupons, available at UNESCO offices all over the world

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25667 GREENWOOD, J.S.; CHRISPEELS, M.J. 1985. Immunocytochemical localization of phaseolin and phytohemagglutinin in the endoplasmic reticulum and Golgi complex of developing bean cotyledons. Planta 164(3):295-302. Engl., Sum. Engl., 27 Refs., Illus. [Dept. of Biology, C-016, Univ. of California, San Diego, La Jolla, CA 92093, USA]

Phaseolus vulgaris. Proteins. Phaseolin. Phytohaemagglutinins. Seed.

The subcellular distribution, in developing seeds of the common bean, of the major storage protein (phaseolin) and the major lectin (phytohemagglutinin) was examined. The proteins were localized using an indirect immunocytochemical method in which ultrathin frozen sections were immunolabeled with rabbit antibodies specific for either phytohemagglutinin or phaseolin. Bound antibodies were then localized using goat-anti-rabbit immunoglobulin G adsorbed onto 4- to 5-nm colloidal gold particles. The sections were postfixed with OsO_4, dehydrated, and embedded in plastic on the grids. Both phytohemagglutinin and phaseolin exhibited a similar distribution in the storage parenchyma cells, being found primarily in the developing protein bodies. Endoplasmic reticulum and Golgi complexes (cisternal stacks and associated vesicles) also were specifically labeled for both proteins, whereas the cytosol and other organelles, such as mitochondria, were not. The transport of storage proteins and lectins from their site of synthesis, the rough endoplasmic reticulum, to their site of deposition, the protein bodies, is mediated by the Golgi complex. [AS (extract)]

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25682 BAYES, P.M.; OFFLER, C.E.; PATRICK, J.W. 1985. Cellular structures, plasma membrane surface areas and plasmodesmatal frequencies of the stem of Phaseolus vulgaris L. in relation to radial photosynthate transfer. Annals of Botany 56(1):125-138. Engl., Sum. Engl., 27 Refs., Illus. [Dept. of Biological Sciences, Univ. of Newcastle, N.S.W. 2308, Australia]

Phaseolus vulgaris. Stems. Cell structure. Plant vascular system. Sucrose. Australia.

Using a structural approach, the proposal that radial transfer of photosynthates in bean stems involves movement through the stem apoplast from the sieve element-companion cell complexes to the recipient sink cells was submitted to further tests. At an early stage of secondary development, the metaphloem sieve elements appeared to be the only functional axial transport conduit in fully elongated stems of bean plants. There is no apparent barrier to the radial transfer of solutes in the stem apoplast. However, radial transfer through the stem symplast could be limited by discontinuities resulting from protoplast degeneration of the protophloem fibers and developing secondary xylem fibers. Estimates of possible sucrose fluxes through the apoplastic and symplastic routes indicated that radial photosynthate transfer from the sieve element-companion cell complexes of the stem metaphloem could follow either cellular route. In the case of apoplastic transfer, the plasma membrane surface area of these complexes is only sufficient to support some form of facilitated movement of sucrose. In contrast, the plasma membrane surface area of the phloem parenchyma is sufficient to permit passive diffusion of sucrose to the apoplast. Plasmodesmatal frequencies suggest that any symplastic transfer to the phloem parenchyma from the sieve elements would be via the companion cells. [AS]

0438

22520 LIOI, L.; BOLLINI, R. 1984. Contribution of processing events to the molecular heterogeneity of four banding types of phaseolin, the major storage protein of Phaseolus vulgaris L. Plant Molecular Biology 3(3):345-353. Engl., Sum. Engl., 37 Refs., Illus. [Istituto del Germoplasma, Consiglio Nazionale delle Ricerche, Via G. Amendola, 165/A I-70126 Bari, Italy]

Phaseolus vulgaris. Cultivars. Phaseolin. Proteins. Italy.

The origin of the molecular heterogeneity of phaseolin was investigated by studying, both in vivo and in vitro, the synthesis and processing of 4 different banding types of phaseolin in 5 Phaseolus vulgaris cv. (Greensleeves, Tendergreen, Marv, Bonello, and II 150415). The results demonstrate that newly-synthesized (unprocessed) phaseolin in all cv. is composed of 3 major components; these differ between cv., both in charge and relative mol wt. Likewise, the processing of these precursors is highly conserved and consists of the co-translational cleavage of a signal peptide, 2 glycosylation steps in the endoplasmic reticulum, and a further modification inside the protein bodies to give the mature form. Some of the molecular heterogeneity of each phaseolin banding type is due to a different extent of glycosylation of its polypeptide components. [AS]

0439

23509 RANSOM, J.F.; MOORE, P. 1984. Geoperception in primary and lateral roots of Phaseolus vulgaris (Fabaceae). 2. Intracellular distribution of organelles in columella cells. Canadian Journal of Botany 62(5):1090-1094. Engl., Sum. Engl., Fr., 33 Refs. [Dept. of Plant Sciences, Texas A & M Univ., College Station, TX 77843, USA]

Phaseolus vulgaris. Roots. Cell structure. USA.

A morphometric analysis of the ultrastructures of columella cells in primary and lateral roots of Phaseolus vulgaris was performed to determine the precise location of cellular components in these cells. Roots were fixed in situ to preserve the in vivo ultrastructure of the cells. All cellular components in columella cells of both types of roots were distributed asymmetrically. The nucleus and vacuole were located primarily in the middle third of both types of columella cells. Dictyosomes, mitochondria, and amyloplasts were most abundant in the lower third of the columella cells in both types of roots. The distribution of amyloplasts was the most asymmetrical of all cellular components examined, with the lower third of the columella cells containing approx. 90% of the relative vol. of amyloplasts in both types of roots. The distribution of cellular components in columella cells of primary roots was not significantly different from that of columella cells of lateral roots. Differences in georesponsiveness of primary and lateral roots of P. vulgaris are probably due to factors other than the ultrastructures of their individual columella cells. [AS]

0440

25610 ZAGORCHEVA, L.; PORYAZOV, I. 1984. Pollen mother cells in sterile F_1 hybrids of P. vulgaris x P. coccineus. Bean Improvement Cooperative. Annual Report 27:208-209. Engl. [Maritza Vegetable Crops Research Inst., Plovdiv, Bulgaria]

Phaseolus vulgaris. Pollen. Hybrids. Phaseolus coccineus. Plant fertility. Cytology.

Pollen mother cell meiosis of 6 sterile F_2 Phaseolus vulgaris x P. coccineus hybrids was investigated. A wide variation among hybrids regarding av. pollen fertility was found. Pollen mother cells with univalents (1-22) were found in all hybrids. Different frequencies of pollen mother cells with quadrivalents or trivalents were also found in all plants. There is a wide variation among plants with regard to frequency of polyads, but no correlation between frequency of univalents and polyads was found. Meiotic disturbances characteristic only of the F_2 are described. The sterility of the investigated hybrids of F_2 is chromosomic as well as genetic. [CIAT]

See also 0465 0477

C00 PLANT PHYSIOLOGY

0441

24893 DARVILL, A.G.; ALBERSHEIM, P. 1984. Phytoalexins and their elicitors—a defense against microbial infection in plants. Annual Review of Plant Physiology 35:243-275. Engl., 108 Refs. [Dept. of Chemistry & of Molecular, Cellular, & Developmental Biology, Univ. of Colorado, Boulder, CO 80309, USA]

Phaseolus vulgaris. Phytoalexins. USA.

Research evidence that accumulation of phytoalexins at the site of attempted infection is one mechanism by which plants resist disease is reviewed. Beans, among other plant species, have been used in research regarding phytoalexins. Expt. are described demonstrating that the enzymes that catalyze phytoalexin synthesis are themselves synthesized anew when plant cells are exposed to microbes or other effective stimuli. Evidence showing that phytoalexins, once accumulated, are catabolized or detoxified by many microorganisms as well as by plants themselves is presented. Elicitors are shown to be not only constituents of some microbes but also to be present in plant cell walls. Elicitors can be solubilized from plant cell walls both by enzymes secreted by infecting microbes and by enzymes in the plant that are thought to be activated during infection. Biotic and abiotic elicitors have been identified. A hypothesis is presented that suggests that all of the abiotic and some of the biotic elicitors stimulate phytoalexin accumulation by causing the release of an endogenous elicitor from plant cell walls. Present and future research on the topics is discussed. [CIAT]

0442

21482 EL-SHARKAWY, M.A.; COCK, J.H.; HELD K., A.A. 1984. Water use efficiency of cassava. 2. Differing sensitivity of stomata to air humidity in cassava and other warm-climate species. Crop Science 24(3):503-507. Engl., Sum. Engl., 24 Refs., Illus.

Phaseolus vulgaris. Plant physiology. Photosynthesis. Stomata. Leaves. Transpiration. Colombia.

Measurements of CO_2 and H_2O exchange and the calculated leaf conductance of attached leaves in well-watered plants were conducted over a range of leaf-air vapor pressure (1.0-4.0 kPa) to compare the response of cassava with that of other warm-climate species, among them beans. The degree of stomatal sensitivity decreased in cassava more than in beans. [AS (extract)]

0443

25681 EMMERT, F.H. 1985. Rate of acropetal transport of the xylem stream in Phaseolus vulgaris. Journal of Plant Nutrition 8(5):391-394. Engl., Sum. Engl., 4 Refs. [Dept. of Plant Science, Univ. of Connecticut, Storrs, CT 06268, USA]

Phaseolus vulgaris. Petioles. Hypocotyls. Epicotyls. Plant physiological processes. Transpiration. Water requirements. USA.

The rate of acropetal movement of the xylem stream was measured in the petioles, epicotyls, and hypocotyls of bean plants. Loss of water by intact, transpiring plants was 1st determined gravimetrically. Next, the vol. of the functional xylem in various sections of the stems was determined using radioisotope dilution techniques. The rate at which the xylem stream renewed itself to account for the overall water loss of the plant served as the basis for flow rate values. [AS]

0444

25382 KUSHAD, M.M.; POOVAIAH, B.W. 1984. Deferral of senescence and abscission by chemical inhibition of ethylene synthesis and action in bean explants. Plant Physiology 76(2):293-296. Engl., Sum. Engl., 31 Refs., Illus. [Dept. of Horticulture, Oregon State Univ., Corvallis, OR 97330, USA]

Phaseolus vulgaris. Ethylene production. Abscission. Petioles. USA.

Three compounds known to inhibit ethylene synthesis and/or action were compared for their ability to delay senescence and abscission of bean explants. Aminoethoxyvinylglycine (AVG), $AgNO_3$, and sodium benzoate were infiltrated into the petiole explants. Their effect on abscission was monitored by measuring the force required to break the abscission zone, and their effect on senescence was followed by measuring chlorophyll and soluble protein in the distal (pulvinus) sections. AVG at concn. between 1-100 micromolar inhibited ethylene synthesis by approx. 80-90% compared with the control during sampling periods of 24 and 48 h after treatment. This compound also delayed the development of abscission and senescence. Treatment with $AgNO_3$ at concn. between 1-100 micromolar progressively reduced ethylene production, but to a lesser extent than AVG. The effects of $AgNO_3$ on senescence and abscission were quite similar to those of AVG. Sodium benzoate at 50 to 5 millimolar did not inhibit ethylene synthesis during the 1st 24 h, but appreciably inhibited ethylene synthesis 48 h after treatment. It also delayed the development of abscission and senescence. The effects of AVG, Ag^+, and sodium benzoate suggest that ethylene could play a major role in both the senescence induction phase and the separation phase in bean explants. [AS]

0445

25303 LIETH, J.H. 1985. Light interception, growth dynamics, and dry matter partitioning in a phytotron-grown snap bean (Phaseolus vulgaris L.) crop: a modeling analysis with reference to air pollution effects. Ph.D. Thesis. Raleigh, North Carolina State University. 141p. Engl., Sum. Engl., 99 Refs., Illus.

Phaseolus vulgaris. Light. Canopy. Snap beans. Growth. Air pollution. Leaf area. USA.

Simple exponential decay models were used to describe the variation in light attenuation within a snap bean canopy over a 33-day period of canopy development. Extinction coefficients were varied over time as a function

of (1) total leaf area and (2) canopy height, and nonlinear least-squares procedures were used to estimate parameter values for these models. The response surfaces generated to depict changes in light attenuation accompanying canopy development illustrated the dynamic nature of canopy closure. A criterion index was defined to aid in assessing the applicability of these models for use in whole plant simulation models, and an evaluation of these models is given based on this index, their predictive accuracy, and utility for use within varying modeling frameworks. A technique was developed for the analysis of plant growth in expt. where a one-time short-term stress (such as gaseous air pollution exposure) is applied during the ontogeny of the plant. The method was worked out in detail for the Richards growth function and applied to growth data of snap bean exposed to O_3. This resulted in the value for the % reduction in the growth rate (74% for the 0.60 ppm O_3 level) and an index for the recovery rate. Results from different studies are comparable. The technique may also be utilized with effects other than stresses and for multiepisodic and chronic events. A C-allocation model for the growth of a snap bean crop was derived and leaf photosynthesis was predicted using a nonrectangular hyperbolic light response curve. The leaf area distribution in the canopy was simulated and, thus, allowed utilization of a simple light interception model. This scheme allowed integration over the canopy to obtain the total daily production. Whole-plant respiration was estimated using values obtained from the literature. Assimilate distribution was modeled with an empirical formulation based on the ratio of plant part (organ) DM increment:total dry wt. increment. The model can be adapted for use in studies involving effects on the leaf compartment of the plant, in particular of gaseous pollutants which show visible injury to the leaves. A previous snap bean model (Lieth) was applied to Phaseolus vulgaris cv. Bush Blue Lake 290 and was validated. Further model development is discussed specifically with respect to studies on air pollutant effects. [AS]

0446

25664 MOORE, R. 1985. Movement of calcium across tips of primary and lateral roots of Phaseolus vulgaris. American Journal of Botany 72(5):785-787. Engl., Sum. Engl., 15 Refs. [Dept. of biology, Baylor Univ., Waco, TX 76798, USA]

Phaseolus vulgaris. Ca. Roots. Nutrient transport. USA.

The movement of Ca across tips of primary and lateral roots of Phaseolus vulgaris was determined by applying ^{45}Ca to one side of the root and collecting radioactivity in an agar receiver block on the opposite side of the root. The ratios of cpm in receiver blocks on the bottom of primary roots:cpm in receiver blocks on the top of primary roots were 1.87 and 2.47 after 1 and 2 h, resp. This polar transport of Ca across tips of primary roots correlated positively with a gravicurvature of 45° after 2 h. The ratio of cpm in receiver blocks on the bottom of lateral roots:cpm in receiver blocks on the top of lateral roots was 1.30 after 2 h. The decreased polar movement of Ca across tips of lateral roots correlated positively with lateral roots being non-graviresponsive. These data (1) support the suggestion that gravistimulation induces polar movement of Ca toward the lower side of tips of primary roots, and (2) suggest that the reduced polar movement of Ca across tips of lateral roots may be involved in uncoupling gravistimulation from gravicurvature in lateral roots. [AS]

0447

25617 OFONKWO, C.A.; CLAYBERG, C.D. 1984. The incidence of outcrossing as related to distance in Phaseolus coccineus L. Bean Improvement

Cooperative. Annual Report 27:157-158. Engl., 4 Refs. [Dept. of Horticulture, Kansas State Univ., Manhattan, KS 66506, USA]

Phaseolus coccineus. Cultivars. Spacing. Cross-pollination. Flowers. USA.

The incidence of outcrossing as related to distance in Phaseolus coccineus was investigated. The red-flowered Scarlet Runner and the white-flowered Dutch Runner were planted in the same row at 0.3 m spacing, with the Scarlet Runner plants in one half of the row and the Dutch Runner plants in the other half. Seeds collected on the white-flowered plants were used to measure the incidence of outcrossing with the Scarlet Runner plants by progeny testing for red-flowered segregants as a function of distance from the red-flowered plants. Cross-pollination of white-flowered plants by red-flowered plants decreased rapidly with distance. However, the results do not indicate how far pollinators do range in P. coccineus although they do suggest that pollen can be transferred over several meters. Substantial cross-pollination can occur over shorter distances in this species (50, 37, and 33% red-flowered plants at 0.3, 0.6, and 0.9 m cumulative distance, resp.). [CIAT]

0448

22137 SEYANI, J.H.; EDJE, O.T. 1974. Photosynthetic efficiency of different zones of Phaseolus beans. Lilongwe, University of Malawi. Bunda College of Agriculture. Research Bulletin no.5. pp.49-58. Engl., Sum. Engl., 11 Refs.

Phaseolus vulgaris. Photosynthesis. Defoliation. Yields. Malawi.

At Bunda College of Agriculture (Malawi), leaves of Phaseolus vulgaris cv. 1199 were removed or not in (a) the top third, (b) the middle third, and (c) the bottom third of the plants at 21, 35, or 49 days after sowing. Mean seed yields were 0.96, 0.82, and 0.78 t/ha at 21, 35, and 49 days after sowing, resp. The highest seed yield (1.08 t/ha) was produced when none of the zones were defoliated. Removing leaves from (a), (b), and (c) decreased seed yields by 17.2, 10.6, and 0.9% and from (a) + (b), (a) + (c), (b) + (c), and (a) + (b) + (c) by 34.8, 11.2, 26.1, and 69.3%, resp., compared with the undefoliated control. Zone (b) was the most photosynthetic-efficient zone when only that zone was undefoliated, whereas (c) was the least efficient. All zones functioned below their photosynthetic efficiency when other zones were present. [Field Crop Abstracts]

0449

25673 THOMAS, C.J.R.; SMITH, A.R.; HALL, M.A. 1985. Partial purification of an ethylene-binding site from Phaseolus vulgaris L. cotyledons. Planta 164(2):272-277. Engl., Sum. Engl., 19 Refs., Illus. [Biochemistry Dept., National Vegetable Research Station, Wellesbourne, Warwicks CV 35 9 EF, England]

Phaseolus vulgaris. Cotyledons. Ethylene production. Proteins. Analysis. United Kingdom.

The solubilized ethylene-binding site (EBS) of Phaseolus vulgaris cotyledons is an asymmetrical protein with a sedimentation coefficient of 2 S and a Stoke's radius of 6.1 nm, determined by ultracentrifugation on isokinetic gradients and gel-permeation chromatography, resp. The mol. wt. and frictional ratio were calculated as 52,000-60,000 and 2.37-2.48, resp. The EBS has an isoelectric point at between pH 3-5, determined by isoelectric focusing, and exhibits a negative charge at pH 8 during nondenaturing electrophoresis. The electrical charge on the EBS is

shielded; the EBS does not bind to anion-exchange media under these exptl. conditions, is not precipitated by ammonium sulphate, and does not precipitate at its isoelectric pH. The EBS preferentially partitions into detergent phases. Results indicate that the EBS is a hydrophobic protein complexed with detergent in aqueous solution. The techniques used to characterize the EBS also resulted in varying degrees of purification. [AS]

0450

22170 VELAZQUEZ-MENDOZA, J. 1979. Transpiración y apertura estomatal en Phaseolus vulgaris L. bajo el sistema riego-sequía. (Transpiration and stomatal opening in beans under the irrigation-drought system). Tesis Ing.Agr. Chapingo, México, Universidad Autónoma. 111p. Span., Sum. Span., 46 Refs., Illus.

Phaseolus vulgaris. Irrigation. Drought. Cultivars. Transpiration. Water requirements. Stomata. Mexico.

Variations in transpiration, stomatal opening, leaf area, and other characteristics were evaluated for 6 bean var. (Canario 107, Flor de Mayo, Jamapa, Negro 150, Pinto Nacional, and Villa Guerrero) under the irrigation-drought system. Bean plants were grown in pots in the greenhouse and 40 days after emergence had sufficient leaf area; therefore plants were subjected to the established humidity levels. Transpiration was determined by the gravimetric method and the stomatal opening by a method which consisted in obtaining a replicate of the adaxial surface of the leaf. The var. x transpiration humidity interaction was not detected, although there was a tendency for genotypes Canario 107 and Negro 150 to differ in the transpiration curves related to humidity levels. The stomatal opening, estimated by the method of replicating the epidermis with nail enamel, did not agree with the transpiration curve due to lack of sensitivity, adjustment, and training with respect to the method. The low detecting capacity of the expt. is due to a strong variation of environmental factors: day and hours within days. In spite of the previous variation, the genotypes always showed significance. [AS (extract)-CIAT]

See also 0437 0498 0499 0509 0541

C01 Plant Nutrition

0451

25665 BOYLE, J.F.; SMITH, C.E. 1985. Growth and leaf elemental composition of snapbeans as affected by applied zinc and interacting fertilizers. Communications in Soil Science and Plant Analysis 16(5):501-507. Engl., Sum. Engl., 17 Refs. [Dept. of Horticulture, Pennsylvania State Univ., Univ. Park, PA 16802, USA]

Phaseolus vulgaris. Snap beans. Fertilizers. N. P. Ca. K. Leaves. Mineral content. Zn. Mn. Nutrient uptake. Growth. USA.

Bush Blue Lake 47 snap beans were grown in 1980 with 12 fertilizer treatments at 3 sites in production areas of NE Pennsylvania (USA) where the soil pH was 6.6-6.7 and soil P levels were high. The application of Zn at 11.2 kg/ha as sulfate, chloride, oxide, or chelate did not increase snap bean yields. Leaf Zn was increased more effectively by applied Zn sulfate or chloride than by Zn oxide while Zn chelate did not increase leaf Zn. The application of P lowered leaf Zn at 2 sites. N applied as ammonium sulfate increased leaf Zn and Mn but when N was applied as urea, only leaf

Mn was enhanced. When lime was applied, leaf Zn and Mn were lowered at only 1 site. [AS]

0452

24427 CORDOVA, J.J. 1984. Importancia de la fertilidad en el cultivo de frejol. (Importance of soil fertility for bean cultivation). In Curso sobre el cultivo de frejol usando la metodología Aprender Haciendo, 1o., Pimampiro, Ecuador, 1984. Conferencias. Quito, Instituto Nacional de Investigaciones Agropecuarias. Programa de Leguminosas de la Estación Experimental Santa Catalina. pp.55-63. Span. [Depto. de Suelos y Fertilizantes, Estación Experimental Santa Catalina, Inst. Nacional de Investigaciones Agropecuarias, Apartado 340, Quito, Ecuador]

Phaseolus vulgaris. Soil fertility. Mineral deficiencies. N. P. K. Mg. Ca. S. Fe. B. Cu. Zn. Toxicity. Al. Mn. Ecuador.

The principles of soil fertility as related to bean crops are discussed, with special reference to nutritional deficiencies of N, P, K, Mg, Ca, S, Fe, Mn, B, Cu, and Zn. Al, Mn, and B toxicities are also described. The correction of nutritional deficiencies is briefly discussed. [CIAT]

0453

25652 DATTA, S.C. 1985. Simultaneous and intermittent measurement of K, Ca and NO_3-ion absorption by intact bean plant (Phaseolus vulgaris L.) in aerobic and anaerobic condition. Plant and Soil 84(2):193-199. Engl., Sum. Engl., 6 Refs., Illus. [Division of Soil Science & Agricultural Chemistry, Indian Agricultural Research Inst., New Delhi-110012, India]

Phaseolus vulgaris. O. Nutrient uptake. K. Ca. Enzymes. India.

Simultaneous and intermittent measurement of K, Ca, and NO_3-ion absorption by intact bean plants was made under both aerobic and anaerobic conditions. Anaerobiosis was found to have a more direct and pronounced effect on K-ion absorption rather than that of NO_3 ion. Significant ionic efflux (particularly of K ion) occurred in anaerobic condition. This was explained on the basis of direct effect of ATPase on cation absorption by inducing an electrochemical and pH gradient. No effect, however, has been found on the rate of Ca ion absorption due to anaerobiosis. [AS]

0454

24412 FELIX, J.F.; OBATON, M.; MESSIAEN, C.M.; SALSAL, L. 1985. Activites nitrate reductase et nitrogenase chez des varietes de haricot (Phaseolus vulgaris L.) d'origine geographique differente. (Nitrate reductase and nitrogenase activities in bean varieties of different geographical origin). Recherche et Developpement Rural 1(1):8-26. Fr., Sum. Fr., 21 Refs., Illus. [Dept. de Phytotechnie, Faculté d'Agronomie et de Médecine Vétérinaire, Damien, Port-au-Prince, Haiti]

Phaseolus vulgaris. Cultivars. Nitrogen fixation. N. Haiti.

Two field trials were carried out at the Faculté d'Agronomie et de Médecine Vétérinaire of Port-au-Prince, Haiti, during 1979-80, to determine whether the tropical bean var. (not submitted to selection for N assimilation) showed a greater N-fixing capacity than temperate var. The 1st trial compared the evolution of nitrate reductase and nitrogenase activities in bean cv. B-789 (tropical) and ELSA (French). The 2nd trial included 8 other tropical and temperate cv. The characteristics of the studied cv.

are included. Tropical var. showed greater acetylene reduction activity and less N assimilation activity than temperate var. This suggests an inverse relationship between these 2 enzymatic activities in beans and a possible genetic variability. These analyses carried out at different physiological stages of the bean plant can give indications about the best dates for supplementary N fertilization. [CIAT]

G.56

25390 HARDIMAN, R.T.; BANIN, A. 1984. The effect of soil type and degree of metal contamination upon uptake of Cd, Pb and Cu in bush beans (Phaseolus vulgaris L.). Plant and Soil 81(1):3-15. Engl., Sum. Engl., 29 Refs., Illus. [Farming Systems Research Program, International Crops Research Inst. for the Semi-Arid Tropics, Patancheru P.O., A.P. 502 324, India]

Phaseolus vulgaris. Nutrient uptake. Cd. Pb. Cu. India.

Five soils of increasing specific surface area were loaded to 5 levels of contamination with Cd, Pb, and Cu, and bean plants were grown on the soils for 30 days. A linear correlation was found between the concn. of Cd in the soil solutions and the amount absorbed by the plant/g root material for 4 out of the 5 soils, and in the case of Cu, for all 5 soils. Quantitatively, there was insufficient Cd or Cu in the soil solution to account for plant uptake of these metals. The amount of Cd absorbed by plants could also be related to the absorption density (concn./specific surface area soil) of the metal in 4 of the 5 soils, whereas the Cu content of plants could be related to the adsorption density of all 5 soils. The metals were apparently removed from the soil solution by root absorption and replenished by metal cations absorbed onto surface sites in the soil. Consideration of the adsorption density of these metals in the soil may be a useful means to determine the permissible limits for heavy metal application for a wide range of soils. Pb uptake was significantly correlated to total Pb in soils, but not to the adsorption density or soil solution concn. The possible interpretation of the results are discussed. [A]

G.56

25389 HARDIMAN, R.T.; JACOBY, B.; BANIN, A. 1984. Factors affecting the distribution of cadmium, copper and lead and their effect upon yield and zinc content in bush beans (Phaseolus vulgaris L.). Plant and Soil 81(1):17-27. Engl., Sum. Engl., 34 Refs., Illus. [Farming Systems Research Program, International Crops Research Inst. for the Semi-Arid Tropics, Patancheru P.O., A.P. 502 324, India]

Phaseolus vulgaris. Roots. Stems. Leaves. Mineral content. Cd. Pb. Cu. Nutrient uptake. Zn. Nutrient transport. India.

Concn. of Cd, Pb, and Cu in the roots, stems, and leaves of Bulgarian bush bean were determined for plants grown in various soils of increasing levels of contamination of these metals. Most of each heavy metal absorbed by plants was retained in roots. Root concn. of Cd, Pb, and Cu increased in response to soil concn., whereas in stems, only Cd and Pb concn. increased and Cu concn. was relatively constant. Cu transport to the stele apparently was metabolically controlled, whereas Cd and Pb reached the stem by leakage across mesodermal areas of the endodermis. Uptake of heavy metals was associated with a decrease in Zn content in plants and a decrease in yield. By regression analysis, decrease in both Zn content and plant yield could be best related to Cd content in stems. Possible reasons for these effects are discussed. [A]

0457

25689 MacLEOD, F.C.; ORMROD, D.P. 1985. Responses of white bean to ammonium or nitrate nutrition at three temperatures. Canadian Journal of Plant Science 65(1):201-205. Engl., Sum. Engl., Fr., 21 Refs. [Dept. of Horticultural Science, Univ. of Guelph, Guelph, Ontario N1G 2W1, Canada]

Phaseolus vulgaris. Temperature. N. Nutrient solution. Chlorosis. Mineral content. pH. Canada.

The response of white bean cv. Seafarer growing in quartz sand to ammonium (NH_4^+) or nitrate (NO_3^-) N source was investigated in controlled environments at 27/11, 18/11, and 19/7°C day/night temp. Ammonium-treated plants developed leaf chlorosis and necrosis. The pH of leachate from the rooting medium dropped from an initial level of 6.0 to values of 3.5-3.9 for NH_4^+-treated plants, while the pH increased to about 6.5 for NO_3^--treated plants. The NO_3^--treated plants had much greater growth overall than NH_4^+-treated plants. Temp. had little or no effect on plant responses to N source. The NO_3^--treated plants contained higher NO_3^- and Ca but lower total N, NH_4^+ and P than NH_4^+-treated plants. [AS]

0458

22508 MOORE, R. 1984. Acid efflux patterns of primary and lateral roots of Phaseolus vulgaris (Fabaceae). American Journal of Botany 71(8): 1168-1170. Engl., Sum. Engl., 11 Refs., Illus. [Dept. of Biology, Baylor Univ., Waco, TX 76798, USA]

Phaseolus vulgaris. Roots. Nutrient transport. Translocation. USA.

Gravirespouding primary roots of Phaseolus vulgaris were characterized by more acid efflux on the upper than on the lower side of the root. Acid efflux patterns of the upper and lower sides of horizontally orientated lateral roots were symmetrical. Addition of sodium orthovanadate (an inhibitor of auxin-induced H^+ efflux) to the growth medium abolished gravicurvature and development of acid efflux asymmetry in horizontally orientated roots. It is concluded that auxin redistribution may cause the asymmetry of acid efflux that mediates gravitropism, and that the lack of an auxin-induced asymmetry of acid efflux may contribute to the min. gravirespondsiveness of lateral roots. [AS]

0459

22510 MORAGHAN, J.T. 1984. Differential responses of five species to phosphorus and zinc fertilizers. Communications in Soil Science and Plant Analysis 15(4):437-447. Engl., Sum. Engl., 13 Refs. [Dept. of Soil Science, North Dakota State Univ., Fargo, ND 58105, USA]

Phaseolus vulgaris. Fertilizers. P. Zn. Dry matter. Cultivars. USA.

The influence of a factorial combination of P (0 and 120 ppm) and Zn (0 and 16 ppm) treatments on growth of maize, flax, navy bean cv. Seafarer, soybeans, and wheat was studied under greenhouse conditions. All crops responded to P and all, except wheat, responded to Zn; the P x Zn interactions were significant, except for wheat. Flax and navy beans showed the largest responses to added Zn and also differed from the other species in that added P without Zn decreased yields. Flax and navy beans treated with P without Zn had the largest P concn., 0.96 and 0.91%, resp.; the unifoliate leaves of these navy bean plants developed water-soaked and necrotic zones prematurely and contained 4.3% P. The suppression in growth

of navy beans resulting from added P appeared to be at least partly associated with P toxicity. [AS (extract)]

0460

25649 SCHWEIZER, P.; ERISMANN, K.H. 1985. Effect of nitrate and ammonium nutrition of nonnodulated Phaseolus vulgaris L. on phosphoenolpyruvate carboxylase and pyruvate kinase activity. Plant Physiology 78(3): 455-458. Engl., Sum. Engl., 30 Refs., Illus. [Pflanzenphysiologisches Inst., Altenbergrain 21, CH-3013 Bern, Switzerland]

Phaseolus vulgaris. Enzymes. Nutrient solution. pH. Plant nutrition. Plant assimilation.

Young bean plants of var. Soxa were fed with 3.5 or 10.0 millimolar N in either the form of NO_3^- or NH_4^+, after being grown on N-free nutrient solution for 8 days. The pH of the nutrient solutions was either 6 or 4. The cell sap pH and the extractable activities of phosphoenolpyruvate carboxylase and of pyruvate kinase from roots and primary leaves were measured over several days. The extractable activity of phosphoenolpyruvate carboxylase (based on soluble protein) from primary leaves increased with NO_3^- nutrition, whereas with NH_4^+ nutrition and on N-free nutrient solution the activity remained at a low level. Phosphoenolpyruvate carboxylase activity from the roots of NH_4^+-fed plants at pH 4 was finally somewhat higher than for the roots of plants grown on NO_3^- at the same pH. There was no difference in activity from the root between the N treatments when pH in the nutrient solution was 6. The extractable activity of pyruvate kinase from roots and primary leaves seemed not to be influenced by the N nutrition of the plants. Results are discussed in relation to the physiological function of both enzymes with special regard to the postulated functions of phosphoenolpyruvate carboxylase in C3 plants as an anaplerotic enzyme and as part of a cellular pH stat. [AS]

0461

25660 SRIVASTAVA, H.S.; ORMROD, D.P. 1984. Effects of nitrogen dioxide and nitrate nutrition on growth and nitrate assimilation in bean leaves. Plant Physiology 76(2):418-423. Engl., Sum. Engl., 29 Refs. [Dept. of Life-Sciences, Univ. of Indore, Indore-452-001, India]

Phaseolus vulgaris. Leaves. Growth. N. Enzymes. Analysis. India.

The influence of nutrient nitrate level (0-20 mM) on the effects of NO_2 (0-0.5 ppm) on growth, on F, photosynthetic pigment, and N contents, and on the activities of enzymes of N assimilation was studied in bean cv. Kinghorn Wax leaves. Exposing 7-day-old bean seedlings for 5 days continuously to 0.02-0.50 ppm NO_2 increased plant height, fresh wt., chlorophyll, carotenoid, organic N, and nitrate contents, and nitrate reductase and glutamate synthase activities in the leaves of seedlings supplied with no external N. At 20 mM nitrate, most of the parameters examined were inhibited except for organic N and nitrate contents and glutamate synthase activity, which increased in most cases. Generally, with an increase in NO_2 concn., the stimulatory effect declined and/or the inhibitory effect increased. A 4-h exposure of 12-day-old bean seedlings to 0.1-2.0 ppm NO_2 increased nitrate content and nitrate reductase activity at each nutrient nitrate level except for a slight inhibition of enzyme activity during exposure to 2.0 ppm NO_2 at 20 mM nitrate. The expt. demonstrated that the effect of NO_2 is strongly influenced by nutrient N level and that NO_2 is assimilated into organic nitrogenous compounds to serve as a source of N, only to a limited extent. [AS]

0462

25680 WESTERMANN, D.T.; PORTER, L.K.; O'DEEN, W.A. 1985. Nitrogen partitioning and mobilization patterns in bean plants. Crop Science 25(2):225-229. Engl., Sum. Engl., 21 Refs., Illus. [Snake River Conserv. Res. Ctr., Kimberly, ID 83341, USA]

Phaseolus vulgaris. Cultivars. Dry matter. N. Nutrient uptake. Plant development. Plant anatomy. USA.

The N partitioning and mobilization patterns in beans were measured. Two dry bean cv., 3512 and 3591, were labeled with either $^{15}NO_3$ or $^{15}N_2$ at the late vegetative (V5), early pod development (R2-R3), and seed filling (R6) developmental stages in the greenhouse. Initial N partitioning was evaluated on plants harvested 48 h after the start of labeling, while the N mobilization patterns were evaluated on the $^{15}NO_3$-labeled plants harvested at subsequent developmental stages and at physiological maturity (R9). Both cv. had similar dry wt. and N distribution patterns throughout development, but 3512 had a larger final seed yield, while the final seed N concn. were greater for 3591. These differences developed from R6 to R9 where the dry wt. increase in 3591 had a N concn. of 28.1 g/kg compared with 9.9 g/kg for 3512. The relative proportion of ^{15}N in each plant part was dependent upon the growth stage and ^{15}N source, and was independent of cv. Greater proportions were found in the mature leaves and roots of plants labeled with $^{15}NO_3$, and in the seed and nodules in these plants labeled with $^{15}N_2$ at all growth stages. Pods and seeds were major sinks from both ^{15}N sources when applied at R2-R3 and R6, resp. The seed at R9 contained 64, 73, and 84% of the labeled-N applied at the V5, R2-R3, and R6 growth stages, resp. The seed contained an av. of 68% of the total plant N and 53% of the total plant dry wt. at R9. These data indicate that the photosynthetic and N_2-fixation activities during seed filling can have a significant influence on the final seed N concn. and yield. [AS]

See also 0473 0519 0657 0701

CO2 Plant Development

0463

25341 BOARO, C.S.F.; CARVALHO, V.L.M. DE; RICUDO, L.R.F.; NAKAGAWA, J. 1984. Estudo de testes em laboratorio para avaliar a qualidade fisiológica de sementes de feijao. (Studies on laboratory tests for evaluating the physiological quality of bean seeds). Revista Brasileira de Sementes 6(2):[illegible]-86. Port., Sum. Port., Engl., 14 Refs. [Inst. Básico de Biologia Medica e Agricola, Campus de Botucatu, Univ. Estadual de Sao Paulo, 18.600 Botucatu-SP, Brasil]

Phaseolus vulgaris. Cultivars. Seed. Germination. Seed vigor. Seed characters. Brazil.

Lab. tests and their parameters for evaluating physiological quality of bean seeds were compared using 5 seeds lots of cv. Aroana, Carioca, and Regente harvested 1 yr of harvest. Seed quality was evaluated by % of live seedlings at 1st count, % of normal seedlings at 1st count, and % of total normal seedlings in the standard germination test, in the cold germination test (15°C), and in the test of immersion in toxic solution (NH_4Cl 1% for 30 min), as well as % of normal seedlings at 1st count and % of total normal seedlings in the accelerated aging test (48 h at 41°C and ± 100% RH). Immersion the seeds in toxic solution was the most efficient. The

cool germination test and the accelerated aging test showed similar or lower efficiency than the standard germination test. [AS]

0464

25804 COSTA, J.G.C. DA; SHIBATA, J.K.; COLIN, S.M. 1985. Indice de colheita em feijoeiro comum. (Harvest index in beans). Pesquisa Agropecuária Brasileira 20(6):737-739. Port., Sum. Port., Engl., 8 Refs. [Centro Nacional de Pesquisa de Arroz e Feijao, Caixa Postal 179, 74.000 Goiania-GO, Brasil]

Phaseolus vulgaris. Cultivars. Yields. Dry matter. Brazil.

The inclusion of total canopy produced by bean plants during the growth period in the calculation of the modified HI (wt. of seeds with 10% MC/dry wt. of all aerial parts produced during the plant cycle x 100), and the correlation of this index and the customary HI (wt. of seeds with 10% MC/dry wt. of aerial parts existent at harvest x 100) with seed yield were studied. Bean var. Canario 107 (determinate bush), Michoacan 12-A-3 (indeterminate short-vine, erect), Negro 150 and Flor de Mayo X-16441 (bush indeterminate climbing long-vine) were used. Results indicated a closer relationship between modified HI and seed yield than between the customary HI and seed yield. It might be assumed that modified HI is a more appropriate procedure to be used as an indirect index to yield. [AS]

0465

25900 DOBBEN, W.H. VAN; AST, A. VAN; COFFE, W.J. 1984. The influence of temperature on morphology and growth rate of bean seedlings. Acta Botanica Neerlandica 33(2):185-193. Engl., Sum. Engl., 6 Refs., Illus. [Vakgroep Vegetatiekunde, Plantecoecologie en Onkruidkunde, Landbouwhogeschool, Bornsesteeg 69, 6708 PD Wageningen, Netherlands]

Phaseolus vulgaris. Seedlings. Growth. Temperature. Leaves. Netherlands.

Phaseolus vulgaris seedlings were grown at 16 and 25°C and 2 light intensities. At 25°C, RGR was twice that at 16°C and plant development took half the time suggesting a linear proportionality between RGR and temp. in this range. This relation implied that RGR has a specific max. which depends on temp. At 16°C, the DM content of seedling leaves rose gradually whereas at 25°C it remained practically constant. Leaf area/unit leaf dry wt. dropped at 16°C so that leaf area ratio decreased after reaching a max. This, however, did not lead to a drop in RGR suggesting that compensation through a higher NAR occurs. At 25°C the decline of RGR in low light intensity was relatively strong, probably because of a high respiration level. Light intensity and temp. had little influence on the specific wt. of leaves. Furthermore, leaf area/unit fresh leaf wt. appeared to be proportional to the inverse of leaf thickness. The findings suggest that inner leaf structure maintains a certain homogeneity independent of outward conditions. Cotyledons were exhausted by the young seedling at a constant rate which was higher in high temp. and low light intensities. [Horticultural Abstracts]

0466

26227 DOLJODE, S.D. 1985. Influence of irradiance on seed germination. Gartenbauwissenschaft 50(1):29-31. Engl., Sum. Engl., Germ., Fr., Russ., 16 Refs. [Indian Inst. of Horticultural Research, Bangalore, India]

Phaseolus vulgaris. Seed. Germination. Illumination. India.

The influence of white fluorescent light (1200 lux) on the germinability of onion, tomato, radish, muskmelon, red pepper, sweet pepper, carrot, cabbage, French bean, and papaya seed was studied. Seed germination was prevented with the exposure to fluorescent light for 2 h/24-h-cycle and subsequent seedlings were more vigorous in nature. This technique proved to be beneficial for the preservation of seeds of horticultural crops. [AS]

0467

25896 HEMANTARANJAN, A.; VAISHAMPAYAN, A. 1984. Effect of cytokinin and various inorganic cations on the polyamine content of French bean (Phaseolus vulgare L.) cotyledons. Biochemie und Physiologie der Pflanzen 179(7):553-559. Engl., Sum. Engl., 30 Refs. [Laboratory of Plant Physiology, Inst. of Agricultural Sciences, Banaras Hindu Univ., Varanasi-221005, India]

Phaseolus vulgaris. Snap beans. Cytokinins. Cotyledons. Seedlings. India.

The effects of kinetin (4.7×10^{-4} M) and 6-benzyladenine (2.22×10^{-4} M) were found to increase ca. 2-fold the putrescine content in cotyledons of French bean seedlings grown for 3 days under fluorescent light. Several inorganic ions (K^{+}, Na^{+}, Ca^{++}, Mg^{++}) at a concn. of 3×10^{-2} M and Zn^{++} at 0.35 micromolar reduced the putrescine content. The combination of kinetin with 2 (K^{+} and Zn^{++}) of several inorganic ions at the same level markedly increased the spermine content, but the putrescine content decreased; Ca and Mg ions were not very effective. The physiological significance of these findings is discussed. [AS]

0468

25218 HERATH, H.M.E.; EATON, G.W. 1981. Yield component comparison of ten cultivars of bush beans (Phaseolus vulgaris L.) grown under heat stress. Tropical Agriculturist 137:147-152. Engl., Sum. Engl., 15 Refs.

Phaseolus vulgaris. Cultivars. Yield components. Yields. Temperature. Growth. Canada.

Ten bush bean cv. were compared on the basis of their yield components under conditions of heat stress. A growth bench was used to provide a climatic model with a 33/23°C day/night temp. Primary data included no. of branches, nodes, racemes, flowers, pods, and seeds. The main yield components were branches/plant, pod no., seeds/pod, and pod size. The no. of seeds/pod is a promising component for breeding since it was not involved in compensatory relationships and accounted for 17.1% of the total yield diversity. [AS]

0469

25871 KAHN, B.A.; STOFELLA, P.J.; SANDSTED, R.F.; ZOBEL, R.W. 1985. Influence of flooding on root morphological components of young black beans. Journal of the American Society for Horticultural Science 110(5):623-627. Engl., Sum. Engl., 19 Refs. [Dept. of Horticulture & Landscape Architecture, Oklahoma State Univ., Stillwater, OK 74078, USA]

Phaseolus vulgaris. Roots. Cultivars. Seedlings. Flooding. USA.

Three black bean cv., Midnight, Black Turtle Soup, and T-39, were grown in a sand culture in a series of greenhouse expt. Seedlings were subjected to various flooding treatments beginning at the time the 1st true leaves were fully expanded and continuing for up to 14 days. Root systems were partitioned into adventitious, basal, and tap components at harvest. Basal

roots accounted for the greatest proportion of the total root biomass in control plants. Adventitious roots became the dominant root component in plants which had been flooded for up to 7 days and then allowed to recover for 7 days. The production of adventitious roots by flooded plants reduced their shoot:root ratios to values closer to those of unflooded control plants. Plants of cv. Midnight usually had larger basal roots and higher total root and shoot wt. than plants of the other 2 cv. All 3 cv., however, were proportionally affected to the same extent by flooding. [AS]

0470

26094 LIETH, J.H.; REYNOLDS, J.F. 1984. A model of canopy irradiance in relation to changing leaf area in a phytotron-grown snap bean (Phaseolus vulgaris L.) crop. International Journal of Biometeorology 28(1):61-71. Engl., Sum. Engl., 30 Refs., Illus. [Blackland Research Center, Box 748, Temple, TX 76503, USA]

Phaseolus vulgaris. Snap beans. Canopy. Irradiation. Plant development. Growth. USA.

Simple exponential decay models were used to describe the variation in irradiance profiles within a snap bean canopy over a 33-day period of canopy development. The extinction coefficients of these models were varied over time as a function of changing canopy leaf area; nonlinear least-squares procedures were used to estimate parameter values. The resultant model response surfaces depict the changes in canopy irradiance that accompany canopy maturation and illustrate the dynamic nature of canopy closure. A criterion index is defined to aid in assessing the applicability of these models for use in whole-plant simulation models, and an evaluation of these models is given based on this index, their predictive accuracy, and the utility for use within varying modeling frameworks. [AS]

0471

25803 MENDES, A.N.G. 1983. Hábito de florescimento e vingamento de flores e de frutos no feijoeiro (Phaseolus vulgaris L.). (Flowering patterns and percentage of flower and fruit drop in bean cultivars). Tese Mestrado. Piracicaba-SP, Brasil, Escola Superior de Agricultura Luiz de Queiroz da Universidade de Sao Paulo. 75p. Port., Sum. Port., Engl., 48 Refs., Illus.

Phaseolus vulgaris. Cultivars. Flowering. Podding. Plant breeding. Brazil.

An expt. was carried out in Piracicaba, Brazil, to study the performance of 12 bean cv. (Aroana, Carioca 1030, Carioca Precoce Arbustivo, CENA 164, Costa Rica 1095, Goiano Precoce, IAPAR RAI 54, Moruna, Mulatinho Paulista, Pirata, Rico 23, and Turrialba) regarding the flowering patterns and % of flower and fruit drop. The cv. had similar flowering patterns and the % of flower and fruit set was very low (av. 29%), showing that only a small part of the reproductive potential was utilized. The cv. produced a large no. of flowers at the beginning of flowering and more than 80% of the fructification occurred during a short flowering period of 12 days. The cv. had short flowering periods (av. 25 days) and the % of flower and fruit set and the no. of grains/pod decreased as the age of plants increased. [AS (extract)]

0472

25669 MOHANDAS, S. 1985. Effect of presowing seed treatment with molybdenum and cobalt on growth, nitrogen and yield in bean (Phaseolus

vulgaris L.). Plant and Soil 86(2):283-285. Engl., Sum. Engl., 9 Refs. [Indian Inst. of Horticultural Research, 255 Upper Palace Orchards, Bangalore-80, India]

Phaseolus vulgaris. Snap beans. Seed. Nodulation. Dry matter. N. Seed treatment. Yields. India.

Bean seeds of cv. Burpees Stringless were subjected to 2 cycles of presowing soaking and drying treatments with sodium molybdate and cobalt nitrite at 1 and 5 ppm concn. used separately and also in combination. Sodium molybdate 2 ppm and cobalt nitrite 1 ppm used singly proved better than the remaining treatments with respect to nodulation, DM, N, and yield. Combined treatment with sodium molybdate and cobalt nitrite did not produce additive effect on any parameter studied compared with their usage alone. [AS]

0473

20894 MOURSI, M.A.; NOUR-EL-DIN, N.A.; MANSOUR, M.A. 1974. Flowering and fruit set of bean (Phaseolus vulgaris L.) as influenced by ammonium sulphate and calcium superphosphate. Egyptian Journal of Horticulture 2(1):23-37. Engl., Sum. Engl., 16 Refs.

Phaseolus vulgaris. Flowering. Podding. Abscission. Fertilizers. Ammonium sulphate. N. Ca. P. Yields. Yield components. Egypt.

In field trials in Egypt, the effects of 0, 100, or 200 kg calcium superphosphate (15% P) and 0 or 100 kg ammonium sulphate (20.5% N)/feddan (1 feddan = 0.42 ha) on Phaseolus vulgaris were examined. Ammonium sulphate had no marked effect on the time of flowering, the % of fruit set, or the total no. or % of abscised flowers. It also decreased the % of fruit abscission and increased the total no. of flowers and fruits/plant, pod and seed yields, no. of seeds/pod length, and pod diameter. Calcium superphosphate accelerated flowering and increased flowering capacity, % of fruit set, total no. of abscised flowers and fruits/plant, but decreased the % abscission of both flowers and fruits. Calcium superphosphate also increased the yields of seeds and pods and the no. of seeds/pod. Ammonium sulphate and calcium superphosphate both acted independently on the various characteristics of bean plants. [Field Crop Abstracts]

0474

25676 RUBLUO, A.; KARTHA, F.K. 1985. In vitro culture of shoot apical meristems of various Phaseolus species and cultivars. Journal of Plant Physiology 119(5):425-433. Engl., Sum. Engl., 22 Refs., Illus. [Tissue Culture Laboratory, Inst. de Biología, Univ. Nacional Autónoma de México, México 20, D.F.]

Phaseolus vulgaris. Apical meristems. Shoots. Temperature. Tissue culture. Phaseolus lunatus. Phaseolus coccineus. Indoleacetic acid. Cytokinins. Growth. Mexico.

In vitro morphogenetic responses of shoot apical meristems of 3 species of Phaseolus (P. vulgaris, P. coccineus, and P. lunatus) were studied under various temp. regimes as well as hormone combinations. Meristems of P. vulgaris exhibited the best response in terms of shoot regeneration (65%) when cultured on media supplemented with 10.0 micromolar each of 6-benzyladenine (BA) and IAA or IBA at a constant temp. of 26°C. The efficiency of bud and shoot regeneration was different with various cv. of P. vulgaris, P. coccineus, and P. lunatus. Except for 10.0 micromolar BA,

other concn. of cytokinins or auxins alone failed to induce bud or shoot regeneration. Even at the optimal level of BA (10.0 micromolar), differential responses were observed in plant regeneration efficiency (0-100%). An elevation of mannitol and sucrose concn. in the media dra.tically reduced the growth of plantlets regenerated from meristems (up to 95%). Sucrose alone, at 5% level, appeared to be adequate to bring about growth reduction and thus facilitate short-term preservation of Phaseolus meristems. [AS]

0475

25672 SEEMANN, J.R.; CRITCHLEY, C. 1985. Effects of salt stress on the growth, ion content, stomatal behaviour and photos,nthetic capacity of a salt-sensitive species, Phaseolus vulgaris L. Planta 164(2):151-162. Engl., Sum. Engl., 53 Refs., Illus. [Biological Sciences Center, Desert Research Inst., P.O. Box 60220, Reno, NV 89506, USA]

Phaseolus vulgaris. Salinity. Growth. Photosynthesis. Yields. Mineral content. Leaves. Stomata. USA.

Phaseolus vulgaris cv. Hawkesbury Wonder was grown over a range of NaCl concn. (0-150 mM), and the effects on growth, ion relations, and photosynthetic performance were examined. Dry and fresh wt. decreased with increasing external NaCl concn. while the root:shoot ratio increased. The Cl^- concn. of leaf tissue increased linearly with increasing external NaCl concn., as did K^+ concn., although to a lesser degree. Increases in leaf Na^+ concn. occurred only at the higher external NaCl concn. (more than or equal to 100 mM). Increases in leaf Cl^- were primarily balanced by increases in K^+ and Na^+. X-ray microanalysis of leaf cells from salinized plants showed that Cl^- concn. was high in both the cell vacuole and chloroplast-cytoplasm (250-300 mM in both compartments for the most stressed plants), indicating a lack of effective intracellular ion compartmentation in this species. Salinity had little effect on the total N and ribulose-1,5-bisphosphate (RuBP) carboxylase content/unit leaf area. Chlorophyll/unit leaf area was, however, reduced considerably by salt stress. Stomatal conductance declined substantially with salt stress such that the intercellular CO_2 concn. (C_i) was reduced by up to 30%. Salinization of plants was found to alter the delta ^{13}C value of leaves of Phaseolus by up to 5% and this change agreed quantitatively with that predicted by the theory relating carbon-isotope fractionation to the corresponding measured intercellular CO_2 concn. Salt stress also brought about a reduction in photosynthetic CO_2 fixation independent of altered diffusional limitations. The initial slope of the photosynthesis vs. C_i response declined with salinity stress, indicating that the apparent in vivo activity of RuBP carboxylase was decreased by up to 40% at high leaf Cl^- concn. The quantum yield for net CO_2 uptake was also reduced by salt stress. [AS]

0476

26229 SREEDHAR, D.; MEHTA, A.R. 1984. In vitro shoot differentiation from hypocotyledonary and epicotyledonary explants of Phaseolus lunatus Linn. Indian Journal of Experimental Biology 22(6):345-346. Engl., Sum. Engl., 13 Refs., Illus. [Dept. of Botany, Univ. of Baroda, Baroda 390 002, India]

Phaseolus lunatus. Shoots. Hypocotyls. Epicotyls. Cotyledons. Culture media. Tissue culture. Growth. India.

Differentiation occurred after 2 wk. in explants from 2-wk.-old seedlings of Phaseolus lunatus cultured on Gamborg's B5 medium supplemented with 2 mg BAP/l and 0.5 mg kinetin/l. [AS]

0477

25661 VAN VOLKENBURGH, E.; SCHMIDT, M.G.; CLELAND, R.E. 1985. Loss of capacity for acid-induced wall loosening as the principal cause of the cessation of cell enlargement in light-grown bean leaves. Planta 163(4):500-505. Engl., Sum. Engl., 25 Refs., Illus. [Dept. of Botany, Univ. of Washington, Seattle, WA 98195, USA]

Phaseolus vulgaris. Leaves. Growth. Light. Osmotic potential. Cell walls. USA.

Cell enlargement in primary leaves of bean can be induced, free of cell divisions, by exposure of 10-day-old, red-light-grown seedlings to white light. The absolute rate of leaf expansion increases until day 12, then decreases until the leaves reach mature size on day 18. The cause of the reduction in growth rate following day 12 has been investigated. Turgor calculated from measurements of leaf water and osmotic potential fell from 6.5 to 3.5 bar before day 12, but remained constant thereafter. The decline of growth after day 12 is not caused by a decrease in turgor. On the other hand, Instron-measured cell wall extensibility decreased in parallel with growth rate after day 12. Two parameters influencing extensibility were examined. Light-induced acidification of cell walls, which initiates wall extension, remained constant over the growth period (days 10-18). Furthermore, cells of any age could be stimulated to excrete H^+ by fusicoccin. However, older tissue was not able to grow in response to fusicoccin or light. Measurements of acid-induced extension of preparations of isolated cell walls showed that as cells matured, the cell walls became less able to extend when acidified. It is a decline in the capacity for acid-induced wall loosening that reduces wall extensibility and thus cell enlargement in maturing leaves. [AS]

See also 0462 0487 0495 0501 0502 0513 0514 0523 0534 0544 0631 0670 0701 0820 0824

C03 Chemical Composition, Methodology and Analyses

0478

26069 ABD EL-SAMEI, M.H.; LASZTITY, K. 1984. Comparative study on the amino acids composition in three local Phaseolus vulgaris seeds varieties. Zeitschrift fuer Lebensmittel-Untersuchung und-Forschung 178(1):24-26. Engl., Sum. Germ., Engl., 22 Refs. [Agricultural Chemistry Dept., Faculty of Agriculture, El-Minia Univ., El-Minia, Egypt]

Phaseolus vulgaris. Cultivars. Seed. Amino acids. Composition. Egypt.

The overall amino acid compositions of 3 Phaseolus vulgaris seed var. (Contender, Swissblan, and Giza) were similar. All had a relative deficiency in S-containing amino acids. Moreover, there was a negative correlation between S-amino acid content and the % of seed proteins. The lysine content of the Phaseolus seeds was relatively high; the amount ranged from 8.05 to 8.63 g/16 g N. Tryptophan was slightly higher for var. Giza than for the others. The highest levels of free amino acids were recorded for var. Contender and Swissblan. Cystine, phenylalanine, and tyrosine were absent from the extracts of the 3 var. [AS]

0479

25632 BENDER, A.E. 1983. Haemagglutinins (lectins) in beans. Food Chemistry 11(4):309-320. Engl., Sum. Engl., 18 Refs., Illus. [Dept. of Nutrition, Queen Elizabeth College, Univ. of London, London, England]

Phaseolus vulgaris. Lectins. Composition. Cooking. Human nutrition. United Kingdom.

Studies on lectin content of beans (red kidney, white kidney, and rose coco beans), in vivo toxicity, heat destruction, and inadequate cooking were conducted. Of 9 types of legumes tested, only the types of Phaseolus vulgaris contained large amounts of lectins (from 17,000 to 53,000 hemagglutinin units). Lectin removal by overnight water soaking was high, ranging from 20 to 70% for 3 red kidney bean samples. Most of the rats fed diets containing raw beans at 60-80% levels died within 7 days on both red and white kidney beans. Differential results were obtained on lectin destruction by heating for varying intervals (2, 5, 10, or 20 min); a small amount of agglutinating power remained in red kidney beans after 20 min cooking at 100°C. There is an increase in toxicity when cooking is at 70-80°C. Comments are made on infant feeding with beans. [CIAT]

0480

25887 CINCO, F.J.; FRELS, J.M.; HOLT, D.L.; RUPNOW, J.H. 1985. Determination of the number and heat stability of alpha-amylase inhibitors in white and red kidney bean (Phaseolus vulgaris). Journal of Food Science 50(2):533-535. Engl., Sum. Engl., 12 Refs., Illus. [Univ. de Sonora, Apartado Postal 336 y 106, Hermosillo, México]

Phaseolus vulgaris. Proteins. Inhibitors. Enzymes. Seed color. USA.

The alpha-amylase inhibitors from Phaseolus vulgaris cv. Great Northern UI-59 (white) and cv. LRF California (red) were isolated using a heat-free procedure. Phenyl-Sepharose chromatography resolved 2 inhibitors from white beans, one of which was much less stable than the other at 70°C, and one from red beans. [AS]

0481

26030 GEPTS, P.; BLISS, F.A. 1984. Enhanced available methionine concentration associated with higher phaseolin levels in common bean seeds. Theoretical and Applied Genetics 69(1):47-53. Engl., Sum. Engl., 24 Refs. [Dept. of Horticulture, Univ. of Wisconsin, Madison, WI 53706, USA]

Phaseolus vulgaris. Seed. Methionine. Phaseolin. Composition. Mineral content. N. Inheritance. USA.

The relationship between available met. concn. and the levels of phaseolin, the major seed storage proteins of the common bean, was studied using 3 groups of genetic materials: (1) the F_2 progenies of interspecific crosses between Phaseolus vulgaris cv. and P. coccineus subsp. coccineus cv. Mexican Red Runner having no detectable phaseolin; (2) the F_2 progenies and segregating F_3 families of crosses between cultivated P. vulgaris lines and a Mexican wild bean accession (PI 325690-3) carrying a gene producing a reduction in phaseolin content; (3) 2 inbred backcross populations: Sanilac x Bush Blue Lake 240 (population 2) and Sanilac x 15R 148 (population 6). Total seed N levels were determined by micro-Kjeldahl, phaseolin levels by rocket immunoelectrophoresis, and available met. levels by the Streptococcus zymogenes bioassay. In all the genetic materials studied, with the exception of population 6, higher phaseolin levels lead to increased available met. concn. Although phaseolin has a low met. concn., it is actually a major source of available met. in common bean seeds, because it represents a large part of total seed N and because limited differences exist between the met. concn. of the different protein fractions. In population 6, no relationship was observed between available

met. and phaseolin content. Other factors, such as additional met.-rich polypeptides or the presence of tannins, might obscure the positive relationship between phaseolin and available met. content in population 6. [AS]

0482

25897 HOOVER, R.; SOSULSKI, F. 1984. Characteristics and concentrations of alpha-amylase inhibitor in Phaseolus vulgaris biotypes. Starch/Stärke 36(7):246-250. Engl., Sum. Engl., Germ., 35 Refs., Illus. [Dept. of Crop Science & Plant Ecology, Univ. of Saskatchewan, Saskatoo, Saskatchewan, Canada S7N 0W0]

Phaseolus vulgaris. Genotypes. Inhibitors. Proteins. Starch content. Canada.

Flours from 6 legume species (lentil, lima bean, field pea, chickpea, fababean, mung bean) were devoid of alpha-amylase inhibitory activity but 5 biotypes of Phaseolus vulgaris showed activities of 27-40 units/mg protein. Air classification of the pin milled flours yielded fine fractions which contained 37% (black bean) to 61% (navy bean) protein and 38 to 66 units of inhibitor activity/mg protein, resp. The coarse starch fractions were proportionately depleted in protein content and inhibitor activity. [AS (extract)]

0483

23615 IZQUIERDO, J.A.; HOSFIELD, G.L.; UEBERSAX, M.A.; ADAMS, W.M. 1985. The utility of the starch iodine and soluble solids tests for evaluating carbohydrate partitioning in dry beans. Agro-Ciencia 1(2):145-152. Engl., Sum. Engl., Span., 23 Refs., Illus. [Depto. de Agronomía, Facultad de Ciencias Agropecuarias y Forestales, Univ. de Concepción, Casilla 537, Chillán, Chile]

Phaseolus vulgaris. Carbohydrate content. Sugar content. Cultivars. Starch content. Roots. Stems. Petioles. USA.

The values of the starch I procedure and total soluble solids content for estimating nonstructural carbohydrate in beans were assessed by correlating the values obtained through analysis for starch and soluble sugar content. Correlations between starch I scores and total soluble solids content vs. concn. of starch and water-soluble sugars as determined by high pressure liquid chromatography were sometimes significant but not of a great magnitude. The coefficients between starch content (mg/g) and starch I scores obtained in roots, stems, and petioles were 0.51, 0.61, and 0.77, resp. Total sugar concn. as determined by high pressure liquid chromatography was significantly correlated (r = 0.42) with total soluble solids only in roots while sucrose was significantly correlated with soluble solids in both roots (r = 0.41) and stems (r = 0.44). Glucose concn. was significantly correlated with total soluble solids in petioles (r = 0.74). Starch I scores were not proportional to starch determined quantitatively. A degree of caution must be exercised when using this method; it should only be used for gross separation of cv. for starch content. Since the petioles store starch and the starch I scores of this tissue correlated with starch better than scores from roots and stems, the petiole could be a useful organ for evaluating carbohydrate partitioning. [AS]

0484

25322 LEE, J.P.; UEBERSAX, M.A.; ZABIK, M.E.; HOSFIELD, G.L.; LUSAS, E.W. 1983. Physicochemical characteristics of dry-roasted navy bean flour

fractions. Journal of Food Science 48(6):1860-1862,1875. Engl., Sum. Engl., 20 Refs., Illus. [Dept. of Food Science & Human Nutrition, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Bean flour. Composition. Sugar content. USA.

Navy beans were dry roasted in a particle-to-particle heat exchanger, dehulled by air aspiration, pin-milled, and air-classified to yield whole, hull, high protein, and high starch flour fractions. Proximate analysis, color, enzyme neutral detergent fiber, starch, N solubility indices, and oligosaccharide contents of these flour fractions were determined. Compositional differences were demonstrated among all flour fractions. Stachyose was the major oligosaccharide in all fractions and was highest in the protein fraction. Substituting 10% bean flours for wheat changed water absorption and dough stability for all fractions. Dry roasted navy bean flour fractions appeared to be suitable ingredients for use in appropriate food systems. [AS]

0485

25874 MORALES S., R. 1984. Incremento del contenido de proteína en el fríjol común (Phaseolus vulgaris L.) mediante irradiación de la semilla con cobalto-60. (Increase in protein content in common beans by means of seed irradiation with cobalt-60). Revista Tikalia 3(2):93-104. Span., Sum. Span., 8 Refs., Illus.

Phaseolus vulgaris. Seed. Irradiation. Cultivars. Mutation. Agronomic characters. Protein content. Guatemala.

Seed of 4 bean var. (Suchitán, Cuarenteño, Jutiapán, and San Martín) at 12% humidity was exposed to different doses of Co-60 gamma radiation. The M_1 (irradiated seeds) were planted in 1982 using randomized block designs with 4 replications for Suchitán and Cuarenteño, and with 5 replications for Jutiapán and San Martín. The effect of radiation on the M_1, M_2, and M_3 generations was analyzed. Mutations were generated for various characteristics such as days to flowering, growth habit, pod color, leaf texture and size, and chlorophyll content. It was determined that doses between 15-20 krad caused the largest no. of mutations. An analysis of total protein content was performed for M_2 of Suchitán and Cuarenteño, and for M_3 of Jutiapán. The analysis showed that the effect of irradiation, especially for doses between 15-20 krad, was the broadening of the range of seed protein content ? towards values lower or higher than the control. The wider ranges of some irradiated materials allowed those families having a min. of 26% protein to be selected. In the future it is expected to obtain lines with acceptable yields and a higher seed protein content. [AS-CIAT]

0486

25657 OSBORN, T.C.; BROWN, J.W.S.; BLISS, F.A. 1985. Bean lectins. 5. Quantitative genetic variation in seed lectins of Phaseolus vulgaris L. and its relationship to qualitative lectin variation. Theoretical and Applied Genetics 70(1):22-31. Engl., Sum. Engl., 32 Refs., Illus. [ARCO Plant Cell Research Inst., 6560 Trinity Ct., Dublin, CA 94596, USA]

Phaseolus vulgaris. Phytoalexins. Phaseollin. Seed. Cultivars. Proteins. Bean flour. Composition. USA.

Seeds of 40 bean cv. having different lectin types were analyzed for quantities of lectin, phaseolin, and total protein. Significant differences were found among groups of cv. with different lectin types for the quantity of lectin and phaseolin. Cv. with more complex lectin types

based on isoelectric focusing-SDS/polyacrylamide gel electrophoresis tended to have higher quantities of lectin and lower quantities of phaseolin than cv. with simple lectin types. An association between lectin type and the quantity of lectin and phaseolin was found also in the seeds of F_2 plants that segregated in a Mendelian fashion for 2 lectin types. Seeds from plants with the complex lectin type had more lectin and less phaseolin than seeds from plants with the simple lectin type. Therefore, the genes controlling qualitative lectin variation also may influence the quantitative variation of lectin and phaseolin. The results of this study are related to other studies on the quantitative variation for seed proteins and to the possible molecular bases for variation in the quantity of lectins in beans. [AS]

0487

22519 PAULS, K.P.; THOMPSON, J.E. 1984. Evidence for the accumulation of peroxidized lipids in membranes of senescing cotyledons. Plant Physiology 75(4):1152-1157. Engl., Sum. Engl., 30 Refs., Illus. [Dept. of Crop Sciences, Univ. of Guelph, Guelph, Ontario N1G 2W1 Canada]

Phaseolus vulgaris. Enzymes. Cotyledons. Fatty acids. Cell structure. Canada.

The extent to which lipid peroxidation reactions can be correlated with membrane deterioration in senescing cotyledons of Phaseolus vulgaris was examined. In particular, the time course of fluorescent pigment accumulation in lipid extracts of microsomal membranes was compared with the temporal pattern of gel phase lipid formation in the membranes. The effects of senescence on the activities of enzymes that regulate levels of reactive O species able to initiate lipid peroxidation and on the levels of reduced and oxidized glutathione, a cysteine-containing tripeptide thought to afford protection against oxidative stress, were also examined. The observations support the contention that formation of gel phase lipid in senescing membranes is attributable to lipid peroxidation and suggest that the reactions of lipid peroxidation are utilized by the cotyledons to mediate deteriorative changes accompanying the mobilization and transport of metabolites from the storage tissue to the developing embryo. [CIAT]

0488

24985 ROMANI, V.L.M. 1983. Estudos bioquímicos sobre variabilidade da composicao protéica em feijao (Phaseolus vulgaris, L.). (Biochemical studies on protein content variability in bean). Tese Mestrado. Piracicaba-SP, Brasil, Escola Superior de Agricultura Luiz de Queiroz da Universidade de Sao Paulo. 109p. Port., Sum. Port., Engl., 127 Refs., Illus.

Phaseolus vulgaris. Cultivars. Mineral content. N. Protein content. Bean flour. Amino acids. Brazil.

The erythroagglutinating activities of 20 Brazilian bean cv. were determined and the possibility of correlating these activities with their lectin compositions was verified. The N and protein contents of cotyledonary meals from the different cv. varied from 2.9 to 4.1% and from 18.6 to 25.9%, resp. Meal hydrolysates were rich in aspartic and glutamic acids, less rich in basic amino acids, and with low met. contents. Except for cv. Pinto, all the extracts showed erythroagglutinating activities against 5 of 6 types of erythrocytes used; however, their activities were not the same and varied among the cv. and also in relation to the type of erythrocytes. Cv. Pintado, Malo, and Goiano Precoce could be distinguished from all others, since their activities were relatively high against

trypsin-treated cow erythrocytes. Samples also differed when examined by electrophoresis under nondissociating acidic and alkaline conditions and under dissociating conditions. Under acidic conditions, differences were observed in the relative concn. of isolectin-type proteins, whereas under dissociating conditions it was observed that the polypeptide compositions of the major protein, glycoprotein II, varied. The agglutinating activities of Brazilian bean cv. do differ, attributable to variations in lectin composition. Also, at least 2 forms of the major bean protein occur among the cv. examined. [AS (extract)]

0489

25662 WAFARCHUK, D.A.; HAMILTON, P.I. 1985. Cellular double-stranded RNA in Phaseolus vulgaris. Plant Molecular Biology 5(1):55-63. Engl., Sum. Engl., 22 Refs., Illus. [Agriculture Canada, Research Station, 6660 N.W. Marine Drive, Vancouver, British Columbia, Canada V6T 1X2]

Phaseolus vulgaris. RNA. Snap beans. Analysis. Roots. Leaves. Canada.

High mol. wt. double-stranded (ds) RNAs have been detected in apparently virus-free French bean cv. Black Turtle Soup. Several other bean cv. were free of detectable high mol. wt. dsRNAs. The dsRNAs have been partially characterized and have homology to the Black Turtle Soup genome as well as to the genomes of other bean cv. The T_m of hybrids formed between Black Turtle Soup DNA and denatured dsRNA have been estimated. [AS]

See also 0456 0457 0475 0495 0516 0820 0821 0829

D00 AGRONOMY

0490

23213 BASCUR B., G. 1983. Situación actual de las leguminosas alimenticias en Chile. (Present situation of food legumes in Chile). In Mesa Redonda sobre Programa Cooperativo Subregional de Producción de Leguminosas Alimenticias de los Países del Cono Sur, Montevideo, Uruguay, 1982. Trabajos presentados. Santiago, Organización de las Naciones Unidas para la Agricultura y la Alimentación. pp.19-23,28-30. Span.

Phaseolus vulgaris. Production. Cultivars. Cultivation. Diseases and pathogens. Injurious insects. Trade. Chile.

The situation of food legumes in Chile is briefly discussed, with emphasis on beans. In 1981, 117,740 ha were planted to beans, with av. yields of 1009 kg/ha and a total production of 138,239 t. Technical aspects related to bean var. for domestic consumption and exportation, agronomic factors affecting production, diseases (BCMV, BYMV, Fusarium, and Rhizoctonia), and pests (Hylemia cilicrura, Epinotia aporema, and Acanthoscelides obtectus) are analyzed. Research results are also mentioned. Bean marketing and commercialization issues are briefly discussed, as well as the possibilities of expansion. [CIAT]

0491

23212 CRNKO, C.J. 1983. Situación actual de las leguminosas alimenticias en Argentina. (Present situation of food legumes in Argentina). In Mesa Redonda sobre Programa Cooperativo Subregional de Producción de Leguminosas Alimenticias de los Países del Cono Sur, Montevideo,

Uruguay, 1982. Trabajos presentados. Santiago, Organización de las Naciones Unidas para la Agricultura y la Alimentación. pp.16-17. Span.

Phaseolus vulgaris. Production. Cultivars. Diseases and pathogens. Injurious insects. Trade. Seed production. Seed characters. Argentina.

The situation of food legumes in Argentina is briefly discussed, with emphasis on beans: 240,000 ha planted to beans, av. yields of 958 kg/ha and a total production of 178,000 t. Bean var. planted include Alubia, Bolita cristal, Great Northern, and Negro. Most beans are produced in Salta. The major bean diseases are those caused by Sclerotinia sclerotiorum, Isariopsis griseola, Colletotrichum lindemuthianum, Uromyces phaseoli, Fusarium, Rhizoctonia solani, Xanthomonas phaseoli, Pseudomonas phaseolicola, BCMV, and bean chlorotic mosaic virus. The major pests are Empoasca sp., Acanthoscelides obtectus, and aphids. Brief comments are made on seed quality, production, and marketing problems. [CIAT]

0492

24622 CURSO SOBRE EL CULTIVO DE FREJOL USANDO LA METODOLOGIA APRENDER HACIENDO, 1o., PIMAMPIRO, ECUADOR, 1984. Conferencias. (Conferences). Quito, Instituto Nacional de Investigaciones Agropecuarias. Programa de Leguminosas de la Estación Experimental Santa Catalina. 114p. Span., illus.

Phaseolus vulgaris. Seeding. Production. Pest control. Soil fertility. Fertilizers. Manures. Irrigation. Plant breeding. Harvesting. Threshing. Storage. Processing. Costs. Ecuador.

The papers presented at the 1st bean production course in Ecuador, using the learn-by-doing methodology, are compiled. The objectives of the course were to transfer bean technology available at Instituto Nacional de Investigaciones Agropecuarias, exchange experiences among farmers, extension agents, and researchers, and analyze the different technological alternatives to solve bean production problems. General topics are dealt with such as the situation of beans in Ecuador, weed control, bean pests and diseases, soil fertility and sampling, use of organic and inorganic fertilizers, irrigation, var. improvement, harvesting, threshing, cleaning, storage, and bush bean production costs. Individual papers are recorded in this publication under the following consecutive no.: 0452, 0510, 0519, 0536, 0565, 0636, 0726, 0787, 0810, and 0827. [CIAT]

See also 0809 0813 0815

D01 Soil, Water, Climate and Fertilization

0493

22578 ACOSTA N., M.A. 1983. Efecto de la fertilización con nitrógeno y fósforo (al suelo), en la producción de fríjol (Phaseolus vulgaris L.), en el área de Caisán, Panamá. (Effect of soil-applied nitrogen and phosphorus fertilizers on bean production in the area of Caisán, Panamá). In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 29a., Panamá, 1983. Memoria. Panamá. v.1. 9p. Span., 3 Refs. [Inst. de Investigación Agropecuaria de Panamá, Apartado 6-A 5391, Estafeta El Dorado, Panamá]

Phaseolus vulgaris. Fertilizers. N. P. Panama.

Over a 4-yr period (1978-82), expt. (3/yr) were carried out in farmers' fields in Caisán (Chiriquí, Panama) to determine the amount of fertilizers required for bean cultivation. The levels of N and P and fertilization formulas used were established. The no. of pods/plant and yield were evaluated. The most relevant data are presented in table form. The recommended doses of N and P were 20 and 40 kg/ha, resp. [CIAT]

0494

21584 ANGELOGIANOPULOS, W. 1978. Observaciones fitofenológicas en fríjol (Phaseolus vulgaris L.) en el municipio de Ibagué. (Phenological observations in beans in the municipality of Ibague). Tesis Ing.Agr., Ibagué, Colombia, Universidad del Tolima. 104p. Span., Sum. Span., 11 Refs., Illus.

Phaseolus vulgaris. Evapotranspiration. Solar radiation. Rainfall data. Temperature. Relative humidity. Colombia.

An expt. was carried out at the U. of Tolima (Colombia) to study the relationship climate-plant-soil using bean cv. Algarrobo. During the vegetative period a precipitation of 235.3 mm and a solar radiation of 464.5 h were recorded. Most days during the expt. were relatively cloudy, giving a good heliothermic index in relation to photoperiodism. Evapotranspiration was high because of certain air temp. and soil factors that were high during all crop stages. Temp. of 18-24°C are the most favorable for the crop. [AS (extract)-CIAT]

0495

25307 BALLESTEROS P., G.A. 1982. El sombreado artificial en un fríjol indeterminado arbustivo. Efectos morfológicos y fisiológicos. (Artificial shading on an indeterminate bush bean. Morphological and physiological effects). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 200p. Span., Sum. Span., 158 Refs., Illus.

Phaseolus vulgaris. Shading. Flowers. Growth. Leaves. Yields. Yield components. Transpiration. Mineral content. N. P. Mg. K. Ca. Mexico.

The effects of artificial shading on the anatomy, morphology, nutrient composition, flowering, and yield of Michoacán 12 A-3 beans (indeterminate growth habit) were studied. Plants were grown free of competition in hydroponic cultures in the greenhouse. Total radiation, RH, temp., and density of photosynthetic photonic flow were evaluated daily. Shading (75%) was imposed artificially before flowering by means of plastic meshes and kept until harvest. Dry wt. of organs, root vol., leaf area, and length of internodes were evaluated weekly. Plants showed morphological plasticity of the stem, leaves, and roots. The most typical response to shading consisted in the lengthening of internodes, restriction of branch growth, and laminar expansion of leaves. Under shade leaves were less thick, showed less development of the parenchyma, and had a darker green color. Stem and root thickness was also less. Flowers showing more possibilities of becoming normal pods were those located at the base of the inflorescences. Shading significantly reduced seed yield and all its components, as well as dry wt. of organs. Leaf area and transpiration were significantly diminished. Also, under shade the transpiration and the water use efficiencies were reduced. The NAR, the RGR, and the stem:root ratio decreased while the leaf area ratio, specific leaf area, and the HI increased due to the shade effect. The % of N, P, and Mg did not vary between control and shaded plants. K accumulated under the shade and Ca increased in the leaves of the control. [AS (extract)-CIAT]

0496

21605 BARRANTES J., L.F.; GONZALEZ M., W.; SOTO A., A.; ARAYA V., R. 1984. Evaluación del control químico de malezas y la fertilización nitro-fosfórica en la producción de fríjol (Phaseolus vulgaris L.). (Evaluation of chemical weed control and nitrogen and phosphorus fertilization in bean production). Alajuela, Universidad de Costa Rica. Estación Experimental Fabio Baudrit M. Boletín Técnico 17(4):12-21. Span., Sum. Engl., Span., 11 Refs., Illus.

Phaseolus vulgaris. Fertilizers. N. P. Herbicides. Yields. Costa Rica.

The response of bean cv. Brunca to applications of N, P, and herbicide mixtures of pendimethalin and methabenzathiazuron was studied at the Fabio Baudrit Moreno Exptl. Station (Alajuela, Costa Rica) to determine the dosages for highest production and greatest profitability for beans. N was applied at 0, 100, and 200 kg/ha, P at 0, 65.5, and 131.0 kg/ha, and pendimethalin and methabenzathiazuron in mixtures of 0, 0.5 + 0.5, and 1.0 + 1.0 kg a.i./ha, resp., preemergence. The treatment of 100 kg N + 65.5 kg P + the herbicide mixture of 0.5 + 0.5 kg a.i./ha produced the highest yield and the thinnest weed cover. According to the economic analysis, the optimum rates were 47.73 kg N/ha, 70.05 kg P/ha, and the herbicide mixture of 0.5 + 0.5 kg a.i./ha. [AS-CIAT]

0497

25601 BARREIRO, L. 1984. Influencia de diferentes niveles de fertilización NPK sobre algunas propiedades físico-mecánicas del fríjol común (Phaseolus vulgaris). (Influence of different NPK fertilization levels on some physical-mechanical properties of common bean). Ciencia y Técnica en la Agricultura. Hortalizas, Papa, Granos y Fibras 3(2):41-49. Span., Sum. Span., Engl., 7 Refs. [Estación Experimental de Granos, Ministerio de Agricultura, La Habana, Cuba]

Phaseolus vulgaris. Fertilizers. N. P. K. Stems. Cuba.

The effect of several combinations and levels of NPK fertilizer on stem resistance to cutting and on pod grain resistance to dropping was determined in bean var. Ica Pijao (Line 32). A randomized block design was used with 3 replicates and 8 treatments: 6 possible combinations of 80, 60, and 90 kg N, P, and K/ha, resp., a control treatment without fertilizer and one with the complete rate. The range for required cutting energy was doubled between extreme rates: 0.08 N m for zero level and 0.16 N m for the complete rate. P and K were found to be the elements that most influenced stem hardness. Also, there was a linear relationship between stem diameter and required cutting energy (0.01 N m/mm of stem diameter increase). On the other hand, it was shown that the different NPK levels did not influence pod grain resistance to dropping. [AS (extract)]

0498

25866 BASCUÑAN B., G.; OLIVA, M.A.; LAING, D. 1985. Termometría infrarroja en selección de genotipos de fríjol (Phaseolus vulgaris L.) resistentes a la sequía. 1. Bases fisiológicas. (Infrared thermometry in the selection of drought-resistant bean genotypes. 1. Physiological bases). Turrialba 35(1):43-47. Span., Sum. Engl., Span., 14 Refs., Illus. [Estación Experimental La Platina, Inst. de Investigaciones Agropecuarias, Casilla 5447, Santiago, Chile]

Phaseolus vulgaris. Genotypes. Cultivars. Drought. Temperature. Canopy. Selection. Resistance. Water stress. Plant physiology. Chile.

It was evaluated if the drought index determined by canopy temp. with an infrared thermometer represents the water level of the plant in order to develop a screening method for identifying water stress-tolerant bean cv. A good correlation between drought index and the physiological parameters leaf water potential and stomatal resistance was determined. These data showed that the method of infrared thermometry may be used as an index for identifying, under field conditions, bean cv. with drought resistance. [AS]

(6400)

25865 BASCUR B., G.; OLIVA, M.A.; LAINO., D. 1985. Termometría infrarroja en selección de genotipos de frijol (Phaseolus vulgaris L.) resistentes a sequía. 2. Crecimiento y productividad. (Infrared thermometry in the selection of drought-resistant bean genotypes. 2. Growth and productivity). Turrialba 35(1):49-53. Span., Sum. Engl., Span., 10 Refs., Illus. [Estación Experimental La Platina, Inst. de Investigaciones Agropecuarias, Casilla 5627, Santiago, Chile]

Phaseolus vulgaris. Cultivars. Genotypes. Resistance. Drought. Growth. Yields. Water stress. Dry matter. Selection. Chile.

The effect of water stress on the productivity of 12 bean cv. was studied using the growth analysis technique and infrared thermometry. A great variability was found in the performance of the cv. Those cv. severely affected by water stress underwent a marked reduction in leaf area, CGR, grain growth rate, and yield, but had a higher DM accumulation in stems and branches. The cv. least affected by water stress did not vary in their growth parameters or yield components, nor presented yield reductions. [AS]

(6500)

22607 BEN, J.R.; VILPA, S.A. 1976. Fertilidade do solo em Santa Catarina. (Soil fertility in Santa Catarina). In Reunião Técnica Anual do Feijão, 13a., Porto Alegre-RS, Brasil, 1976. Ata. Porto Alegre, Brasil, Instituto de Pesquisas Agronômicas. pp.85-87. Port.

Phaseolus vulgaris. Fertilizers. N. P. K. Dung. Yields. Brazil.

In Jan. 1976, 2 expt. were conducted in western Santa Catarina, Brazil, to evaluate the response of bean cv. Rio Ibapi to (1) NPK fertilization (0, 30, 60, and 90 kg N; 0, 50, 100, and 150 kg P; and 0, 30, 60, and 90 kg K/ha) and (2) chicken manure (0, 8, 16, and 32 t/ha), with or without maintenance fertilization (45 kg N + 40 kg P/ha). The results of expt. 1 were lost due to a severe disease outbreak. In expt. 2, bean yields were also low due to the same cause and to climatic factors, but the results show that although differences in production were slight and do not justify chicken manure application, in terms of relative yield the differences between treatments show a response of beans to manure. With a basic mineral maintenance fertilization, beans tended to respond to the higher rates of chicken manure: 1196 kg/ha at 32 t chicken manure/ha with maintenance fertilization vs. 760 kg/ha at the same chicken manure rate but without maintenance fertilization. [CIAT]

(6501)

22607 BERGAMASCHI, H.; WIECHMANN, S.J. 1976. Efeitos de regimes de umidade do solo em diferentes estádios de desenvolvimento e populacoes no rendimento do feijoeiro (Phaseolus vulgaris L.). (Effects of soil moisture regimes at different developmental stages and of plant populations on bean yields). In Reunião Técnica Anual do Feijão, 13a.,

Porto Alegre-RS, Brasil, 1976. Ata. Porto Alegre, Brasil, Instituto de Pesquisas Agronomicas. pp.35-50. Port., 1 Ref., Illus.

Phaseolus vulgaris. Soil moisture. Spacing. Planting. Growth. Yields. Yield components. Brazil.

The effects of different soil moisture regimes (I_0, natural soil humidity with no irrigation; I_1, water tension under 1 atm. up to flower bud initiation; I_2, water tension under 1 atm. from flower bud initiation to maturity; I_3, water tension under 1 atm. during the entire cropping cycle) and of plant populations (120,000, 240,000, 360,000, and 480,000 plants/ha) on bean cv. Rio Tibagi yields and yield components were investigated. The soil moisture regimes applied to the different bean developmental stages significantly affected yields. The highest av. yield (2222 kg/ha) was obtained with regime I_3 but was statistically similar to the mean yields of I_1 and I_2 (2091 and 2062 kg/ha, resp.). The lowest av. yield (1747 kg/ha) was obtained with I_0. The different plant populations had no significant effects on yields, but there was a slight decrease in yields at 480,000 plants/ha. There was a highly significant interaction between water and plant population on grain yields and wt. of 100 seeds. Plant density had a significant effect on no. of pods/plant and no. of seeds/pod. Plant density only influenced growth rate after flowering initiation. [CIAT]

0502

23620 CEREZO V., C.A.; PRATI V., L.F. 1985. Efecto del tipo de cama en la salinidad de un suelo cultivado en fríjol y regado por gravedad. (Effect of the seedbed type on the salinity of soil planted to beans and furrow-irrigated). Tesis Ing.Agr. Palmira, Universidad del Valle. Universidad Nacional de Colombia. 196p. Span., 86 Refs., Illus.

Phaseolus vulgaris. Cultivars. Irrigation. Salinity. Land preparation. Yield components. Developmental stages. Temperature. Relative humidity. Spacing. Planting. Colombia.

Calima-type bean cv. BAT 2367, BAT 1376, and A-179 were planted at CIAT (Palmira, Colombia) in a split plot design to evaluate the effect of seedbed type and furrow irrigation on salinity and in turn, its effect on bean yield components. Plots 4.8 m wide were planted (1) in single rows spaced at 0.6 m and (2) in 1.2-m-wide seedbeds with double bean rows spaced at 0.6 m. Irrigation in the former was applied every 1 or 2 furrows and in the latter, every furrow. Seedbed height was 0.2 m. Low salinity levels affected beans under high temp. and low RH. Bean sensitivity to salinity decreased at low temp. and high RH. Damage to beans was higher at constant conductivities than at fluctuating conductivities, even at low salinity levels. Although seed germination and plant emergence are critical bean development stages sensitive to salinity, low salinity levels had no direct effect on plant emergence, except a delay that facilitated pathogen invasion. Biomass and pod production were enhanced by low salinity levels at low soil water tension and noncritical environmental conditions. Significant differences were observed between bean cv. in response to moisture, salinity, and environmental conditions. The use of saline water for irrigation should be conditioned by the initial soil salinity status, the environmental conditions, and the development stage of beans. Planting systems at higher spacings between irrigation furrows showed improved seedbed water distribution and salt concn. outside the area of contact with seeds, as well as improved irrigation uniformity in heavy soils. Additional specific studies on the topic are recommended. [CIAT]

0503

25400 CHAMBA H., L.E. 1985. Fertilización con tres fuentes de NPK en el cultivar de frejol (Phaseolus vulgaris L.). (Fertilization with three sources of NPK on bean cultivars). Tesis Ing.Agr. Ecuador, Universidad Nacional de Loja. 95p. Span., Sum. Span., Engl., 35 Refs., Illus.

Phaseolus vulgaris. Fertilizers. N. P. K. Income. Ecuador.

An expt. was conducted at the Lanzaca demonstration farm (Loja Province, Ecuador) to (1) compare the efficiency of 3 types of compound fertilizers made in different ways (chemical reaction, bulk blending of fertilizers, and hand mixing) and 4 levels of fertilization (0, 20-60-20, 30-90-30, and 40-120-40 of N, P, and K, resp.) on bean yield, and (2) establish the highest profitability according to the economical analysis of treatments. The bulk-blended fertilizer had the best effect on the no. of pods/plant, grains/pod, and grain yield. The highest yield was obtained with the bulk-blended 40-120-40 treatment (1999 kg/ha) equivalent to an increment of 45.8% in relation to the control and the highest marginal return rate. [AS (extract)]

0504

25634 COPELAND, L.O.; LEEP, R.H. 1982. Dry edible bean production in Michigan. East Lansing, Michigan State University. Cooperative Extension Service. Extension Bulletin E-1525. 4p. Engl., 4 Refs.

Phaseolus vulgaris. Cultivars. Climatic requirements. Land preparation. Soil requirements. Fertilizers. Weeding. Harvesting. Storage. Marketing. Disease control. Insect control. Bean common mosaic virus. Xanthomonas phaseoli. Pseudomonas phaseolicola. Xanthomonas phaseoli var. fuscans. Colletotrichum lindemuthianum. Resistance. USA.

Practical recommendations for dry bean production in Michigan (USA) are presented. Aspects dealt with include soil and climate requirements; var. and seed selection; soil selection and preparation; fertilization; planting time, rates, and method; and chemical weed control. A list of 27 var. is provided with information on general agronomic characteristics and reactions to Xanthomonas phaseoli, X. phaseoli var. fuscans, Pseudomonas phaseolicola, BCMV, and 4 Colletotrichum lindemuthianum races. General recommendations are given for cultural and chemical control of bean diseases and pests, harvesting, drying, storage, and marketing. [CIAT]

0505

23201 CURSO NACIONAL DE FREJOLES, 1o., TALCA, CHILE, 1983. Trabajos presentados. (Papers presented). Santiago, Organización de las Naciones Unidas para la Agricultura y la Alimentación. 171p. Span., Illus.

Phaseolus vulgaris. Production. Planting. Weeding. Fertilizers. Irrigation. Disease control. Diseases and pathogens. Injurious insects. Insect control. Harvesting. Economics. Transfer of technology. Chile.

Between Nov. 17, 1982-April 15, 1983, the 1st theoretical-practical bean course was conducted in Chile to transfer bean technology to agricultural technicians and selected farmers, cause a multiplier effect for the technology being transferred, and obtain feedback from farmers to researchers. The topics dealt with include planting and general aspects of the crop, weed control, fertilization, irrigation, viral, fungal, and bacterial diseases, insect pests, harvesting, and economic analysis. The 'learn-by-doing' methodology used in the course was considered an excellent

means to transfer technology. Individual papers are recorded in this publication under the following consecutive no.: 0511, 0515, 0531, 0532, 0553, 0680, 0694, 0723, and 0811. [CIAT]

0506

25891 DRAKE, S.R.; SILBERNAGEL, M.J.; DYCK, R.L. 1984. The influence of irrigation, soil preparation and row spacing on the quality of snap beans, Phaseolus vulgaris. Journal of Food Quality 7(1):59-66. Engl., Sum. Engl., 15 Refs. [United States Dept. of Agriculture, Agricultural Research Service, P.O. Box 30, Prosser, WA 99350, USA]

Phaseolus vulgaris. Snap beans. Irrigation. Land preparation. Planting. Spacing. Seed characters. Seed color. Canned beans. USA.

Irrigation frequency influenced quality of fresh, canned, and frozen snap beans; subsoiling influenced quality of fresh snap beans. The seed index of fresh snap beans was reduced with optimal irrigation and subsoiling as against deficit irrigation and no subsoiling. Optimal irrigation resulted in a darker fresh snap bean with a high moisture and ascorbic acid content and lower shear values. Subsoiling resulted in fresh snap beans high in moisture and low in shear values. Canned and frozen snap beans that were optimally irrigated were low in shear values, drained wt., and drip losses. Cultural practices influenced fresh, canned, and frozen snap bean pod quality. Stress conditions, water stress, and soil compaction tended to hasten maturity, which was reflected in the quality parameters measured. [AS]

0507

22584 ECHAVEZ B., R.; FREYTAG, G.F.; BEAVER, J.S. 1983. Respuestas del fríjol al tratamiento con fertilizante en tres suelos de Puerto Rico. (Bean responses to fertilizer treatments on three Puerto Rican soils). In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 29a., Panamá, 1983. Memoria. Panamá. v.2. 5p. Span., 5 Refs. [Univ. de Puerto Rico, Mayagüez, Puerto Rico 00708, Puerto Rico]

Phaseolus vulgaris. Fertilizers. N. P. K. Cultivars. Soil fertility. Yields. Puerto Rico.

The performance of 11 bean cv. and advanced lines from Puerto Rico, 4 parental var. from the U. of Nebraska (USA), and 5 local checks were studied over a broad soil fertility range at the exptl. stations of Fortuna, Limani, and Isabela. At planting, 15, 45, and 90 kg of N, P, and K/ha were applied. In Fortuna, yield levels were high and disease incidence was low, in Isabela they were moderate, and in Limani production was low and disease incidence high. The fertilizer treatment did not significantly affect the yields of the 20 cv. and lines in Fortuna and Isabela soils, but it was significant in Limani soil. There was no evidence of a significant interaction between treatments and rust and bacterioses indexes. Most of the advanced lines showed high tolerance to root diseases. [CIAT]

0508

24841 EDJE, O.T. 1983. Response of maize and beans to Leucaena prunings. Lilongwe, Malawi, Bunda College of Agriculture. 22p. Engl., Sum. Engl., 15 Refs., Illus. [Bunda College of Agriculture, P.O. Box 219, Lilongwe, Malawi]

Paper presented at Agroforestry Workshop, Lilongwe, Malawi, 1983.

Phaseolus vulgaris. Green manures. Yields. Malawi.

The possibility of a smallholder farmer in Malawi of sowing a fast growing N-fixing tree such as Leucaena and of using fine stems and leaf prunings as green manure to meet some fertilizer requirements, and hence reduce production costs, was investigated in 3 field expt. Leucaena prunings increased bean seed yields but not as much as those of maize; bean seed yield for 0, 10, and 20 t Leucaena were 915, 1160, and 1706 kg/ha, resp. Farmers who wish to use Leucaena leaves as fertilizer could grow the plant along bunds, in strips across their farms, along farm boundaries, or as hedge plants. At a density of 10,000 Leucaena plants/ha, a farmer should be able to realize the equivalence of three 50-kg bags of calcium ammonium nitrate or about 4 bags of sulfate of ammonia. [AS (extract)]

0509

25899 ESPINOSA V., D. 1986. Resistencia a la sequía XVIII. Efecto de la tensión hídrica (sequía) en la simbiosis Rhizobium phaseoli-Phaseolus vulgaris L. [Resistance to drought XVIII. Effect of the water tension (drought) on the Rhizobium phaseoli-Phaseolus vulgaris symbiosis]. Tesis Biólogo. México, Universidad Nacional Autónoma de México. 169p. Span., Sum. Span., 129 Refs., Illus.

Phaseolus vulgaris. Resistance. Drought. Rhizobium phaseoli. Cultivars. Genotypes. Stomata. Transpiration. Nodulation. Symbiosis. Mexico.

An expt. was carried out in the greenhouse to determine the survival and competition of 2 Rhizobium phaseoli mutants resistant to antibiotics (CPMEX1$_{Str150}$ and CPMEX22$_{Spc200}$) when the host is submitted to water stress conditions. Three Phaseolus vulgaris genotypes (Negro 150 G3, Michoacán 12A3, and Bayo Durango of growth habits IV, II, and III, resp.) were used; the 1st 2 genotypes are considered resistant to drought. Three samplings were done: during the vegetative stage, at flowering, and during pod fill. At sampling the plant and soil water potentials were determined. To determine the no. of rhizobia/g of soil, decimal dilutions of the soil rhizosphere were performed and planted on plates of yeast extract-mannitol-red Congo agar, with antibiotics. It was found that the values of stomatal resistance and transpiration, equal to or less than 30 s/cm and 1 microgram $H_2O/cm^2/s$, resp., drastically reduced the values of dry wt. of foliage, roots, and nodules, and the total no. of nodules. It was observed that a soil water potential below -15 baryes reduced the no. of viable R. phaseoli mutants. Nodulacion % under drought conditions caused by introduced strains were high, medium, and low in the vegetative, flowering, and pod fill stages, resp. Under water stress conditions, nitrogenase activity in the vegetative stage was severely reduced, even without detecting significative values of acetylene reduction (0 micromoles C_2H_4); this was not the case during flowering, where although the nitrogenase activity was reduced, values of 0 were not reached. [AS (extract)-CIAT]

0510

24429 FELIX, R. 1984. Manejo del agua de riego. (Handling irrigation water). In Curso sobre el cultivo de frejol usando la metodología Aprender Haciendo, 1o., Pimampiro, Ecuador, 1984. Conferencias. Quito, Instituto Nacional de Investigaciones Agropecuarias. Programa de Leguminosas de la Estación Experimental Santa Catalina. pp.81-84. Span.

Phaseolus vulgaris. Irrigation. Ecuador.

Factors that should be taken into account when irrigating bean crops (soil texture, infiltration speed, slope, and irrigation depth) are briefly

discussed. The factors affecting irrigation water consumption are also mentioned and the available irrigation methods are pointed out. [CIAT]

0511

23204 FERNANDEZ DEL P., M. 1983. Fertilización del poroto. (Bean fertilization). In Curso Nacional de Frejoles, 1o., Talca, Chile, 1983. Trabajos presentados. Santiago, Organización de las Naciones Unidas para la Agricultura y la Alimentación. pp.49-60. Span., Illus.

Also in Investigación y Progreso Agropecuario La Platina (Chile) no.19: 35-36. 1983.

Phaseolus vulgaris. Fertilizers. Soil fertility. N. Nodulation. Rhizobium phaseoli. Inoculation. Chile.

Aspects on bean fertilization in Chile are discussed. The concepts of soil fertility, manures, and mineral fertilizers are discussed as well as the criteria that should be considered when deciding whether or not beans should be fertilized. Nutrient (N and P) deficiency symptoms are briefly described and the criteria to determine fertilizer needs and rates are discussed. The importance of nodulation and beans/Rhizobium phaseoli symbiosis is explained, with an example of the bean N requirements when all N contributions from different sources (soil and symbiotic N fixation) are taken into account. To obtain a good quality bean crop, the no. of nodules/plant should be 200-300, soil pH should be 5.5-6.7, adequate soil P levels should be above 12 ppm, and the nutrients P, Mo, and S should be available at adequate concn. Likewise, excess N should be avoided and only thiram- or PCNB-based fungicides should be used to treat bean seeds; manures can be applied and very humid soils should be avoided. Recommendations on how to inoculate bean seeds with Rhizobium and special precautions to be taken with inoculants are given. The practical field trip to observe specific aspects of this topic is described. [CIAT]

0512

23989 FRITZ, J. 1968. Essai de fertilisation des haricots aux Colimacons. (Bean fertilization trial in Colimacons). In Institut de Recherches Agronomiques Tropicales et des Cultures Vivrieres. Rapport Annuel 1967. Saint Denis, Reunion. pp.125-126. Fr.

Phaseolus vulgaris. Fertilizers. Yields. Reunion.

A trial was established in 1967 in Colimacons, Reunion, to determine the effect of N fertilizer on beans. Four NPK treatments were applied: 0 (control), 0-100-100, 25-100-100, and 50-100-100. Yields were 103.5, 153.4, 178.0, and 189.7 kg/ha, resp. No differences were observed between control and PK treatments in less fertile soils and between PK and NPK treatments in more fertile soils. [CIAT]

0513

25668 HALVORSON, A.D.; BERGMAN, J.W. 1983. Zinc fertilization of dry beans on soils high in available phosphorus. Sidney, Montana Agricultural Experiment Station. Bulletin no.751. 12p. Engl., Sum. Engl., 16 Refs., Illus. [United States Dept. of Agriculture, Agricultural Research Service, P.O. Box 1109, Sidney, MT 59270, USA]

Phaseolus vulgaris. Fertilizers. Zn. Yields. USA.

Based on results of this research and soil analysis data from the farm survey, Zn fertilization of dry beans in the Yellowstone Valley (Montana, USA) is recommended under conditions of high levels of available soil P (above 16 ppm) and marginal levels of available soil N (0.56-1.00 ppm) in order to prevent yield losses and delayed maturity caused by P-induced Zn deficiency. Zn fertilization also caused an advancement in maturity date each year, thereby allowing for an earlier harvest. Grain yields were increased by an av. of 328.7 kg/ha over all Zn sources by foliar Zn application during the 3-yr period. Soil-applied granular $ZnSO_4$, $ZnSO_4$ solution, and ZnMKS at 11.2 kg Zn/ha increased grain yields by an av. of 627.1, 599.0, and 397.1 kg/ha, resp. Soil-applied ZnEDTA increased the av. grain yield by 426.3 and 787.5 kg/ha for the 1.1 and 5.6 kg Zn/ha treatments, resp. [Soils and Fertilizers]

0514

26028 HERATH, H.M.E.; WAHAB, M.N.J. 1979. Effect of nitrogen and plant population on growth and yield of bush beans (Phaseolus vulgaris) var. Cherokee Wax. Tropical Agriculturalist 135:83-98. Engl., Sum. Engl., 17 Refs., Illus.

Phaseolus vulgaris. N. Planting. Spacing. Dwarf beans. Dry matter. Growth. Sri Lanka.

The effect of plant population and N fertilizer on growth and seed yield of bush beans is described. Leaf and stem DM content and total DM of tops were significantly affected by N and plant population. During the final harvest, total no. of pods, no. of filled pods, and total seed yield responded significantly to N as well as plant density. However, the yield of plump seeds was affected significantly only by N and not spacing. Slight increase in HI was observed with increased N. Also N appeared to increase the ratio of plump seed:total seeds. Positive linear correlations were observed between total no. of pods, no. of filled pods, and yield of plump seed with N up to 60 kg/ha. Highest yield was obtained with a plant population of 200,000 plants/ha and 60 kg N/ha (half at sowing and half 35 days after sowing). Closer spacing (400,000 plants/ha) reduced yields. [AS]

0515

23205 MIRANDA N., O. 1983. Riego, conceptos básicos. (Basic concepts of bean irrigation). In Curso Nacional de Frejoles, 1o., Talca, Chile. 1983. Trabajos presentados. Santiago, Organización de las Naciones Unidas para la Agricultura y la Alimentación. pp.61-84. Span., Illus.

Phaseolus vulgaris. Irrigation. Water requirements. Chile.

The basic concepts of bean irrigation are discussed. The following methods to determine appropriate irrigation time are described: (1) the method based on soil, plant, and climatic characteristics; (2) the tensiometer method; and (3) the practical hand method. Examples of irrigation water and frequency are given. The furrow irrigation system is described and its leveling requirements, advantages, disadvantages, design, and calculations are discussed. The water distribution systems described include the syphon method, the method consisting of a leveled irrigation ditch with floodgates and straight pipe lines, and the method of plastic pipe lines; the costs of each are given. A practical field trip on the topic is described. [CIAT]

0516

22514 MULLINS, C.A.; COFFEY, D.L. 1983. Effects of molybdenum, granular inoculants, and nitrogen fertilization on snap bean production and leaf

nutrient content. Tennessee Farm and Home Science no.126:2-5. Engl., 9 Refs. [Soil Science Dept., Univ. of Tennessee, Knoxville, TN 37901, USA]

Phaseolus vulgaris. Snap beans. Mo. N. Fertilizers. Rhizobium. Strains. Yields. Petioles. Mineral content. P. K. Ca. Mg. USA.

Tests were conducted in 1979 and 1980 at the U. of Tennessee Plateau expt. station in Crossville (USA) to evaluate the effects of Mo seed treatment, granular inoculant application, and N fertilization on snap bean yield and leaf petiole content of selected nutrients. With the exception of an increase in leaf petiole P content, Mo-treated seed had little influence on most other factors evaluated in this study. Inoculation with the 2 Rhizobium strains did not compensate for the need of N fertilization of snap beans. [Microbiology Abstracts]

0517

22507 OSORIO, C.A.S.; FREIRE, J.F.J. 1982. Experimento sobre os efeitos do nitrogenio mineral na simbiose Phaseolus vulgaris L/Rhizobium phaseoli. [Experiment on the effects of mineral nitrogen on the Phaseolus vulgaris/Rhizobium phaseoli symbiosis]. Agronomia Sulriograndense 18(2):67-77. Port., Sum. Port., Engl., 22 Refs. [Secao de Fertilidade do Solo, Inst. de Pesquisas Agronomicas, Secretaria da Agricultura, Goncalves Dias, 570.9000 Porto Alegre-RS, Brasil]

Phaseolus vulgaris. Fertilizers. N. Rhizobium. Symbiosis. Brazil.

In greenhouse trials in 1976, Phaseolus vulgaris cv. Rio Tibagi was given 0-80 ppm N as ammonium sulphate at sowing and harvested 28, 36, 46, or 55 days after emergence. Application of 80 ppm N significantly reduced nodulation and N fixation in early growth. N content and DM yield of shoots and roots increased significantly with increasing N application and with date of harvest. [Soils and Fertilizers]

0518

22604 OSORIO, C.A.S.; POYS, A.I.; GOEPFERT, C.F.; MARTINOTTO, V.; ZALIN, O. 1976. Efeitos da adubacao nitrogenada em feijoeiro (1975/76). [Effects of bean nitrogen fertilization (1975-76)]. In Reunião Técnica Anual do Feijao, 1Ra., Porto Alegre-RS, Brasil, 1976. Ata. Porto Alegre, Brasil, Instituto de Pesquisas Agronomicas. pp.68-72. Port., Sum. Port., 5 Refs.

Phaseolus vulgaris. Cultivars. Fertilizers. N. Yields. Brazil.

The effect of 0, 40, and 80 kg N/ha, 1/3 applied at planting and 2/3 at 3 wk. after plant emergence, on 10 bean var. was studied in 1975 at the Osorio exptl. station (Rio Grande do Sul, Brazil). Although the response to N fertilization was not significant for all cv., yields tended to increase at the higher rates (1159, 1375, and 1555 kg/ha for 0, 40, and 80 kg/ha, resp.) and N fertilization was still economically feasible. The highest yielding cv. were 51052, Rio Tibari, Agua de Mel, Rico, and Maquiné with av. of 1664, 1500, 1497, 1455, and 1451 kg/ha, resp. [CIAT]

0519

24428 PADILLA, W. 1984. El uso de abonos orgánicos e inorgánicos en la producción de cultivos. (The use of organic and inorganic fertilizers in crop production). In Curso sobre el cultivo de frejol usando la metodología Aprender Haciendo, 1o., Pimampiro, Ecuador, 1984.

Conferencias. Quito, Instituto Nacional de Investigaciones Agropecuarias. Programa de Leguminosas de la Estación Experimental Santa Catalina. pp.65-73. Span. [Depto. de Suelos y Fertilizantes, Estación Experimental Santa Catalina, Inst. Nacional de Investigaciones Agropecuarias, Apartado 340, Quito, Ecuador]

Phaseolus vulgaris. Nutrient uptake. Manures. Fertilizers. Ecuador.

Several aspects related to the use of organic and inorganic fertilizers in crop production are discussed, with emphasis on beans. Topics such as uptake of nutrients by plants and soil mineralization and immobilization are reviewed. The chemical composition of common organic manures is given and their advantages are mentioned. Organic manures and inorganic fertilizers are compared. The benefits of an appropriate use of fertilizers are stressed. [CIAT]

0520

25360 PETERSEN JUNIOR, A.C.; DAVIS, D.D. 1982. Yield response of Phaseolus vulgaris L. and Phaseolus acutifolius subjected to water stress. Bean Improvement Cooperative. Annual Report 25:53-54. Engl. [Dept. of Horticultural Science & Landscape Architecture, Univ. of Minnesota, St. Paul, MN 55108, USA]

Phaseolus vulgaris. Phaseolus acutifolius. Water stress. Cultivars. Drought. Resistance. Selection. Yields. USA.

In 1979 a replicated field expt. was conducted on a sandy loam soil in Becker (Minnesota, USA) to study the effects of water stress on yield and its components in drought-tolerant and drought-susceptible common bean cv. (Pinto U.I. 111, White Half Runner, Great Northern, O.S.U. 1604, and Prosser BHP-15) and Phaseolus acutifolius accession 258. With no irrigation, P. acutifolius outyielded the 5 bean cv. (2230 vs. 819.5-1686.0 kg/ha, resp.) and almost doubled its own yield under irrigation (1242.0 kg/ha). While bean yields decreased significantly under water stress, av. individual seed wt. increased or remained constant. Water stress had little influence on HI of beans but increased that of P. acutifolius. Nonirrigated P. acutifolius flowered earlier and produced more biomass at maturity than when irrigated. The results suggest that P. acutifolius is tolerant to drought and that it is more productive under water stress conditions. [CIAT]

0521

22606 PONS, A.L.; OSORIO, C.A.S.; CALLIARI, R. 1976. Efeito da adubacao nitrogenada, fosfatada e potássica em feijoeiro. (Effect of bean fertilization with nitrogen, phosphorus, and potassium). In Reuniao Técnica Anual do Feijao, 13a., Porto Alegre-RS, Brasil, 1976. Ata. Porto Alegre, Brasil, Instituto de Pesquisas Agronomicas. pp.78-84. Port., Sum. Port., 6 Refs., Illus.

Phaseolus vulgaris. Fertilizers. N. P. K. Yields. Brazil.

An expt. was conducted in 1975 at the Vacaria exptl. station (Rio Grande do Sul, Brazil) to investigate the effect of N (0, 30, 60, and 90 kg/ha), P (0, 22, 44, and 66 kg/ha), and K (0, 25, 50, and 75 kg/ha) on bean cv. Rio Tibagi yields. Yields were high for all treatments including the control (1797 kg/ha). The optimum NPK combination that would be economically advantageous was 60-44-50. Higher rates of any element tended to decrease yields. Beans were less responsive to P. The results demonstrate that excellent bean yields can be obtained in acid soils, thus indicating promising perspectives to increase the area planted to this crop. [CIAT]

0522

22605 PONS, A.L.; OSORIO, C.A.S.; WOLFENBUTTEL, R.; SALGADO, V.; COMIN, C.M.V.; ANDRIGHETTI, A.; SALIN, O.; ZANOTELLI, V. 1976. Efeito da calagem e da adubacao nitrogenada em feijoeiro (1975/76). [Effect of liming and nitrogen fertilization on beans (1975-76)]. In Reuniao Técnica Anual do Feijao, 13a., Porto Alegre-RS, Brasil, 1976. Ata. Porto Alegre, Brasil, Instituto de Pesquisas Agronomicas. pp.73-77. Port., Sum. Port., 2 Refs.

Phaseolus vulgaris. Agricultural lime. Fertilizers. N. Yields. pH. Brazil.

The results of an expt. carried out in Rio Grande do Sul, Brazil, to determine the effect of liming (0, 1/2, 1, and 2 times the amount indicated to increase soil pH to 6.5) and N fertilization (0, 30, 60, 90, 120, and 150 kg/ha) on bean cv. Rio Tibagi yields, are presented. Half of the amount of lime required to increase the soil pH to 6.5 would give practically the same profitability as the highest N rates: 1846 vs. 1851-2187 kg/ha with 90-150 kg N/ha. It would be economically advantageous to apply N at the highest rates with no lime. The av. yields over N rates for all lime rates were not significantly different. [CIAT]

0523

25878 RAMIREZ, G. 1984. Efecto de la fertilización con nitrógeno y fósforo del fríjol común (Phaseolus vulgaris) en un suelo de Upala. (Effect of fertilization with nitrogen and phosphorus on common bean in Upala soil). Agronomía Costarricense 8(1):69-73. Span., Sum. Span., Engl., 20 Refs., Illus. [Unidad de Suelos, Ministerio de Agricultura y Ganadería, San José, Costa Rica]

Phaseolus vulgaris. Fertilizers. N. P. Growth. Yields. Costa Rica.

The effect of different doses of N (0-200 kg/ha) and P (0-120 kg/ha) on the growth of common bean was studied using a 5 x 4 factorial design in Upala soil (Costa Rica). The N had a significant lineal effect at 0.01%, whereas for P the effect was significant and lineal at 0.10%. The highest yield (1364 kg/ha) was obtained with levels of 200 and 120 kg N and P/ha, resp., representing an 109% increase over the check (652 kg/ha). It was concluded that fertilization is one of the important factors for yield increase. [AS]

0524

21663 RIVERA G., J.C.; CHAVES F., C.A. 1984. Riego restringido en cinco cultivares de fríjol (Phaseolus vulgaris L.). (Restricted irrigation in five bean cultivars). Alajuela, Universidad de Costa Rica. Estación Experimental Fabio Baudrit M. Boletín Técnico 17(3):1-6. Span., Sum. Engl., Span., 15 Refs.

Phaseolus vulgaris. Cultivars. Irrigation. Yields. Yield components. Water requirements. Costa Rica.

The effect of restricted irrigation on bean cv. Porrillo Sintético, ICTA-Jutiapán, Talamanca, ICA-Pijao, and Turrialba 4 was studied at the Fabio Baudrit Moreno exptl. station (Alajuela, Costa Rica), using a randomized complete block desig. with 6 replications. Surface furrow irrigation was supplied. The variation of the crop coefficient was determined. The total consumptive use was 34.17 cm and the partial monthly values of the crop coefficient were successively 0.89, 0.90, and 0.57, with a global value of 0.78. Significantly different responses were found for dry wt. of 100 seeds at 76 and 90 days, flowering %, and no. of pods/plant. Production was statistically the same for cv. ICA-Pijao, Talamanca,

Porrillo Sintético, and ICTA-Jutiapán, and the yield of cv. Turrialba-4 was only lower to those of ICA-Pijao and ICTA-Jutiapán. [AS-CIAT]

0525

24871 RONZELLI JUNIOR, P. 1985. Resposta de cultivares de feijao (Phaseolus vulgaris L.) a calagem e adubacao fosfatada. (Response of bean cultivars to lime and phosphate fertilization). Tese Doctor Sc. Vicosa-MG, Brasil, Universidade Federal de Vicosa. 67p. Port., Sum. Port., 63 Refs., Illus.

Phaseolus vulgaris. Cultivars. Agricultural lime. Fertilizers. P. Yields. Yield components. Brazil.

The response of 15 bean cv. to the combination of 3 levels of liming (0, 4.84, and 9.68 t dolomitic lime/ha) with 3 doses of P fertilizer (0, 60, and 120 kg/ha) was evaluated in Piracaia, Brazil. Cv. Rio Ivaí, Carioca 80, BAT 67, Aysó, Ricopardo 896, and ICTA Tamazulapa responded the best to the treatments; therefore, they were considered sensitive to toxic Al and to P deficiency. Cv. Carioca, Vagem Roxa 1805, Aroana 80, and Rio Iguacu were tolerant. Cv. Rio Tibagi, Rio Negro, Rio Vermelho, Aeté-3, Negrito 897, Rico 23, and Rico 1735 were intermediate. [AS (extract)-CIAT]

0526

25310 STRYDOM, E. 1971. The production of green beans. Pretoria, South Africa, Department of Agricultural and Technical Services. Leaflet no.64. Vegetable Series no.7. Green Bean Series no.1. 9p. Engl.

Phaseolus vulgaris. Snap beans. Production. Climatic requirements. Soil requirements. Fertilizers. Planting. Timing. Land preparation. Irrigation. Cultivars. Harvesting. Marketing. Meloidogyne. Delia platura. Homoptera. Tetranychus telarius. Euxoa. Anaplocnemis curvipes. Mylabris oculata. Kysius natalensis. Thysanoptera. Plusia orichalcea. Acanthoscelides obtectus. Fusarium. Colletotrichum lindemuthianum. Fromyces phaseoli. Insect control. Disease control. Symptomatology. South Africa.

General information on different aspects of green bean production, with emphasis on South Africa, is presented. Brief discussions are presented on economic importance, production areas, climatic and soil requirements, fertilization, planting time and rates, seed treatment, crop rotations, soil preparation and cultivation, chemical weed control, irrigation, harvesting, marketing, and yields. A brief description of available bush and climbing bean var. is also given. The main bean insect pests, diseases, and other minor disorders are listed; a brief note on symptoms and control is included for each one. [CIAT]

0527

24947 TESHA, A.J. 1983. Drought resistance in some bean varieties (Phaseolus vulgaris) grown in Tanzania. Morogoro, Tanzania, University of Dar es Salaam. 10p. Engl., 6 Refs., Illus.

Paper presented at Tanzanian Bean Workshop, 2nd., Morogoro, Tanzania, 1983.

Phaseolus vulgaris. Cultivars. Resistance. Drought. Selection. Water content. Water absorption. Tanzania.

A pot expt. under greenhouse conditions was conducted with 15 bean var. from Tanzania in order to search for a rapid and reliable drought resistance screening method. Plant height, MC, electrical conductivity,

and root:shoot ratio were measured, and correlations between these parameters were calculated. Plant height was of little value for drought resistance determination, since it did not correlate with water retention capacities. Bean var. were significantly different in their water retention capacities; this criterion has been shown to be related to drought resistance. A significantly negative correlation (r = -0.81) was found between water retention and electrical conductivity values. A poor correlation was found between the root:shoot ratio and water retention and conductivity (r = -0.369 and -0.311, resp.), indicating that while the former could be important in maintaining water uptake, the maintenance of membrane integrity is more important under severe drought conditions. Both water retention and electrical conductivity measurements proved successful in indicating drought tolerance in beans, but for large samples the latter method should be preferred. [CIAT]

See also 0450 0451 0452 0459 0468 0469 0473 0533
0548 0556 0557 0560 0570 0572 0578 0585
0591 0595 0608 0609 0610 0633 0671 0684
0752 0777 0784 0790 0800 0801 0803 0804

D02 Cultivation Practices: Planting, Weed Control and Harvesting

0528

22577 ACOSTA N., M.A. 1983. Evaluación de dosis y épocas de aplicación de paraquat como solución económica en el control de las malezas en el frijol (Phaseolus vulgaris). (Evaluation of doses and application dates of paraquat as an economical solution for weed control in beans). In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 29a., Panamá, 1983. Memoria. Panamá. v.2. 10p. Span., 2 Refs. [Inst. de Investigación Agropecuaria de Panamá, Apartado 6 A 4391, Estafeta El Dorado, Panamá]

Phaseolus vulgaris. Herbicides. Panama.

The date and dose of paraquat application were evaluated under field conditions in Centro Calsán and Minorlo Troescht (Panama) for weed control in bean var. chilene in 1981-82. There were highly significant differences (P < 0.01) between application dates, being superior the application at 20 days. The application of 3 l paraquat was toxic for the crop. The utilization of 1-2 l/ha, 20 days after germination, is recommended. [CIAT]

0529

25626 AGUILAR V., G.A. 1985. Control de malas hierbas y Mustia hilachosa en frijol (Phaseolus vulgaris L.); bajo dos sistemas de labranza. (Control of weeds and web blight in beans under two tillage systems). Tesis Ing.Agr. San José, Universidad de Costa Rica. 76p. Span., Sum. Span., 5 Refs., Illus.

Phaseolus vulgaris. Weeding. Herbicides. Rhizoctonia solani. Disease control. Chemical control. Land preparation. Costa Rica.

An expt. was conducted in Isparza, Costa Rica, with bean cv. Porrillo 70 to evaluate the efficiency of the chemical control of weeds and wed blight (Thanatephorus cucumeris) under 2 tillage systems (zero and conventional). The treatments applied were DEBP + pendimethalin (1.00 + 0.75 kg/ha), bentazon + fluazifop-butyl (1.00 + 0.50 kg/ha), and paraquat (0.50 kg/ha), and the application or not of benomyl 15, 30, and 45 days after planting.

The tillage system used and the application or not of the fungicide did not influence bean yields. However, a positive response in yields and grain production was obtained with chemical weed control, outyielding the check by over 50%. The highest control of web blight was obtained when benomyl was applied in the zero tillage system. [AS (extract)-CIAT]

0530

22576 ARAYA V., R. 1983. Paraquat como desecante del follaje para adelantar la cosecha de fríjol común (Phaseolus vulgaris). (Paraquat as a foliage desiccant to hasten the harvest of common beans). In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 29a., Panamá, 1983. Memoria. Panamá. v.2. 9p. Span., Sum. Engl., Span., 8 Refs., Illus. [Estación Experimental Fabio Baudrit Moreno, Apartado 183 B, Alajuela, Costa Rica]

Phaseolus vulgaris. Harvesting. Cultivars. Yields. Colombia. Costa Rica.

The effect of paraquat (20% a.i.) as a foliage desiccant in beans was evaluated applied at rates of 0-800 g/ha on 3 different dates (25-44 days after flowering) in Cali, Colombia, and in Alajuela, Costa Rica. The var. evaluated were Diacol Calima (Cali) and Mexico 80-R (Alajuela). In Cali the best treatment was the dose of 400 g/ha, when physiological maturity reached 82.5%. In Alajuela there were small reductions in yield and in seed size when paraquat was applied between 32-36 days after flowering (25-30% physiological maturity). However, when the desiccant was sprayed 39 days after flowering (70% physiological maturity), the yield was higher (1659 kg/ha) than the treatments without paraquat. The best dose for Mexico 80-R was 300 g/ha (1626 kg/ha). [CIAT]

0531

23209 BASCUR B., G. 1983. Cosecha del poroto. (Bean harvesting). In Curso Nacional de Frejoles, 1o., Talca, Chile, 1983. Trabajos presentados. Santiago, Organización de las Naciones Unidas para la Agricultura y la Alimentación. pp.122-128. Span., Illus.

Phaseolus vulgaris. Harvesting. Timing. Threshing. Agricultural equipment. Mechanization. Chile.

The manual bean harvesting method is briefly described, and the manual and semimechanical systems used to thresh beans are explained. A practical field day was conducted to determine the optimum harvest time, calibrate the threshing machine, and select bean grains. [CIAT]

0532

23202 BASCUR B., G. 1983. Siembras y aspectos generales en la producción de poroto. (Bean planting and general production aspects). In Curso Nacional de Frejoles, 1o., Talca, Chile, 1983. Trabajos presentados. Santiago, Organización de las Naciones Unidas para la Agricultura y la Alimentación. pp.19-32. Span., Illus.

Phaseolus vulgaris. Production. Planting. Spacing. Land preparation. Seed characters. Germination. Chile.

General aspects on bean production in Chile are presented, with emphasis on planting. The major factors affecting bean yields include diseases and pests, fertilization, weeds, irrigation, and harvesting. Regarding bean planting, overall aspects on planting date, var., soil preparation, planting system, depth, and density, and seed quality are discussed. Data

on growth habit, vegetative cycle, interrow spacing, and seed rates are given for 22 bean var. commonly grown in the country. The practical side of these topics is presented, indicating how the demonstration plots were established, the var. planted and their spacings, calculations of the no. of seeds/ha, calibration of the planter, and criteria used to evaluate plant emergence (seedling health, stand estimation, and actual plant density). [CIAT]

0533

24894 BURGWIN, W.A. 1969. A spacing and fertilizer trial with Mexico 142 beans. Kenya Sisal Board Bulletin 69:22-23. Engl., Sum. Engl., Illus.

Phaseolus vulgaris. Planting. Spacing. Fertilizers. N. Kenya.

Results of a trial in which plant density was doubled with compensation for nutrient demand showed no significant differences between treatments, indicating that both higher plant density (spacing 10 x 30 cm) and the use of fertilizers (100 kg P + 100 kg N) could increase the yield and profitability of Mexico 142 beans on the Thika (Kenya) red loam soils. [AS]

0534

24986 CALDERON F., E. 1980. Estudio de los efectos fitotóxicos del herbicida alachlor en fríjol (Phaseolus vulgaris L.). (Phytotoxic effects of the herbicide alachlor in beans). Tesis Mag.Sc. Nuevo León, México, Instituto Tecnológico y de Estudios Superiores de Monterrey. 88p. Span., Sum. Span., 48 Refs., Illus.

Phaseolus vulgaris. Herbicides. Toxicity. Mexico.

Expt. were carried out in the greenhouse and in the microtechnique lab. of the Instituto Tecnológico y de Estudios Superiores de Monterrey (Nuevo León, Mexico) to determine the toxic effect of the herbicide alachlor in beans, using doses of 1-8 kg a.i./ha, and the effects on the external and microscopic anatomy of the bean stem. It was observed that commercial doses (1-2 kg/ha) reduced growth slightly but did not induce any other phytotoxic symptom. When applying high doses, twice that commercially recommended (3-4 kg/ha), a phytotoxic response is induced, consisting in a severe decrease in growth, leaf chlorosis, necrosis of leaf apexes, and abnormal development (wrinkling) of the leaf blade. As to histological development, it was observed that alachlor reduced the development of stem cells affecting cell differentiation as well as growth. The general disorganization in the cambial zone was very notable especially at high doses (4 and 5 kg/ha) presenting disorder in the rows of cells undergoing division. Disturbance was also observed in the differentiation of the vascular tissue, and the xylem showed smaller and less lignified vessels. [AS (extract)-CIAT]

0535

24645 CAMERMAN, A. 1976. Essai de densite de semis sur le haricot nain Saxa. (Seed density trial in Saxa bush bean). Rubona, Institut des Sciences Agronomiques du Rwanda. Note Technique no.8. 7p. Fr.

Phaseolus vulgaris. Spacing. Planting. Yields. Rwanda.

The possibility of increasing the yields of bush bean var. Saxa was studied at Rubona Station, Rwanda, in 1976, by using different plant spacings. Six treatments were used in a randomized block design with 5 replications. The statistical analysis did not indicate differences between the planting

spacings evaluated. Spacings of 40 x 20 cm, at a rate of 2 seeds/hill, and continuous lines at 40 cm, when using planters, were considered adequate. [CIAT]

0536

24424 CARRERA B., V. 1984. Principios de control de malezas en el cultivo de frejol. (Principles of weed control in beans). In Curso sobre el cultivo de frejol usando la metodología Aprender Haciendo, lo., Pimampiro, Ecuador, 1984. Conferencias. Quito, Instituto Nacional de Investigaciones Agropecuarias. Programa de Leguminosas de la Estación Experimental Santa Catalina. pp.19-23. Span. [Estación Experimental Santa Catalina, Inst. Nacional de Investigaciones Agropecuarias, Apartado 340, Quito, Ecuador]

Phaseolus vulgaris. Weeding. Ecuador.

The principles of weed control in beans are discussed; a general explanation of the available cultural, mechanical, and chemical methods is included. [CIAT]

0537

21762 DE LAJONQUIERE, Y. 1982. Nouveaux matériels de récolte des fruits et des légumes. (New harvesters of fruits and legumes). Bulletin Technique d'Information (France) no.367-368:197-198. Fr., Illus. [Centre National du Machinisme Agricole, du Genie Rural des Eaux et des Forest, Aix-en-Province, France]

Phaseolus vulgaris. Mechanization. Harvesting. Agricultural equipment. France.

Specialized harvesters for diverse commodities such as fruits and legumes in France are briefly described. For French beans, huge 5-row mechanical harvesters (approx. 15 t/ha) with a transversal bar are currently used; these machines have storage places for pods. They only harvest snap beans of type "mange-tout d'industrie" but promising results have been obtained with fine snap beans. [CIAT]

0538

24850 EDJE, O.T.; MUGHOGHO, L.K. 1979. Response of indeterminate dry beans to trellis height. Malawi Journal of Science 3:24-29. Engl., Sum. Engl., 3 Refs.

Phaseolus vulgaris. Indeterminate cultivars. Trellises. Yields. Yield components. Malawi.

Field expt. were conducted at Bunda College of Agriculture (Lilongwe, Malawi) to determine the effect of staking or trellis height on bean seed yield and quality over 2 seasons. The treatments were control and trellis heights of 0.5, 1.0, 1.5, 2.0, and 2.5 m tall. Jute twines, tied to 2 horizontal bamboo poles, formed the trellis along which vines were trained. Seed yields, pooled over 2 yr, were 482, 1884, 2338, and 2250 kg/ha for the control, 1.0-, 1.5-, and 2.0-m-tall trellises, resp. The no. of pods/plant also increased significantly with trellis height and the correlation coefficient between seed yield and no. of pods/plant and seed yield and stem DM were r = 0.891 and r = 0.835, resp. [AS]

0539

22130 EDJE, O.T. 1978. Response of Phaseolus beans to overseeding and stand reduction. Lilongwe, University of Malawi, Bunda College of Agriculture. Research Bulletin no. 9. pp.8-15. Engl., Sum. Engl., 7 Refs.

Phaseolus vulgaris. Planting. Spacing. Dwarf beans. Thinning. Yields. Yield components. Malawi.

The effects of sowing excess seed followed by thinning on the yield of determinate Phaseolus vulgaris cv. 253/1 and 1196 were studied in the rainy season of 1975-76 at Bunda College of Agriculture (Malawi). Initial populations of 50 plants/m² were thinned (a) 1 or (b) 2 wk. before or (c) at full flowering to give 22 plants/m², or initial plant populations of (d) 25 and (e) 50 plants/m² were thinned 1 wk. after emergence to give 22 and 44 plants/m², resp. In both cv., LAI, leaf area ratio, specific leaf area, specific leaf wt., and HI yield/m² increased with each delay in thinning. None of the thinning treatments affected seed yields but the mean yield from cv. 1196 (1.36 t/ha) was twice that from 253/1. Doubling the population to 44 plants/m² did not affect seed yield. Correlation coefficients between yield and the no. of filled pods/m² or of filled pods/plant were 0.84 and 0.92, resp. These yield components were not sensitive to interplant competition in (a), (b), and (c), but were sensitive in (e). [Field Crop Abstracts]

0540

24851 EDJE, O.T.; MUGHOGHO, L.F.; AYONOADU, F.W.P. 1972. Effect of leaf removal on the yield of Phaseolus beans. Malawi Journal of Science 1:10-14. Engl., Sum. Engl., 9 Refs.

Phaseolus vulgaris. Defoliation. Yields. Cultivars. Determinate cultivars. Indeterminate cultivars. Yield components. Malawi.

The effect of leaf removal, for use as a vegetable, on seed yield of determinate (cv. No. 228/2 and 495/9/1) and indeterminate (cv. No. 97/1) and 801) bean cv. was studied at Bunda College Farm, Malawi. Leaf removals in determinate cv. were carried out once (3 leaves at 27 days after planting) or twice (3 leaves each time at 27 and 36 days after planting). Leaf removals in indeterminate cv. were carried out once (5 leaves at 26 days after planting), twice (5 and 7 leaves, resp., at 26 and 33 days after planting), and 3 times (5, 7, and 20 leaves, resp., at 26, 33, and 63 days after planting). In determinate cv. seed yield decreased by up to 30.6 and 46.8% when defoliations were carried out once and twice, resp.; in indeterminate cv. the yield reductions were 14.2, 30.5, and 37.3%, resp. In general, the no. of pods/plant and seed size also decreased with the no. of defoliations. Defoliation of determinate beans is not recommended where leaves and seeds are regarded as economic yield. [CIAT]

0541

21543 ERASMUS, D.J.; NELSON, W.E.; STADEN, J. VAN 1982. Combined use of a selective herbicide and seaweed concentrate. South African Journal of Science 78(10):423-424. Engl., 5 Refs., Illus. [Dept. of Botany, Univ. of Natal, P.O. Box 375, Pietermaritzburg 3200, South Africa]

Phaseolus vulgaris. Herbicides. Plant assimilation. Leaves. South Africa.

The effect of Kelpak 66 seaweed concentrate on leaf absorption of 2-methyl-4-chlorophenoxyacetic acid (herbicide) labelled with ^{14}C in beans and wheat was investigated. Appreciable amounts of radioactivity were

taken up by the fed bean leaves when applied in combination with the seaweed concentrate or Tween 20. This absorbed radioactivity was distributed throughout the plant. The higher concn. of the seaweed concentrate (1:100) induced a greater relative uptake of the herbicide in beans than the 1:500 solution. A combination of Tween 20 and seaweed concentrate resulted in the greatest relative uptake. The selectivity of the herbicide was not detrimentally affected when used in combination with the seaweed concentrate. [CIAT]

0542

25596 FENNIMORE, S.A.; MITICH, L.W.; RADOSEVICH, S.R. 1984. Interference among bean (Phaseolus vulgaris), barnyardgrass (Echinochloa crus-galli), and black nightshade (Solanum nigrum). Weed Science 32(3):336-342. Engl., Sum. Engl., 13 Refs., Illus. [Univ. of California, Davis, CA 95616, USA]

Phaseolus vulgaris. Weeds. Herbicides. USA.

The interference between dry bean var. Red Kidney, Solanum nigrum, and Echinochloa crus-galli was examined in replacement series expt. A modified replacement series expt. was also performed to examine the effects of no interference, and intraspecific and interspecific interference on the height, leaf area, and dry wt. of beans, S. nigrum, and E. crus-galli. In both types of competition expt., beans germinated earlier than either weed species and caused significant reductions in weed height, leaf area, and dry wt. The impact of beans upon itself was always greater than the effect of either weed species. In lab. studies, E. crus-galli and S. nigrum seeds were subjected to 5 concn. of trifluralin. Field studies, conducted at several locations in the Central Valley of California (USA) in which trifluralin-treated plots were compared with nontreated plots, demonstrated that trifluralin favors trifluralin-tolerant weeds (S. nigrum), but trifluralin-sensitive weeds (E. crus-galli) have not been eliminated despite 26 yr of trifluralin use. [AS]

0543

25684 FUENTES P., J.R.; SILVA, J.F. DA; VIEIRA, C.; CONDE, A.R. 1984. Eficiencia dos herbicidas alachlor e linuron na cultura de feijao (Phaseolus vulgaris L.). (Efficiency of the herbicides alachlor and linuron in beans). Revista Ceres 31(176):248-264. Port., Sum. Port., Engl., 15 Refs., Illus. [Inst. de Producción y Sanidad Vegetal, Univ. Austral de Chile, Casilla 567, Valdivia, Chile]

Phaseolus vulgaris. Weeding. Herbicides. Toxicity. Yields. Brazil.

The performances of the herbicides alachlor and linuron were evaluated as applied for weed control in beans (cv. Novirio 890) during both the rainy and dry season plantings at Vicosa (MG, Brazil). During the rainy season, grasses were the predominant weeds. Alachlor was equally efficient in the control of both grasses and broadleaves, and, although the beans manifested injury symptoms, yields were increased. Linuron did not provide satisfactory weed control and yields were reduced. Weed infestation was less during the dry season and did not affect bean growth. Broadleaves predominated and were controlled with both herbicides. Alachlor caused injury to the beans and yield reduction. Linuron was not phytotoxic. Herbicide mixtures did not increase the effectiveness of the products in either season. [AS]

0544

25346 FUENTES P., J.R.; SILVA, J.F. DA; VIEIRA, C.; CONDE, A.E. 1984. Tolerancia de cultivares de feijao (Phaseolus vulgaris L.) aos herbicidas alachlor e linuron. (Tolerance of bean cultivars to the herbicides alachlor and linuron). Revista Ceres 31(174):136-145. Port., Sum. Port., Engl., 16 Refs., Illus. [Inst. de Producción & Sanidad Vegetal, Univ. Austral de Chile, Casilla 567, Valdivia, Chile]

Phaseolus vulgaris. Cultivars. Weeding. Herbicides. Toxicity. Dry matter. Chile.

Alachlor and linuron were used separately and jointly, in various doses, to control weeds among 5 bean var. (Ricobaio 1014, Negrito 897, Carioca, Costa Rica, and Ricopardo 896) in the greenhouse. Alachlor reduced the growth rate in all var., but Negrito 897 and Costa Rica were the least affected. Negrito 897 was insensitive to linuron, though all other var. suffered a reduction in growth rate, to a greater or lesser extent. No interaction between the herbicides was noticed. [Plant Breeding Abstracts]

0545

25398 IGLESIAS, I.; IFAÑETA, M.; IFREZ, I. 1984. Influencia de la época de siembra en cultivares de frijol (Phaseolus vulgaris). (Influence of planting date on bean cultivars). Ciencia y técnica en la Agricultura. Hortalizas, Papa, Granos y Fibras 3(1):59-67. Span., Sum. Span., Engl., 10 Refs. [Estación Experimental de Granos El Tomeguín, Ministerio de la Agricultura, La Habana, Cuba]

Phaseolus vulgaris. Cultivars. Planting. Timing. Yields. Seed characters. Cuba.

A trial was conducted at El Tomeguín exptl. station (La Habana, Cuba) during the 1982-83 crop year to determine the best planting date for 7 bean var. (Ica Pijao, Bonita 11, Hatuey, Red Kloud, Bolita 42, M-112, and CC-25-9). There was no var. x planting date interaction. Results showed that the best av. yields were obtained with the Oct. planting (2.6 t/ha). Yields of 1.7, 1.9, 1.7, 1.1, 0.9, 0.6, 0.2, and 0.1 t/ha were obtained for the plantings of Sept., Nov., Dec., Feb., March, Jan., April, and May, resp. Small grain var. showed nonsignificant differences among themselves, but they outyielded the large grain var. [AS]

0546

24661 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1974. Resultats de deux essais comparatifs varietaux de haricots volubiles l'un avec tuteurage des varietes, l'autre sans tuteurage. (Results of two comparative varietal trials with climbing beans, one with stakes and the other without stakes). Rubona. Resultats d'Essais, no.3. 16p. Fr.

Phaseolus vulgaris. Climbing beans. Cultivars. Stakes. Yields. Rwanda.

Two comparative var. trials were carried out with climbing beans at the Rubona Station (Rwanda) during 1974. A Fisher block design was used for both trials, with 6 replications in space and 5 and 4 replications, resp., over time. Beans were planted at a 40 x 20 cm distance (2 seeds/site). In the 1st trial (without stakes), check var. Kulma was inferior (P = 0.01) to Amarillo 156 and 6473; check var. 54 verified its value. In the 2nd trial (with stakes) only Amarillo 156 outyielded var. 54; var. Sviramabuye had a good performance. The use of stakes increased yields by 145-219%. [CIAT]

0547

24958 JAKOBSEN, H. 1980. Bean production. Mbeya, Tanzania, Uyole Agricultural Centre. Working paper HWP 4/80. 6p. Engl.

Paper presented at the Research Extension Seminar, Mbeya Region, 1980.

Phaseolus vulgaris. Planting. Timing. Colletotrichum lindemuthianum. Isariopsis griseola. Uromyces phaseoli. Elsinoe phaseoli. Rotational crops. Seed production. Cultivars. Yields. Tanzania.

General aspects on planting time, diseases, cv., crop rotations, and seed production of new bean cv. in Mbeya region of Tanzania are presented. Beans should be planted no later than March 1 around the city of Mbeya, March 20 in Mbeni, and May 10 in the Tukuyu-Mitalula area. Beans and maize should be planted as early as possible on the same date. Common diseases in the region include those caused by Colletotrichum lindemuthianum, Isariopsis griseola, Uromyces appendiculatus, and Elsinoe phaseoli. Suggestions for the control of C. lindemuthianum are given. T3 and Kabanima have been released for commercial production as outstanding material; selections with yield potential over 3000 kg/ha in the Southern Highlands can be expected. Beans-maize and beans-potatoes are suitable crop rotation patterns for the region. The way seeds of the released cv. T3 and Kabanima could be possibly multiplied and distributed is discussed. [CIAT]

0548

24921 JAKOBSEN, H. 1976. Bean study, Sumbawanga 1974. Mbeya, Tanzania, Uyole Agricultural Centre. Research Report no.19. 7p. Engl., Sum. Engl.

Phaseolus vulgaris. Production. Planting. Timing. Intercropping. Weeding. Fertilizers. Homoptera. Insect control. Cultivars. Tanzania.

A pilot survey on beans was carried out in Sumbawanga, Tanzania, in Nov. 1974 to determine planting times and methods, use of capital input, and production constraints. Pests were found to cause great losses, and white and yellow cv. were the most popular because of their good taste, high yields, good market prices, and easiness to cook. Results stress the need of introducing a plant protection program together with improved crop husbandry and possibly improved pure cv. as an alternative to the local mixtures. [AS]

0549

27661 JIMENEZ M., E.; CHAVARRIA C., P.L. 1984. Uso de herbicidas en maíz y su efecto residual para el fríjol en siembras posteriores. (Herbicide use in maize and their residual effect on subsequent bean plantings). Alajuela, Universidad de Costa Rica. Estación Experimental Fabio Baudrit M. Boletín técnico 17(3):15-20. Span., Sum. Engl., Span., 11 Refs., Illus.

Phaseolus vulgaris. Zea mays. Relay crops. Weeding. Herbicides. Yields. Costa Rica.

An expt. was conducted on 2 different soils of the Fabio Baudrit exptl. station (Alajuela, Costa Rica) to evaluate the effect of 3 herbicides (atrazine, alachlor, and thiobencarb) alone and in mixtures for weed control in maize, and to observe their effect on beans planted after the maize flowering period. Herbicides were applied at maize planting time; beans were planted 90, 110, and 130 days later. The best control of narrow- and broad-leaved weeds was obtained with the mixture of atrazine +

alachlor (1.25 + 1.00 kg and 1.25 + 2.00 kg/ha). There were no significant differences among the bean planting dates. Bean yield was higher when planted 90 days after the maize planting. [AS]

0550

22168 MAY M., G. 1978. Evaluación de herbicidas en aplicación postemergente al cultivo del fríjol Phaseolus vulgaris L. en la zona de Chapingo, México. (Evaluation of postemergence herbicides applied to beans in the Chapingo area, Mexico). Tesis Ing.Agr. Chapingo, México, Universidad Autónoma. 74p. Span., Sum. Span. 44 Refs.

Phaseolus vulgaris. Herbicides. Weeding. Yields. Mexico.

An expt. was conducted at the Escuela Nacional de Agricultura (Chapingo, Mexico) to evaluate the efficiency of 2 postemergence herbicides (bentazon and sodium salt of acifluorfen) in controlling weeds in bean var. Canario '01. The weeded control always produced the highest yields (2677 kg/ha), but also showed the highest costs. An economic analysis showed that the best treatments were bentazon + sodium salt of acifluorfen (1.00 + 0.59 l/ha) and sodium salt of acifluorfen (0.59 and 1.19 l/ha). [AS (extract)-CIAT]

0551

24650 MPABANZI, A.; NABYAMANA, J.N. 1977. Resultats d'un essai d'ecartement de semis sur haricot volubile var. 54 a Rubona. (Results of a planting distance trial with climbing bean var. 54 in Rubona). Rubona, Institut des Sciences Agronomiques du Rwanda. Resultats d'Essais no.10. 7p. Fr.

Phaseolus vulgaris. Spacing. Planting. Yields. Rwanda.

A trial was carried out to determine the possibility of increasing yields of bean var. 54 with a lower plant density and to establish better plant densities at the Rubona Station, Rwanda, during 1977. Six plant densities were used in a split plot randomized block design with 4 replications over time. Results are given in table form. Only the 4th replication was significant but no treatment exceeded the check (40 x 20 cm, 0.08 m^2/site, 70 kg seed/ha) which remained as the highest yielding. [CIAT]

0552

22941 NUÑEZ R., R. 1976. Estudio de componentes del rendimiento en 4 variedades de fríjol (Phaseolus vulgaris L.) sembradas a 4 densidades en Gral. Escobedo, N.L. ciclo tardío 1975. (Study of the yield components in 4 bean varieties sown at 4 densities in Gral. Escobedo, N.L., late cycle 1975). Tesis Ing.Agr. Monterrey, Universidad Autónoma de Nuevo León. 135p. Span., Sum. Span., 28 Refs., Illus.

Phaseolus vulgaris. Cultivars. Yield components. Spacing. Planting. Yields. Mexico.

At the exptl. field of the U. Autónoma de Nuevo León, Mexico, the development of various yield components in 4 bean var. (Pinto, Delicias 71, Canario 107, and Mantequilla), sown at 4 densities (120,000, 100,000, 80,000, and 60,000 plants/ha), was studied. In all the var., planting density significantly affected the following characteristics: yield of 20 plants, straw wt., grain:straw ratio, estimated yield/useful plot area, no. of pods/plant, and wt. and vol. of 100 seeds; however, the no. of

seeds/pod was not affected. The highest yielding var. at the 4 densities was Delicias 71. [AS (extract)-CIAT]

0553

23203 ORMEÑO N., J. 1983. Control de malezas en poroto. (Weed control in beans). In Curso Nacional de Frejoles, 1o., Talca, Chile, 1983. Trabajos presentados. Santiago, Organización de las Naciones Unidas para la Agricultura y la Alimentación. pp.33-48. Span., Illus.

Phaseolus vulgaris. Weeds. Weeding. Herbicides. Chile.

The theoretical and practical aspects of weed control in bean crops are presented. An overall discussion is given of weeds/beans competition, plant characteristics that condition the competitive ability, and critical competition periods. Cultural, mechanical, and chemical weed control measures are discussed. Weeds found in South Central Chile are listed. A successful chemical weed control program will depend on the knowledge of the weed species, its type, density, and growth stage, climatic and edaphic conditions, type of chemical application (incorporated preplanting, preemergence, or postemergence), and general characteristics of the chemical. Recommendations on the use of herbicides and their mixtures are given. [CIAT]

0554

22967 PIMENTA B., E. 1979. Evaluación de herbicidas para el control de malezas en frijol de temporal en la región de Zapopan, Jal. (Herbicide evaluation for weed control in rainfed beans in the Zapopan region, Jal.). Tesis Ing.Agr. Jalisco, México, Universidad de Guadalajara. 56p. Span., Sum. Span., 33 Refs., Illus.

Phaseolus vulgaris. Herbicides. Weeding. Mexico.

An expt. was conducted at the agricultural exptl. field Los Belenes of the U. of Guadalajara, Mexico, to obtain information on chemical weed control in beans. The best treatments as to economic feasibility and effectiveness were linuron (1 kg/ha), methabenzthiazuron (2 kg/ha), and the mixture alachlor + linuron (2 + 1 kg/ha). [AS (extract)-CIAT]

0555

25602 PORTAZOV, I.; FOSTOV, D.; CASANOVA, A.; IORDANOV, D.; SAVON, R. 1984. Evaluación agroeconómica de la cosecha mecanizada de la habichuela con la cosechadora FZB. (Agroeconomical evaluation of mechanized harvesting of snap beans with the FZB harvester). Ciencia y Técnica en la Agricultura. Hortalizas, Papa, Granos y Fibras 3(2):31-39. Span., Sum. Span., Engl., 9 Refs.

Phaseolus vulgaris. Snap beans. Agricultural equipment. Mechanization. Harvesting. Costs. Cuba.

During the 1982-83 crop year, a mechanized harvesting extension trial was carried out with snap bean var. Harvester (imported), using the FZB harvester. The trial was conducted at the Empresa de Cultivos Varios 19 de Abril (La Habana, Cuba) on red ferralitic soil in 16-m² plots. Five replications were made and the amount of actual production, losses, and field yield were determined. Results indicate a high efficacy resulting from mechanized labor as compared with hand harvesting. The direct costs of harvesting decreased 15 times and that of labor, 75 times; productivity increased approx. 8-fold and the loss of nonharvested pods ranged between

24-28% of the field yield. It was verified that the harvester replaces the work of 75-80 day-laborers/day and thus is economically profitable, whereas hand harvesting was found to be not economically effective. [AS]

0556

22596 REUNIAO TECNICA ANUAL DO FEIJAO, 13a., PORTO ALEGRE-RS, BRASIL, 1976. Ata. (Proceedings). Porto Alegre, Brasil, Instituto de Pesquisas Agronomicas. 261p. Port., Sum. Refs., Illus.

Phaseolus vulgaris. Herbicides. Entomology. Climatic requirements. Diseases and pathogens. Soil fertility. Plant breeding. Brazil.

The papers presented at the Annual Technical Meeting on Beans covering research activities for the 1975-76 crop year in Rio Grande do Sul, Brazil, are compiled. Topics dealt with include chemical weed control, entomology, ecology-climatology, plant pathology, soil fertility, seed technology, and var. improvement. The present situation of beans in the region is discussed. An outstanding outcome was the release of bean var. Carioca and Rio Tibagi for commercial production. The bean research plans for Rio Grande do Sul and Santa Catalina are outlined. Individual papers are recorded in this publication under the following consecutive no.: 0500, 0501, 0518, 0521, 0522, 0558, 0566, 0614, 0615, 0691, 0698, 0707, 0708, 0729, 0812, and 0820. [CIAT]

0557

24696 FURAIHAYO, F.R. 1978. A review of the status of grain legumes in Uganda. Journal of Agronomy and Crop Science 146:235-245. Engl., Sum Engl., Germ., 26 Refs.

Phaseolus vulgaris. Production. Planting. Spacing. Cultivars. Fertilizers. Yields. Plant introductions. Plant breeding. Uganda.

The status of the different grain legumes (beans, groundnuts, soybeans, pigeon peas, cowpeas and peas) in Uganda is analyzed, covering the cultivation area, breeding of new cv., disease resistance, and economic value leading to the bridging of the protein gap in human diets and animal feeds. [AS (Extract)]

0558

22597 KUCHEMM FILHO, O.; VENTURELLA, L.R.C. 1976. Ensaio com seis herbicidas simples e cinco misturas de tanque para o controle de ervas daninhas do feijoeiro. (Weed control in beans with 6 herbicides applied alone and 5 herbicide tank mixes). In Reuniao Técnica Anual do Feijao, 13a., Porto Alegre-RS, Brasil, 1976. Ata. Porto Alegre, Brasil, Instituto de Pesquisas Agronomicas. pp.1-10. Port., Sum. Port., 8 Refs., Illus.

Phaseolus vulgaris. Herbicides. Weeding. Brazil.

To evaluate the effectiveness of herbicides applied alone and in mixtures to control weeds in beans in Osorio (Rio Grande do Sul, Brazil), a field expt. was designed with the following treatments: (1) preplant incorporated-EPTC at 5.42 kg a.i./ha, trifluralin at 0.96 kg/ha, nitralin at 0.96 kg/ha, dinitramine at 0.72 kg/ha, and the mixture trifluralin + metribuzin (0.72 + 0.21 kg/ha, resp.); (2) preemergence-chlorthal-methyl at 10.5 kg/ha, metribuzin at 0.42 kg/ha, and the mixtures alachlor + metribuzin (1.44 + 0.21 kg/ha, resp.), chlorthal-methyl + linuron (5.25 + 0.38 kg/ha, resp.), chlorthal-methyl + metribuzin (5.25 + 0.21 kg/ha, resp.), and

alachlor + linuron (1.44 + 0.36 kg/ha, resp.). Two controls, hand-weeded and unweeded, were used. The best control of the monocotyledonous weeds was obtained with trifluralin, chlorthal-methyl, nitralin, dinitramine, and trifluralin + metribuzin. A good control of the dicotyledonous weeds was obtained with alachlor + metribuzin, chlorthal-methyl + metribuzin, alachlor + linuron, and metribuzin alone. Bean yields were statistically higher for chlorthal-methyl treatment (1010 kg/ha) compared with the rest. [CIAT]

0559

22936 SALINAS P., R.A. 1976. Efecto de 4 fechas de siembra en la producción de seis variedades de frijol (Phaseolus vulgaris L.) en la región de General Escobedo, N.L. (Effect of 4 planting dates on the production of six bean varieties in the region of General Escobedo, Nuevo León). Tesis Ing.Agr. Monterrey, México, Universidad Autónoma de Nuevo León. 7p. Span., Sum. Span., 26 Refs.

Phaseolus vulgaris. Cultivars. Timing. Planting. Yields. Mexico.

A field expt. was conducted at the U. Autónoma de Nuevo León, Mexico, to evaluate the effect of 4 planting dates (July 25, Aug. 14, and Sept. 3 and 23) on yields of 6 bean var. (Pinto, Canario 107, Mantequilla, Delicias, Antigua, and Flor de Mayo). Good yields were obtained from the 1st 2 planting dates. With later planting dates, the plant growth cycle decreased progressively as well as the flowering period, plant height, and yields. The best planting date was July 25. Var. Canario 107 and Mantequilla performed the best. [AS (extract)-CIAT]

0560

24637 SAVILE, A.H.; WRIGHT, V.A. 1958. Notes on Kenya agriculture. 3. Oil seeds, pulses, legumes, and root crops. East African Agricultural Journal 24(1):1-9. Engl.

Phaseolus vulgaris. Phaseolus acutifolius. Cultivation. Kenya.

Brief annotations on climate and soil requirements, cultivation, harvesting, and major uses of various oil seeds, legumes, and root crops in Kenya are presented. A table listing spacings, seed rate, yields, and time to maturity for each crop is also included. Phaseolus vulgaris and P. acutifolius are major staples for human consumption for which 337-1124 and 506-1686 Kg/ha are expected at 3.0 and 3.5 mo. after planting, resp. [CIAT]

0561

25441 SIVIERO, M.E.; MELHORANCA, A.L.; LEAL, J.A. 1985. Epoca da semeadura de feijao (Phaseolus vulgaris L.) em Dourados, MS. (Bean planting time in Dourados, MS). Dourados- MS, Brasil, Empresa Brasileira de Pesquisa Agropecuária. Unidade de Execucao de Pesquisa de Ambito Estadual de Dourados. Comunicado Tecnico no.23. 10p. Port., 3 Refs. [Unidade de Execucao de Pesquisa de Ambito Estadual de Dourados, Caixa Postal 661, 79.800 Dourados-MS, Brasil]

Phaseolus vulgaris. Cultivars. Planting. Timing. Yields. Brazil.

An expt. was conducted in Dourados between 1981-84 and in Indapolis (Brazil) in 1983 to determine the best bean planting dates. In 1981, bean yields were nil when planted during the dry seasons (Feb., March, April, and June); for the rainy season planting dates (Aug., Sept., and Oct.), yields were only obtained for the 1st planting date (range 567-967 kg/ha

for test var. Carioca, ICA Cell 10104, Porrillo 70, Ica Pijao, and Porrillo Sintético). In 1983, the best planting date was Feb. compared with May plantings (1401 vs. 438 kg/ha, resp., as av. for the same cv.). In 1984 in Dourados, with 4 planting dates and cv. Carioca, CNF 0010, Rio Ivai, and Rio Tibagi, the highest yields (av. 862 kg/ha) were obtained from the May plantings; the same year in Indapolis with the same cv. and 2 planting dates (April and May, av. yields for both were 2029 and 1976 kg/ha, resp. In 1984 with 4 planting dates and cv. Carioca, CNF 0010, ICA Cell 10104, and H 75-7-CM (78), yields were obtained only for the 1st 3 planting dates (March and early and late April) and were highest for early April plantings (av. 1194 kg/ha). The best bean planting date for Dourados is April, although Feb. and May plantings are feasible but with greater risks and lower yields. [CIAT]

0562

22976 SOTORZANO V., E. 1977. Determinación de la densidad óptima de siembra en fríjol (Phaseolus vulgaris) bajo condiciones de humedad residual, Costa de Jalisco. (Determination of the optimum bean planting density under residual moisture conditions, Jalisco coastal region). Tesis Ing.Agr. Jalisco, México, Universidad de Guadalajara. 82p. Span., Sum. Span., 19 refs., Illus.

Phaseolus vulgaris. Cultivars. Spacing. Planting. Yields. Mexico.

A field expt. was conducted in the Jalisco coastal region, Mexico, to determine the optimum planting densities of bean var. Jamapa, Satava-425, Canario 101, and Bayo Ferriendo (control). Thirty-six treatments were applied as a result of the factorial combination of var., interturrow spacings (56, 66, and 80 cm) and interplant spacings (5, 10, and 15 cm). The best var. were Jamapa and Satava-425. The best distance between furrows was 80 cm, and between plants, 5 and 10 cm. [CIAT]

0563

25609 THOMAS, C.V.; WAINES, J.G. 1982. Rooting depth comparison between Phaseolus vulgaris and P. acutifolius. Bean Improvement Cooperative. Annual Report 25:57. Engl.

Phaseolus vulgaris. Cultivars. Rooting. USA.

Three tests were conducted to compare rooting depth of Phaseolus vulgaris and P. acutifolius. In the 1st test P. acutifolius PI 321638 and PI 319443 were compared with bean cv. Masterpiece and Small White 53. The mean max. root depth was 152.06, 156.10, 120.44, and 102.00 cm for PI 321638, PI 319443, Masterpiece, and Small White 53, resp. In a 2nd test no significant differences in max. root length were observed between PI 321638, Masterpiece, and BC1, seed from the interspecific hybrid between these 2 lines. In a 3rd test P. acutifolius PI 321638, L172, and PI 310801 were compared with bean cv. Pinto P 115, Gloria Pink, and Dark Red Kidney. Rooting depth estimates were incomplete for beans, but P. acutifolius appeared to extract water up to at least 180 cm. [CIAT]

0564

23045 VARNER, G.V. 1983. Direct harvesting dry beans in Michigan? Michigan Dry Bean Digest 8(1):22. Engl.

Phaseolus vulgaris. Harvesting. USA.

The reasons why beans are not yet directly harvested with the combine in Michigan (USA) are explained. The main reason is that direct harvesting would cause a loss of production (10-15%). [CIAT]

0565

24423 VILLASIS, C. 1984. Situación del cultivo de frejol en el Ecuador y aspectos generales de su producción. (The situation of beans in Ecuador and general aspects of its production). In Curso sobre el cultivo de frejol usando la metodología Aprender Haciendo, 1o., Pimampiro, Ecuador, 1984. Conferencias. Quito, Instituto Nacional de Investigaciones Agropecuarias. Programa de Leguminosas de la Estación Experimental Santa Catalina. pp.13-17. Span. [Programa de Leguminosas, Estación Experimental Santa Catalina, Inst. Nacional de Investigaciones Agropecuarias, Apartado 340, Quito, Ecuador]

Phaseolus vulgaris. Production. Yields. Land preparation. Planting. Timing. Spacing. Ecuador.

The present situation of beans in Ecuador is briefly reported, including area, production, and yields for the period 1977-82. The main bean production constraints are diseases and insects, poor quality seed, untimely crop management, and a limited or inefficient use of inputs. General comments are given on soil preparation, planting dates and methods, including recommendations on planting depth, densities, and distances. [CIAT]

0566

22604 GESTPHALEN, C.L.; SUTILI, V.; BERGAMASCHI, H.; MATZENAUER, R.; MASTINOTTO, A.; AMBROSETTI, A. 1976. Determinacao das influencias de elementos meteorológicos no rendimento de cultivares de feijao em diferentes épocas de semeadura. (Determining the influence of meteorological elements on yields of bean cv. at different planting dates). In Reuniao Técnica Anual do Feijao, 13a., Porto Alegre-RS, Brasil, 1976. Ata. Porto Alegre, Brasil, Instituto de Pesquisas Agronomicas. pp.51-64. Port., 1 Ref., Illus.

Phaseolus vulgaris. Cultivars. Planting. Timing. Genotypes. Adaptation. Yields. Brazil.

In 1975 expt. were conducted in Osorio, Santo Augusto, and Taquari (Rio Grande do Sul, Brazil) to determine the effect of different planting dates on yields of bean cv. and to evaluate the genotype and environment x planting date interactions. In Osorio excess rainfall in Sept. and Dec., together with low solar radiation, had a negative effect on bean yields and favored anthracnose incidence. No planting date x var. interaction was observed. The best planting dates were early Nov. and early and mid-Oct. Yields of bean cv. 5105?, Rico, Maguino, and Tambo, averaged over all planting dates were 9.1, 916, 894, and 368 kg/ha, resp. In Santo Augusto there was no significant difference between planting dates (av. for all cv. 1983 kg/ha); all climatic factors were near the theoretical optimum at this site. In Taquari the highest av. yields were obtained in the early Nov. and mid-Oct. plantings (1775 and 1450 kg/ha, resp., averaged over all cv.). The highest av. yield over all planting dates was obtained with bean cv. 5105? (1496 kg/ha) followed by Rico (1389 kg/ha). [CIAT]

See also 0496 0501 0504 0505 0506 0514 0526 0569
0571 0573 0581 0583 0586 0589 0593 0596
0601 0602 0604 0609 0616 0633 0673 0752
0786 0827 0836

0567

3193 ARAYA V., R.; ZUMBADO, C. 1983. Interacción de siete cultivares de fríjol voluble con dos de maíz en asociaciones simultáneas. (Interaction of seven climbing bean cultivars with two maize cultivars in simultaneously planted associations). Alajuela, Universidad de Costa Rica. Estación Experimental Agrícola Fabio Baudrit M. Boletín Técnico (et.)1:7-9. Span., Sum. Span., Engl., 7 Refs.

Phaseolus vulgaris. Zea mays. Intercropping. Cultivars. Yields. Costa Rica.

At the Fabio Baudrit Moreno exptl. station (Alajuela, Costa Rica), 3 expt. were set up: 2 with simultaneously planted maize-beans in association and 1 with monocropped beans with props. Maize cv. of different heights (Tico V-1, short; Tico H-4, tall) and 2 climbing bean cv. were used. Bean yields in association with maize were reduced in a differential manner, depending on the maize cv., from 1 to 70%. The maize cv. used showed no yield reductions as a result of their association, except for the negative effect produced by bean cv. P-18 on maize cv. Tico H-4 and that of bean cv. P-523 and P-18 on maize cv. Tico V-1. Bean cv. Alajuela 1 increased the yields of Tico H-4, and so did bean cv. Mexico 296-N with Tico V-1 yield. Bean cv. Mexico 296N and California Small Yeorder were the most productive in both association and monoculture. [AS]

0568

3620 ARIAS F., J.; SUESCUN C., J.; MUÑOZ, R. 1985. El asocio papa x fríjol arbustivo: influencia del genotipo de fríjol con tres poblaciones en su productividad. (Association potato x bush beans: influence of bean genotype with three populations on their productivity). Revista ICA 18:411-418. Span., Sum. Span., Engl., 8 Refs., Illus. [Inst. Colombiano Agropecuario, Programa de Cultivos Múltiples, Tibaitatá, Apartado Aéreo 151127, El Dorado, Bogotá, Colombia]

Phaseolus vulgaris. Solanum tuberosum. Intercropping. Dwarf beans. Planting. Spacing. Colombia.

Two expt. were carried out in La Selva (Antioquia, Colombia) during seasons A and B of 1980 to evaluate the effect of 3 different bush bean var. (Cargamanto Moche, Diacol Cafío, and line 1.203-70) on the production of the multiple cropping system potato (var. Diacol Capiro)/beans. A split plot design was used with the bean genotypes as the main plots, and the bean populations as subplots, replicated 3 times. The effect was measured by using a bush bean population of 25,000 plants/ha, planted with 2 different distributions within the potato crop, and another bean population of 50,000 plants/ha with just 1 distribution. The results of the 2 consecutive harvests did not show significant differences in the total yield of potatoes, beans, or regarding the bean populations. Bush bean av. yields were 298, 914, and 341 kg/ha for Diacol Cafío, Cargamanto Moche, and 1.203-70, resp., when grown in association with potato var. Diacol Capiro. [CIAT]

0569

3763 ARIAS F., J. 1982. Comparación de sistemas de siembra de fríjol en el arreglo maíz intercalado con fríjol arbustivo (M//Fa). Pruebas regionales 1981. [Comparison of bean planting systems in the maize/bush bean (M/BB) intercropping arrangement. 1981 Regional trials]. In _____, ed. Reunión Anual del Programa de Cultivos Múltiples, 7a., Málaga,

Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.85-88. Span. [Centro Nacional de Investigación, Programa de Cultivos Múltiples, Apartado Aéreo 151173, El Dorado, Bogotá, Colombia]

Phaseolus vulgaris. Dwarf beans. Zea mays. Intercropping. Planting. Spacing. Yields. Income. Colombia.

Bush bean var. Diacol Calima was intercropped with maize in 5 different arrangements to study their effect on yields; these were (1) and (2) 2 and 4 bean planting sites, resp., between 2 maize planting sites, (3) 2 parallel furrows of each crop, (4) 2 bean planting sites between 2 maize planting sites + 1 parallel furrow, (5) 1 parallel row of beans. The bean populations for the resp. treatments were 40,400, 80,800, 120,400, 100,600, and 60,200 plants/ha. Bean yields were low due to chrysomelid attacks (283.6, 457.8, 489.1, 450.8, and 290.5 kg/ha, resp.) but tended to increase as bean population increased. An economic analysis indicated that treatments 2 and 4 should be preferred, but treatment 2 appears more favorable to the farmer since it facilitates cultural practices. [CIAT]

0570

22741 ARIAS F., J. 1982. Evaluación del efecto de la aplicación de urea foliar en el sistema tradicional de relevo papa-maíz-fríjol. (Evaluation of the effect of applying foliar urea to the traditional potato-maize-bean relay system). In _____., ed. Reunión Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.[illegible]. Span. [Centro Nacional de Investigación, Programa de Cultivos Múltiples, Apartado Aéreo 151173, El Dorado, Bogotá, Colombia]

Phaseolus vulgaris. Relay crops. Zea mays. Solanum tuberosum. Urea. Dung. Yields. Colombia.

The effect of applying foliar urea (0, 2, 4, and 6%) to the potato-maize-climbing bean cv. ICA-Viberal relay system is evaluated. The results are only given for potato since beans and maize will be harvested in 1982. [CIAT]

0571

22753 ARIAS F., J. 1982. Evaluación del sistema yuca-maíz-fríjol. (Evaluation of the cassava-maize-bean system). In _____., ed. Reunión Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.162-165. Span. [Centro Nacional de Investigación, Programa de Cultivos Múltiples, Apartado Aéreo 151173, El Dorado, Bogotá, Colombia]

Phaseolus vulgaris. Intercropping. Zea mays. Manihot esculenta. Planting. Yields. Colombia.

An expt. was conducted in Bello (Antioquia, Colombia) in which the bush bean cv. Tone and the climbing bean cv. Liberino were intercropped (//) with cassava and maize in the following treatments: (1) monocrops of all 4; (2) cassava//Tone; (3) cassava//maize; (4) cassava//maize/Tone; (5) cassava//maize + Liberino; (6) cassava//maize + Liberino//Tone; and (7) cassava//Tone (2 plantings). In general, bush bean and climbing bean yields were reduced by 50% and by more than 50%, resp., compared with the resp. monocrops (1384 and 79% kg/ha). [CIAT]

0572

22751 ARIAS F., J. 1982. Fertilización del sistema caña tecnificada x fríjol arbustivo en el municipio de Cocorna, Antioquia. (Fertilization of technically planted sugarcane/bush beans in Cocorna, Antioquia). In _____., ed. Reunion Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.150-152. Span. [Centro Nacional de Investigación, Programa de Cultivos Múltiples, Apartado Aéreo 151123, El Dorado, Bogotá, Colombia]

Phaseolus vulgaris. Intercropping. Saccharum officinarum. Fertilizers. Dwarf beans. Yields. Colombia.

Bush bean var. Cafío and Línea 10487 were intercropped with sugarcane in Cocorná (Antioquia, Colombia) at a rate of 6 bean seeds/m. The following fertilizer treatments were applied to Cafío: 200 + 500, 400 + 500, and 400 + 0 NPK (13-26-6) and dolomitic lime/ha, resp.; only 400 + 500 kg/ha of each, resp., were applied to Línea 10487. The resp. bean yields were 250, 401, 130, and [illegible] kg/ha. Yields were rather low due to adverse rainy weather. In economic terms, it is not worth increasing the NPK rate from 200 to 400 kg/ha; however, lime should be applied. [CIAT]

0573

22749 ARIAS F., J. 1982. Influencia de la población, distribución y el genotipo de fríjol en la productividad del sistema papa x fríjol arbustivo. (Effect of bean population, distribution, and genotype on the productivity of the potato x bush bean system). In _____., ed. Reunión Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.150-152. Span. [Centro Nacional de Investigación, Programa de Cultivos Múltiples, Apartado Aéreo 151123, El Dorado, Bogotá, Colombia]

Phaseolus vulgaris. Cultivars. Solanum tuberosum. Intercropping. Planting. Spacing. Yields. Colombia.

Bush bean var. Diacol Cafío, Cargamanto Mocho, and Línea 202-70 were planted in association with potatoes at 3 bean plant densities (25,000, 50,000, and 75,000 plants/ha in arrangements of 1 x 1, 2 x 1, and 2 x 2 bean and potato plants, resp.) in eastern Antioquia, Colombia. Cargamanto Mocho outyielded Diacol Calima and the latter outyielded Línea 202-70. The highest bean yields were also obtained with the highest plant density (50,000 plants/ha), followed by 75,000 plants/ha in a 1 x 1 arrangement. The highest net returns and profitability were also obtained with Cafío and Cargamanto Mocho at the highest plant densities. [CIAT]

0574

22733 ARIAS F., J.; MOSQUERA P., G. 1982. Producción y productividad del asocio maíz x fríjol utilizando cuatro densidades de población de maíz "Sogamoceño" con tres poblaciones de fríjol "Bola Rojo". (Production and productivity of maize x beans in association using four plant densities of maize cv. Sogamoceño and three plant densities of bean cultivar Bola Rojo). In _____., ed. Reunión Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.17-21. Span. [Centro Nacional de Investigación, Programa de Cultivos Múltiples, Apartado Aéreo 151123, El Dorado, Bogotá, Colombia]

Phaseolus vulgaris. Intercropping. Zea mays. Planting. Spacing. Yields. Income. Colombia.

The production, productivity, and profitability of maize cv. Sogamoceño/ bean cv. Bola Rojo in association were measured; the crops were planted simultaneously at 4 (2, 3, 4, and 5 maize plants/site) and 3 (2, 3, and 4 bean plants/site) plant densities, resp., in all possible combinations. A disturbance seriously reduced bean yields in 1981. However, data from the 1979 expt. indicated that bean yields did not differ significantly as a result of intercropping at the various plant populations. Beans decreased maize production by 15%. The av. bean yield was 667 kg/ha. Net income/ha and land use efficiency ratios were higher for the associated system than for the resp. monocrops. Associated cropping was found highly efficient for farmers; further research is required. [CIAT]

0575

22741 ARIAS F., J., ed. 1982. Reunión Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. (Annual Meeting of the Multiple Cropping System Program, 2a., Malaga, Colombia, 1982). Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. 176p. Span., 12 Refs., Illus. [Centro Nacional de Investigación, Programa de Cultivos Múltiples, Apartado Aéreo 151123, El Dorado, Bogota, Colombia]

Phaseolus vulgaris. Intercropping. Relay crops. Zea mays. Solanum tuberosum. Saccharum officinarum. Manihot esculenta. Colombia.

The 28 papers submitted to the annual meeting (1982) of the Multiple Cropping System Program of the Institute Colombiano Agropecuario are presented; 20 refer to beans in the following multiple cropping systems: beans/maize, potato/maize/beans, maize/beans/broad beans/quinoa, tobacco/beans, potato/beans, sugarcane/beans, cassava/beans, and cassava/maize/beans, either in association, intercropped, or relayed. Individual papers are recorded in this publication under the following consecutive no.: 0569, 0570, 0571, 0572, 0573, 0574, 0582, 0583, 0584, 0585, 0586, 0593, 0594, 0595, 0596, 0597, 0598, 0604, 0605, 0606, 0607, 0608, and 0609. [CIAT]

0576

21155 CAETANO, I.F. 1983. Comportamento de cultivares de mandioca (Manihot esculenta Crantz) e de feijao (Phaseolus vulgaris L.) em plantio consorciado. (Performance of cassava and bean cultivars in association). Tese Mar.Sc. Vicosa-MG, Brasil, Universidade Federal de Vicosa. 61p. Port., Sum. Port., 21 Refs., Illus.

Phaseolus vulgaris. Cultivars. Manihot esculenta. Intercropping. Yields. Brazil.

An expt. of cassava-beans in association was conducted in Coimbra (Minas Gerais, Brazil) to evaluate 3 bean populations distributed in 1, 2, and 3 rows between the alleys of cassava. Two bean cv. (Preto Sessenta Dias 53 and Negrito 897) of different growth habit were used. The 2 bean cv. strongly competed with cassava. Bean yield increased from 17.3 to 37.9% when the cropping pattern changed, resp., from 1 to 2 and 3 rows intercropped in the alleys of cassava. [CIAT]

0577

25671 CAPINERA, J.L.; WEISSLING, T.J.; SCHWEIZER, E.E. 1985. Compatibility of intercropping with mechanized agriculture: effects of strip intercropping of pinto beans and sweet corn on insect abundance in Colorado. Journal of Economic Entomology 78(2):354-357. Engl., Sum.

Engl., 20 Refs., Illus. [Colorado State Univ., Fort Collins, CO 80523, USA]

Phaseolus vulgaris. Intercropping. Zea mays. Mechanization. Injurious insects. USA.

The potential for management of insect pest densities by regulation of crop diversity through intercropping was examined in sweet maize and pinto beans in Colorado, USA. Insect abundance was monitored in maize and beans in alternating multiple-row patterns of 1, 2, 4, 8, and 16 rows. Insect responses to intercropping treatments were variable, with positive, negative, and neutral responses observed, depending on species of insect and crop. In some cases, insect abundance was affected by strip intercropping widths of up to 8 rows, suggesting that strip intercropping may be compatible with some types of mechanized agriculture. In beans, Epilachna varivestis was strongly influenced by bean/maize diversity. [AS]

0578

24853 EDJE, O.T.; MUSHOGHO, I.E.; RAO, Y.P. 1978. Bean improvement programme: 1976/77 and 1977/78 rain-fed and 1976 irrigated crop experiments. Lilongwe, Malawi, Bunda College of Agriculture. Research Bulletin no.9. pp.76-94. Engl., Sum. Engl.

Phaseolus vulgaris. Germplasm. Cultivars. Intercropping. Zea mays. Fertilizers. Yields. Selection. Plant breeding. Pseudomonas phaseolicola. Colletotrichum lindemuthianum. Sclerotium rolfsii. Resistance. Malawi.

Results of field trials with Phaseolus vulgaris in the rainy seasons of 1976-77 and 1977-78 and the dry season of 1976 are presented. Seed yields were generally lower in 1977-78 than in 1976-77. In cv. trials the highest yields were given by cv. 1309, 125, 1250, and 1290 with 2.52, 2.27, 2.56, and 2.91 t/ha, resp. The effects of mixed cropping with maize, staking height, application of N, P, K, and S, irrigation, spacing and plant density, fungicide treatment, depodding, and defoliation are also reported. [AS (extract)]

0579

24896 FISHER, N.M.; LAYCOCK, D.; MASYANGA, B.S.F.; OWUOR, J.O. 1976. Report on mixed cropping experiments in the West of Kenya during the 1975 season. Kenya, University of Nairobi. Faculty of Agriculture. Department of Crop Science. Technical Communication no.16. 10p. Engl., Sum. Engl., 5 Refs.

Phaseolus vulgaris. Zea mays. Intercropping. Planting. Spacing. Yields. Kenya.

In trials during 1975 at 3 sites in Western Kenya (Kitale, Kakamega, and Kisii), the yield of maize grown at the recommended plant spacing was not affected by interplanting with beans or by any difference in cultural practices applied to the beans. Bean yields were small or negligeable if planted at the 1st weeding of maize and considerably lower than in pure stand when planted at the same time. Mixed beans did not give an economic response to P fertilizer applied in addition to the standard maize fertilizer. A higher density of mixed beans than that which is achieved by planting 1 row of beans between 75-cm maize rows, with seeds spaced 15 cm in the row, is not worthwhile unless the maize crop is very poor. The increase in returns to land from mixtures compared with pure stands was positive but small at the site with highest maize yields and progressively increased at sites with lower maize yields. [AS]

0580

24895 FISHER, N.M. 1975. Seasonal differences in the relative productivity of crop mixtures and pure stands at Kabete. Kenya, University of Nairobi. Faculty of Agriculture. Department of Crop Science. Technical Communication no.14. 16p. Engl., Sum. Engl., 8 Refs., Illus.

Phaseolus vulgaris. Intercropping. Zea mays. Yields. Planting. Spacing. Kenya.

The productivity of maize-bean and maize-potato mixtures in alternate rows was compared with that of pure stands of the component species during 4 cropping seasons at the Faculty of Agriculture, U. of Nairobi, Kenya. In seasons with low rainfall, the yields from the mixtures were lower than those from pure stands; however, in one exceptionally wet season a yield advantage for maize-bean mixtures was found. The poor performance of mixtures in the low rainfall seasons appeared to result from large yield reductions in maize, attributable to competition from the potato or bean. In the one high rainfall season no such reduction in maize yield occurred. The implication of these findings for mixed cropping farming system is discussed. [AS]

0581

25647 FLECK, N.G.; MACHADO, C.M.N.; SOUZA, R.S. DE 1984. Eficiencia da consorciacao de culturas no controle de plantas daninhas. (Efficiency of intercropping in weed control). Pesquisa Agropecuária Brasileira 19(5):591-598. Port., Sum. Port., Engl., 17 Refs., Illus. [Univ. Federal do Rio Grande do Sul, Faculdade de Agronomia, Caixa Postal 776, 90.000 Porto Alegre-RS, Brasil]

Phaseolus vulgaris. Intercropping. Zea mays. Helianthus annuus. Weeding. Brazil.

A field expt. was carried out in Guaíba (Rio Grande do Sul, Brazil) in 1981-82 with Phaseolus vulgaris, sunflower, and maize to compare their competitive ability against weeds when grown alone or intercropped. In general, intercropping reduced weed growth compared with that in the corresponding monocultures and gave greater soil coverage. P. vulgaris monocultures gave good soil coverage but low competitive efficiency against weeds. Sunflower was highly competitive with weeds. [Weed Abstracts]

0582

22748 FLOREZ, C.; ARIAS F., J. 1982. Control de enfermedades foliares en fríjol voluble asociado con maíz en clima medio. (Control of leaf diseases in the climbing beans x maize associated cropping system in temperate climates). In Arias F., J., ed. Reunión Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.125-128. Span.

Phaseolus vulgaris. Zea mays. Intercropping. Cultivars. Disease control. Chemical control. Yields. Colombia.

The associated cropping systems maize x climbing bean var. ICA-Viboral or Liborino received the following chemical treatments to evaluate the control of leaf diseases in the temperate zone of Bello (Antioquia, Colombia): (1) no chemical control; (2) mancozeb, 3 g/l; (3) benomyl, 0.7 g/l; (4) benomyl + chlorothalonil, 0.5 + 2 g/l; and (5) carbendazim, 4 g/l. Treatments were applied 30 days after planting and thereafter at 15-day intervals until pod yellowing. There was no definite effect of the chemical control on yields

of either bean var. ICA-Viboral yields for the resp. treatments were 280, 273, 302, 341, and 275 kg/ha (av. 296 kg/ha) and Liberino yields were 471, 418, 474, 463, and 523 kg/ha (av. 470 kg/ha). More solid conclusions will be drawn when the 2nd cycle is harvested. [CIAT]

0584

22752 FLOREZ, G. 1982. Evaluación de diferentes arreglos poblacionales de fríjol en un cultivo tradicional de yuca. (Evaluation of different bean plant population arrangements in a traditional cassava crop). In Arias P., J., ed. Reunión Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.158-161. Span.

Phaseolus vulgaris. Intercropping. Manihot esculenta. Planting. Spacing. Yields. Colombia.

Bush bean var. Placel Cafío was intercropped with cassava in 8 different spatial arrangements and plant densities. The following bean yields were obtained, in spite of the adverse rainy conditions: (1) 270 kg/ha for beans planted in islands within the cassava furrow; (2) 155 kg/ha for an arrangement similar to 1 but includity a bean furrow in the alley; (3) 160 kg/ha for a bean furrow at 40 cm from the cassava furrow; (4) 120 kg/ha for beans within the cassava row; (5) 211 kg/ha for a bean furrow in the alley; (6) 180 kg/ha for 2 bean furrows in the alley at 40 cm; (7) 495 kg/ha for 2 bean furrows in the alley and 2 transversal bean furrows; and (8) 280 kg/ha for 1 bean furrow in the alley and 1 transversal bean furrow. [CIAT]

0585

22746 FLOREZ, G.; ARIAS F., J. 1982. Evaluación de diferentes materiales de maíz en asocio con fríjol veluble de clima medio. (Evaluation of different maize varieties in association with temperate climbing beans). In Arias P., J., ed. Reunión Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.103-105. Sp .

Phaseolus vulgaris. Zea mays. Cultivars. Intercropping. Yields. Colombia.

Climbing bean var. ICA-Viboral and Liberino were planted in association with 5 different maize var. in the temperate zone of Bello (Antioquia, Colombia) to evaluate yields. Three maize plants and 2 bean plants were planted per site. The low av. yield for both bean var. of 400 kg/ha (range 309-441 kg/ha) stressed the importance of studying this system for temperate climates. [CIAT]

0586

22750 FLOREZ, G.; MUÑOZ, R.; ARIAS F., J. 1982. Fertilización del sistema caña tradicional x fríjol arbustivo en el municipio de Barbosa, Antioquia. (Fertilization of the traditional sugarcane x bush bean system in Barbosa, Antioquia). In Arias P., J., ed. Reunión Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.153-155. Span.

Phaseolus vulgaris. Intercropping. Dwarf beans. Fertilizers. Saccharum officinarum. Yields. Colombia.

Bush bean var. Cafío was intercropped with sugarcane at a plant density of approx. 50,000-60,000 plants/ha. Fertilizer treatments consisted of

10-30-10 NPK at 0, 300, 400, or 500 kg/ha, dolomitic lime at 0, 500, or 1000 kg/ha, and FYM at 0, 500, or 1000 kg/ha. The 3 or 4 mo. left after the harvesting of the sugarcane can be used for bean planting. The treatment giving the highest cost:benefit ratio (2.79) was 400 kg 10-30-10 + 500 kg dolomitic lime + 500 kg FYM/ha for a yield of 1150 kg beans/ha; however, the highest bean yield (1400 kg/ha) was obtained when 500 kg 10-30-10 + 1000 kg dolomitic lime + 500 kg FYM/ha were applied but the cost:benefit ratio was lower (2.74). [CIAT]

0586

22747 FLOREZ, C.; ARIAS F., J. 1982. Productividad de diferentes arreglos del sistema maíz y fríjol en clima medio. (Productivity of different arrangements in the maize + beans system in temperate climates). In Arias P., A., ed. Reunión Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.106-124. Span., 8 Refs., Illus.

Phaseolus vulgaris. Zea mays. Intercropping. Planting. Spacing. Cultivars. Yields. Income. Colombia.

Bush bean var. Cafío and Tone and the climbing bean var. Liborino were planted in different association and/or intercropping arrangements with maize, in the temperate zone of Belle (Antioquia, Colombia), to evaluate their productivity. The av. yield for both bush bean var. over 2 seasons was 910.3 kg/ha (range 779-1,057 kg/ha). The av. climbing bean yield over 2 seasons was 924.5 kg/ha (range 775-1087 kg/ha). Land use efficiency ratios and net incomes were higher for all multiple cropping arrangements compared with monocrops. The highest net returns were obtained when Tone was intercropped within the maize furrow + bean furrow intercropped at 15 cm of the maize furrow on both sides and when Cafío was intercropped within the maize furrow + 2 bean furrows between the maize furrow. The results indicated that small farmers are losing efficiency in productivity when maize is planted alone. [CIAT]

0587

21609 GONZALEZ M., W.; ARAYA V., R.; GONZALEZ V., F. 1985. Análisis económico de cuatro cultivares de fríjol (Phaseolus vulgaris) asociados al maíz (Zea mays) en diferentes sistemas de siembra. (Economic analysis of four bean cultivars in association with maize in different planting systems). Alajuela, Universidad de Costa Rica. Estación Experimental Fabio Baudrit M. Boletín Técnico 18(2):6-16. Span., Sum. Engl., Span., 18 Refs. [Programa de Investigación en Economía Agrícola, Estación Experimental Fabio Baudrit, Univ. de Costa Rica, Apartado 183-4050, Alajuela, Costa Rica]

Phaseolus vulgaris. Zea mays. Intercropping. Relay crops. Cultivars. Costs. Income. Yields. Costa Rica.

An economic analysis was performed on 4 bean cv. (Huetar, Prunca, Alajuela 1, and Mexico 79-3) intercropped with improved maize cv. Tico V-1 under simultaneous and relay planting systems in Grecia (Alajuela, Costa Rica). The most profitable system for subsistence farming was cv. Huetar in association and Alajuela 1 in relay planting during the same vegetative cycle of maize. For commercial crops, Huetar planted simultaneously in association with maize was the best economic alternative. [AS]

0588

21630 GONZALEZ V., E.M.; ARAYA V., R.; GONZALEZ M., W.; GALVEZ E., G. 1984. Evaluación de la asociación de dos ciclos vegetativos de fríjol

(Phaseolus vulgaris L.) con uno de maíz (Zea mays L.). (Evaluation of the association of two vegetative cycles of beans with one of maize). Alajuela, Universidad de Costa Rica. Estación Experimental Fabio Baudrit M. Boletín Técnico 17(4):1-7. Span., Sum. Engl., Span., 10 Refs.

Phaseolus vulgaris. Zea mays. Intercropping. Cultivars. Relay crops. Yields. Yield components. Costa Rica.

In Grecia, Costa Rica, 2 bean crops (cv. Huetar, Brunca, Mexico 29-N, and Alajuela 1) were tested in association with 1 vegetative cycle of maize (cv. Tico V-1, short-statured) and compared with the maize-bean association under only 1 planting cycle. The maize yield under 2 planting cycles of beans was the same when simultaneously planted in association with beans, but was 28% lower in relay planting. A differential behavior was found among bean cv. for the different planting systems. Likewise, the maize was affected by all bean cv. in simultaneous planting. Cv. Huetar was the best under simultaneous planting for its high yield and for allowing the highest maize yield. Mexico 29-N showed the highest yield under the relay planting system. [AS]

0589

24917 JEAN, G.C. 1978. Estimación del mejor arreglo espacial en la asociación de maíz (Zea mays L.) y fríjol (Phaseolus vulgaris L.) en Apodaca, N.L. (Estimate of the best spatial arrangement in the association of maize and beans in Apodaca, N.L.). Tesis Ing.Agr. Nuevo León, México, Instituto Tecnológico y de Estudios Superiores de Monterrey. 62p. Span., Sum. Span., 41 Refs., Illus.

Phaseolus vulgaris. Intercropping. Zea mays. Planting. Spacing. Yields. Mexico.

An expt. was carried out in the agricultural expt. field of the Instituto Tecnológico y de Estudios Superiores de Monterrey, under the conditions of Apodaca (Nuevo León, Mexico) to observe the performance of the bean/maize association and determine the best spatial arrangement. The following treatments were used: beans and maize planted in monocrop; complete maize furrow alternated with 1 of beans; intercropped furrow with 1 maize and 1 bean plant; intercropped furrow with 2 maize plants/1 bean plant; intercropped furrow with 1 maize plant/2 bean plants. Var. used were NVLS-1 dwarf (maize) and Delficia 71 (beans). In the association treatments with plants intercropped in the same furrow, maize was found to reduce yields of associated beans in direct relation to the % of the population it occupies in the field. It was observed that bean yield is related to the no. of pods/plant, being constant the av. no. of grains/pod and its apparent density. The greatest economic benefit was obtained from beans in monocrop. There is evidence that the association in complete furrows with dwarf maize is more productive than the association intercropped in the same furrow. [AS (extract)-CIAT]

0590

23427 LEPIZ I., R. 1978. La asociación maíz-fríjol y el aprovechamiento de la luz solar. (Maize, beans in association and the utilization of sunlight). Tesis Doctor en Ciencias. Chapingo, México, Secretaría de Agricultura y Recursos Hidráulicos. 335p. Span., Sum. Span., 86 Refs., Illus.

Phaseolus vulgaris. Intercropping. Zea mays. Spacing. Planting. Yields. Mexico.

Seven bean/maize expt. were conducted to search for improved light use efficiency in the system by (1) identifying var. combinations of both species with increased intercropping ability and min. mutual interference for light utilization, (2) testing maize spatial arrangements for better light penetration, (3) determining critical periods for light competition in both species, and (4) determining the efficiency of the system to use the available light compared with the monocrops. The best intercropping ability, less interference for light, and highest yields were obtained with semiclimbing bean Negro 150/early maturing maize H-28 of intermediate height. Light interception was higher in associations than in monocrops. Due to reductions in light intensity at lower canopy strata, grain yields are reduced in associations. The LER and economic returns were higher for the associations. The best maize spatial arrangement for increased light penetration was 4 plants/site, 160 cm between planting sites and 80 cm between rows, and beans between maize planting sites. The critical period in which bean yields were more affected by maize regarding light intensity was between late flowering and 20 days later. [CIAT]

0591

22515 MACHADO, C.M.N.; FLECK, N.G.; SOUZA, R.S. DE 1984. Eficiencia na utilizacao da terra e rendimentos das culturas em consorcio. (Land use efficiency and yields of associated crops). Pesquisa Agropecuária Brasileira 19(3):317-327. Port., Sum. Port., Engl., 20 Refs., Illus. [Univ. Federal do Rio Grande do Sul, Faculdade de Agronomia, Caixa Postal 776, 90.000 Porto Alegre-RS, Brasil]

Phaseolus vulgaris. Zea mays. Helianthus annuus. Intercropping. Yields. Fertilizers. N. Weeding. Brazil.

A field expt. evaluating dry beans, maize, and sunflower in monoculture or intercropped in pairs was conducted during the 1981-82 growing season at the U. Federal do Rio Grande do Sul in Guaíba, Brazil. The land use efficiency of monocrops and intercrops was compared and the individual performance of crop species when submitted to interplant competition was evaluated. All the cropping systems, sown on the same date, were submitted to 2 levels of N fertilization (0 and 80 kg/ha) and to 2 weed control practices (with and without hoeing). The LERs were higher for the intercropping systems. Sunflower was highly competitive when associated with beans or maize. The response of dry beans to N fertilizer and to weed control was higher when intercropped with maize than when associated with sunflower. [AS]

0592

25873 MALDONADO M., S.I.; MARTINEZ T., E.A. 1984. Evaluación agronómica del sistema caña de azúcar (Saccharum officinarum L.) asociado con leguminosas de grano, fríjol común (Phaseolus vulgaris L.), caupí (Vigna unguiculata Walp.) y soya (Glycine max L.). [Agronomic evaluation of the sugarcane/grain legume (beans, cowpeas, and soybeans) associated cropping system]. Revista Tikalia 3(2):24-35. Span., 11 Refs., Illus.

Phaseolus vulgaris. Intercropping. Saccharum officinarum. Yields. Guatemala.

An expt. was conducted to evaluate the competitive effect of grain legumes (beans, cowpeas, soybeans) on sugarcane yields and the economic feasibility of the sugarcane/grain legume associated cropping system for intermediate and small farmers in Guatemala. Nine treatments were evaluated, among which 3 included beans as follows: sugarcane/bean var. Suchitan, sugarcane/bean var. Tamazulapa, and monocropped bean var. Suchitan. No significant

differences were found between sugarcane yields in the various treatments, but they were highest with Tamazulapa beans (66 t/ha). The % increase over monocropped sugarcane was 17 and 6% for Tamazulapa and Suchitan beans, resp. Suchitan bean yields were similar in monoculture and in associated cropping (417 and 477 kg/ha, resp.). The LER for sugarcane/Suchitan beans was 2.20. The lowest net incomes were obtained with beans since chemical disease control increased production costs. [CIAT]

0593

22754 MONSALVE V., O.; ARIAS F., J. 1982. Efectos de la asociación maíz-fríjol arbustivo sobre los rendimientos y otras características de las especies. (Effects of maize-bush bean association on yields and other characteristics of the species). In Arias F., J., ed. Reunión Anual del Programa de Cultivos Múltiples, 7a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.166-172. Span., Illus. [Centro Nacional de Investigación, Programa de Cultivos Múltiples, Apartado Aéreo 151123, El Dorado, Bogotá, Colombia]

Phaseolus vulgaris. Intercropping. Dwarf beans. Cultivars. Zea mays. Planting. Spacing. Weeds. Yields. Yield components. Colombia.

The effect of associating maize and bush beans on yield, yield components, and other agronomic characteristics of bush bean var. ICA-Tundama and Diacol Andino in Simijaca (Cundinamarca, Colombia) was studied. The green beans yielded 2.40 and 1.05 t/ha, resp. To evaluate the effect of the shade of maize plants on bean yields, other parameters were measured: plant height, no. of pods/plant, and wt. of 100 grains. These values were, resp., 50 cm, 9.0, and 269.4 g for ICA-Tundama, and 50 cm, 5.2, and 317.2 g for Diacol Andino. The av. no. of pods/plant was the parameter that affected green bean yields the most. [CIAT]

0594

22734 MONSALVE V., O.; ARIAS F., J. 1982. Evaluación agronómica de algunas variedades de fríjol voluble en el asocio tradicional con maíz del altiplano cundiboyacense. (Agronomic evaluation of some climbing bean varieties in the traditional associated cropping system with maize used in the Cundiboyacense altiplano). In Arias F., J., ed. Reunión Anual del Programa de Cultivos Múltiples, 7a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.22-25. Span. [Centro Nacional de Investigación, Programa de Cultivos Múltiples, Apartado Aéreo 151123, El Dorado, Bogotá, Colombia]

Phaseolus vulgaris. Climbing beans. Intercropping. Zea mays. Cultivars. Adaptation. Colletotrichum lindemuthianum. Fromyces phaseoli. Resistance. Selection. Yields. Colombia.

Seven local bean var. from Antioquia, 2 from Nariño, 2 from Cundinamarca, and 5 promising lines from the bean program of the Instituto Colombiano Agropecuario (Colombia) were evaluated in association with maize to identify higher yielders with resistance to diseases (i.e., Colletotrichum lindemuthianum and an unidentified pathogen that causes a severe disturbance). The disturbance was not observed in var. Liborino Enredadera, Cargamanto Bala, and Pero (intermediate growth cycle); this latter var. was considered the most adequate for association with maize and gave the highest yields (712 kg/ha). [CIAT]

0595

22738 MUÑOZ, E.; SUESCÚN, J. 1982. Efecto de la fertilización en el sistema de siembra en relevo papa, maíz, fríjol voluble, en suelos del

oriente antioqueño. (Effect of fertilization on the potato-maize-climbing bean relay system in soils of eastern Antioquia). In Arias F., J., ed. Reunión Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.47-46. Span.

Phaseolus vulgaris. Fertilizers. Relay crops. Zea mays. Climbing beans. Yields. Solanum tuberosum. Colombia.

The effect of fertilization (10-30-10 NPK + B + lime + FYM) on yields of the relay system potato-maize-climbing bean var. ICA-Viboral was evaluated at 3 locations in eastern Antioquia (Colombia) during 3 cropping cycles from 1979 to 1981. Results are reported only for La Selva and La Unión. The highest bean yields in La Selva in 1979 and 1980 were 3.10 and 0.90 t/ha, resp., with 400 kg NPK + 30 kg B + 4 t lime + 2 t FYM/ha. In 1981, at both sites, the highest yields were 1.90 and 1.75 t/ha with 600 kg NPK + 2 t FYM/ha, suggesting a positive response of beans to both organic and chemical fertilization. However, the results indicate that by fertilizing potatoes at 100 kg NPK in the relay system, there is sufficient residual effect to support adequate bean yields. [CIAT]

0596

22732 OBANDO G., L.; ARIAS F., J. 1982. Descripción de los principales sistemas de cultivos múltiples en el departamento de Nariño. (Description of main multiple cropping systems in the department of Nariño). In Arias F., J., ed. Reunión Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.1-16. Span., Sum. Span., 2 Refs., Illus. [Programa de Cultivos Múltiples, Inst. Colombiano Agropecuario, Centro Regional de Investigación Obonuco, Apartado Aéreo 339, Pasto, Colombia]

Phaseolus vulgaris. Cultivation systems. Intercropping. Zea mays. Cultivars. Planting. Vicia faba. Spacing. Colombia.

The different bean cropping systems used by farmers in the dept. of Nariño, Colombia, are described and analyzed in order to increase crop benefits. In cold climates, the maize x climbing bean system is predominant, and in many cases other crops such as broad bean and quinoa are added. In the intermediate, warm zone a complex of systems is found due to the great diversity of crops in the region; however, the beans/maize system is considered as dominant and to a lesser degree, peanuts/maize. All of these systems are practiced in a traditional way and with inadequate technology. [AS-CIAT]

0597

22742 OBANDO G., L.; ARIAS F., J. 1982. Evaluación agroeconómica del sistema maíz x fríjol voluble // haba // quinua. (Agroeconomic evaluation of the maize x climbing beans association system intercropped with broad beans and quinoa). In Arias F., J., ed. Reunión Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.54-77. Span., 4 Refs. [Programa de Cultivos Múltiples, Inst. Colombiano Agropecuario, Centro Regional de Investigación Obonuco, Apartado Aéreo 339, Pasto, Colombia]

Phaseolus vulgaris. Vicia faba. Zea mays. Intercropping. Production. Yields. Economics. Costs. Income. Colombia.

An agroeconomic evaluation was conducted of the maize x climbing bean cv. Mortiño associated cropping system intercropped (//) with broad beans and

quinoa. Maize x beans were planted at 1 x 1 m spacings, with broad beans between maize x beans and quinoa every 5 spacings in furrows across the maize x beans association. Bean yields were reduced from 2387 kg/ha in the monocrop to 712, 625, and 383 kg/ha in the beans x maize, beans x maize//broad beans, and beans x maize//broad beans//quinoa cropping systems, resp. Duncan's test indicated that the best treatments in terms of production were monocropped beans and maize x beans//broad beans. The high profitability of the maize x beans//broad beans and maize x beans systems (148 and 141%, resp.) indicated that these were the best treatments and most recommendable. The land use efficiency ratio also indicated that the best system was maize x beans//broad beans (1.5). [CIAT]

0598

22744 OBANDO G., L.; ARIAS F., J. 1982. Evaluación del sistema maíz//fríjol arbustivo en el departamento de Nariño. (Evaluation of the maize/bush beans intercropping system in the department of Nariño). In Arias F., J., ed. Reunión Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.89-92. Span. [Programa de Cultivos Múltiples, Inst. Colombiano Agropecuario, Centro Regional de Investigación Obonuco, Apartado Aéreo 339, Pasto, Colombia]

Phaseolus vulgaris. Dwarf beans. Zea mays. Intercropping. Yields. Colombia.

An expt. was conducted in farmers' field in Taminango (Nariño, Colombia) to evaluate the performance of the maize/bush beans intercropping system traditionally used in the region. Bush bean var. Calima was intercropped with maize var. Clavo and ICA V-303, and the following treatments were applied: (1) fertilization (200 kg 10-30-10 NPK/ha) + disease and pest control (seed treated with carboxin, carbofuran at 20 kg/ha, and 4 applications of benomyl + methomyl each at 200 g/ha); (2) only fertilization; (3) only disease and pest control; and (4) a check with no fertilization nor chemical control. Beans responded significantly to fertilization and chemical control, yielding 707.07, 161.61, 272.73, and 60.00 kg/ha for treatments 1, 2, 3, and 4, resp., with maize var. Clavo, and 830.0, 247.5, 385.7, and 235.2 kg/ha for treatments 1, 2, 3, and 4, resp., with maize var. V-303. Thus soil fertility, pests, and diseases appear as major factors affecting bean yields in the region. High populations of cicadellids and chrysomelids were observed causing severe damage as well as diseases caused by Fusarium sp., Rhizoctonia, Colletotrichum lindemuthianum, Thanatephorus cucumeris, Isariopsis griseola, and Phoma sp. [CIAT]

0599

22971 PEREZ T., H. 1975. Comparación de rendimientos económicos en asociación maíz-fríjol. (Comparison of the economic yields in the association maize-beans). Tesis Ing.Agr. Jalisco, México, Universidad de Guadalajara. 55p. Span., Sum. Span., 19 Refs.

Phaseolus vulgaris. Intercropping. Zea mays. Yields. Income. Mexico.

An expt. was undertaken in exptl. fields of the Escuela Agrícola of the U. de Guadalajara, Mexico, to compare the economic yields of the association maize-beans. It was concluded that the association maize-beans represents one of the best alternatives for the farmers. [AS (extract)-CIAT]

0600

22525 RAMALHO, M.A.P.; SILVA, A.F. DA; AIDAR, H. 1984. Cultivares de milho e feijao em monocultivo e em dois sistemas de consorciacao.

(Maize and bean cultivars in monoculture and in two intercropping systems). Pesquisa Agropecuária Brasileira 19(7):827-833. Port., Sum. Port., Engl., 19 Refs. [Centro Nacional de Pesquisa de Milho e Sorgo, Caixa Postal 151, 35.700 Sete Lagoas-MG, Brasil]

Phaseolus vulgaris. Intercropping. Zea mays. Yields. Brazil.

In an expt. conducted in Sete Lagoas (Minas Gerais, Brazil) in 1981-82, 3 maize cv. (Cargill, Ag 301, and Ag 351) and 9 bean var. (Carioca, Rio Tibagi, Rico-23, Diacol Calima, Goiano Precoce, CNF 610, Venezuela 350, IPA 7419, and Rosinha G-2) were evaluated in 2 intercropping systems in which maize and beans were planted simultaneously and in monoculture. One system consisted of maize and beans sown alternately in the same row and the other of alternate rows of maize and beans. Regardless of maize or bean cv. or sowing system, intercropping reduced bean seed yields by 58% compared with monoculture (range 42% in cv. IPA 7419 to 68% in cv. Goiano Precoce and Rosinha G-2). Correlation coefficient of av. growth of bean cv. as intercrops and in monoculture was low (r = 0.4) suggesting a possible interaction between bean cv. and cropping systems. No significant interactions were noted between bean and maize cv. or between maize cv. and cropping syster. The most efficient maize cv. for intercropping was Ag 301. [Field Crop Abstracts]

0601

25879 REIS, W.P.; RAMALHO, M.A.P.; CRUZ, J.C. 1985. Arranjos e populacoes de feijoeiro na consorciacao com o milho. (Spacings and populations of beans in association with maize). Pesquisa Agropecuária Brasileira 20(5):575-584. Port., Sum. Port., Engl., 41 Refs.

Phaseolus vulgaris. Intercropping. Zea mays. Planting. Spacing. Yield components. Yields. Brazil.

Two expt. were carried out in Sete Lagoas and Lavras (Minas Gerais, Brazil) during the 1982-83 growing season to evaluate new planting patterns for maize and beans in association. The evaluated treatments involved 3 maize row spacings (0.5, 1.0, and 1.5 m) for a constant population of 40,000 plants/ha, combined with 2 bean populations (100,000 and 200,000 plants/ha) with 3 planting systems: within the rows, between the rows, and both within and between the rows of maize. Results showed that increased row spacing of maize had no effect on the grain yield of the crops. There was no significant effect between the bean planting systems. Planting beans within the maize rows is more advantageous due to ease of management. The highest bean plant density gave better productivity, and there was no effect on maize grain yield. The competition effect reduced bean grain yield by 39%, and pod no. was the primary component of grain production most affected because of the reduction of the no. of flowers; the yield from the floral stage was also affected. [AS]

0602

22974 RIVERA N., L.A. 1976. Ensayo de asociación maíz-frijol en la zona temporalera de El Llano, Ags. (Maize-beans association trial in the rainfed zone El Llano, Ags.). Tesis Ing.Agr. Jalisco, México, Universidad de Guadalajara. 39p. Span., Sum. Span., 18 Refs., Illus.

Phaseolus vulgaris. Intercropping. Zea mays. Spacing. Planting. Yields. Mexico.

An expt. was conducted in Cañada Honda (Aguascalientes, Mexico) to study the advantages of the maize-beans association compared with the resp.

monocultures and to determine the economic potential of this association. Different planting densities were used for both crops. The best treatments were 40,000 and 40,000, 20,000 and 110,000, 30,000 and 50,000, 30,000 and 110,000, and 20,000 and 50,000 maize and bean plants/ha, resp. [AS (extract)-CIAT]

0603

25604 ROSSIT, P.M.; AMBROSE, R.J.; POWER, A.G.; HRUSKA, A.J. 1984. Overyielding in polycultures of tomato and bean in Costa Rica. Tropical Agriculture (Trinidad) 61(4):208-212. Engl., Sum. Engl., 28 Refs. [Division of Biological Sciences, Univ. of Michigan, Ann Arbor, MI 48109, USA]

Phaseolus vulgaris. Intercropping. Lycopersicum esculentum. Yields. Planting. Spacing. Costa Rica.

Expt. were carried out to determine the relative yielding performance of bean cv. Mexico 80 and tomatoes in monoculture and polyculture in Costa Rica. Bean yield in monoculture was 1116 kg/ha, while in intercropping yields were 695 and 242 kg/ha for high and low population density tomato, resp. There was a nonsignificant trend towards yield greater than 50% in the polycultures, suggesting that the cropping system positively affected bean yield. [CIAT]

0604

22245 SEGOVIA S., F.; ARIAS F., J. 1982. Estudio agro-económico de tres poblaciones de fríjol arbustivo en el sistema maíz asociado con fríjol arbustivo en clima medio. (Agroeconomic study of three bush bean populations in the maize/bush beans associated cropping system in temperate climates). In Arias F., J., ed. Reunión Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.93-102. Span.

Phaseolus vulgaris. Climbing beans. Zea mays. Intercropping. Planting. Spacing. Yields. Income. Costs. Colombia.

To assess the possibility of transforming the traditional maize sole cropping system used in temperate climates in the Colombian Andean region into a maize/bean associated cropping system, an expt. was conducted in Encise (Santander, Colombia) to evaluate bush bean var. Diacol Calima and ICA-Pijao in association with maize var. Blandito Regional. Plantings consisted of 1, 2, or 4 bean plants/site in all possible combinations with 1, 2, or 4 maize plants/site, with a check (0 maize plants/site). Diacol Calima yields ranged between 90-215 kg/ha, the highest being for the combination 1 x 4 maize and bean plants, resp. ICA-Pijao yields ranged between 290-619 kg/ha, the highest being for the combination 1 x 2 maize and bean plants, resp. Multiple cropping favors maize since yields were higher than in monocrop. The highest rates of return were obtained in the combination 2 maize plants x 1 bean plant. Demonstration plots should be established in farmers' fields and expt. should be repeated with other var. [CIAT]

0605

22246 SUESCUN, J.; MUÑOZ, R.; ARIAS F., J. 1982. Evaluación agronómica de variedades nativas de fríjol voluble en el sistema maíz-fríjol en asocio, relevo y relevo post-asocio. (Agronomic evaluation of local climbing bean varieties in maize-beans in association, relay, and postassociation relay systems). In Arias F., J., ed. Reunión Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.36-37. Span.

Phaseolus vulgaris. Intercropping. Relay crops. Zea mays. Cultivars. Yields. Selection. Colombia.

The results of bean/maize cv. V-453 in association and in relay planting in La Selva (Antioquia, Colombia) with 6 local climbing bean var. (Cargamanto, Radical, Calabozo, Liborino, ICA-Viboral, Huevo de Pinche) are presented. The improved bean var. ICA-Viboral, yielding 772 and 856 kg/ha in the resp. systems, was used for comparison. The highest yield (937 kg/ha) was obtained with Calabozo in the relay system. Liborino also proved promising and yielded 905 kg/ha in association with maize. There appeared to be no incompatibilities of maize with the rest of the bean var. (Cargamanto, Radical, and Huevo de Pinche). [CIAT]

0606

22745 SUESCUN, J.; MUÑOZ, R.; ARIAS F., J. 1982. Evaluación de diferentes arreglos del sistema maíz-fríjol (voluble y arbustivo) en el oriente de Antioquia. [Evaluation of different spatial arrangements of the maize-bean (climbing and bush types) system in eastern Antioquia]. In Arias F., J., ed. Reunión Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.26-45. Span.

Phaseolus vulgaris. Cultivars. Relay crops. Intercropping. Zea mays. Yields. Income. Cost. Colombia.

The bush bean var. Cafío and the climbing bean var. ICA-Viboral were associated, intercropped, or relay planted with 2 maize var. in eastern Antioquia (Colombia) during 3 cropping cycles. Data for the 1981 cycle was not taken due to losses caused by hailstorms. Climbing beans affected maize yields more than bush beans. The highest bean yields for both climbing and bush types were obtained in monocrops (2048 and 1926 kg/ha for ICA-Viboral and 2489 and 2990 kg/ha for Cafío in the 1979 and 1980 cropping cycles, resp.) and in relay plantings (1468 and 1533 kg/ha for ICA-Viboral and 1[illegible] and 1705 for Cafío in relay with maize var. ICA V-402 and ICA V-453 in the 1979 and 1980 cropping cycles, resp.). Data on yields and land use efficiency indicate the superiority of all associated cropping systems compared with monocrops. The best results were obtained with maize intercropped with bush beans; relay with climbing beans: 1457 kg/ha for Cafío and 1714.2 kg/ha for ICA-Viboral with V-402, and 1096 and 1945 kg/ha, resp., with V-453. [CIAT]

0607

22747 SUESCUN, J.; ARIAS F., J. 1982. Evaluación de la producción de fríjol voluble (ICA-Viboral) en relación con el sistema de tutoraje de maíz empleado. [Climbing bean (ICA-Viboral) yields related to the maize prop system used]. In Arias F., J., ed. Reunión Anual del Programa de Cultivos Múltiples, 2a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.38-41. Span.

Phaseolus vulgaris. Intercropping. Zea mays. Tutoring. Yields. Colombia.

The results of 2 expt. designed to evaluate maize as a prop for climbing bean var. ICA-Viboral are presented. In expt. 1 with maize var. V-402, the following maize-based prop systems were used: T1, maize plant growing freely; T2, maize stalk cut at the height of the 1st ear; T3, maize stalk folded at an acute angle; and T4, maize stalk folded horizontally. The av. bean yields obtained in the resp. treatments were 1616, 1684, 1880, and 2104 kg/ha. Plants were more stable in T2, T3, and T4, and pod load was better distributed; leaf area was higher in T4 due to increased exposure to

sunlight. In expt. 2, T1 was discarded and maize var. V-454 was also included for comparison. Again, the horizontal folding produced the highest bean yields: 1541 and 1861 kg/ha with the resp. maize var. Both maize var. proved successful as props for beans. [CIAT]

0668

2239 FUISOY, L.; MUÑOZ, E. 1982. Influencia de la gallinaza en la producción de frijol cargamanto bajo el sistema tradicional de relevo papa-maíz-frijol. (Effect of farmyard manure on the production of cargamanto-type beans in the traditional potato-maize-bean relay system). In Arias F., J., ed. Reunión Anual del Programa de Cultivos Múltiples, 3a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.42-49. Span.

Phaseolus vulgaris. Zea mays. Solanum tuberosum. Dung. Relay crops. Yields. Colombia.

The effect of 0, 1.0, 2.0, and 2.5 t FYM/ha applied to beans in the potato-maize-climbing bean cv. ICA-Viboral relay system was studied in La Selva (Antioquia, Colombia). There was no considerable difference between 0 and 1.0, and 2.0 t FYM/ha, although bean yields increased from 919.4-1041.9 kg/ha to 1129.1 kg/ha. However, beans responded significantly to 2.5 t FYM/ha, yielding 1576.0 kg/ha and thus justifying the additional cost of the FYM. [CIAT]

0669

2240 SUISOY, L.; MUÑOZ, E. 1982. Influencia de las poblaciones en el arreglo maíz-fríjol voluble con fertilización constante por planta. (Effect of plant populations in maize-climbing beans in association with constant fertilization/plant). In Arias F., J., ed. Reunión Anual del Programa de Cultivos Múltiples, 3a., Málaga, Colombia, 1982. Trabajos presentados. Bogotá, Instituto Colombiano Agropecuario. pp.50-51. Span.

Phaseolus vulgaris. Zea mays. Intercropping. Fertilizers. Planting. Spacing. Dung. Yields. Colombia.

The effect of varying plant populations of both maize and climbing bean cv. ICA-Viboral in association was studied under constant fertilization (50 kg 10-30-10 NPK + 2 t FYM/ha) in La Selva (Antioquia, Colombia) in 1980. Bean populations were 24,000, 36,000, and 48,000 plants/ha and maize populations, 36,000, 48,000, and 60,000 plants/ha. As both populations increased, bean yields tended to decrease, with a yield lower than 412 kg/ha for the 48,000 x 60,000 bean x maize plant populations, resp. The bean yields for the rest of the combinations (24,000 x 36,000, 36,000 x 36,000, and 36,000 x 48,000 bean x maize plants, resp.) were 694, 690, and 678 kg/ha, resp. Maize yields were not affected. [CIAT]

0610

2134 TIEAHO T., J.L. 1979. Uso de mezclas de abonos orgánicos y minerales en bajas dosificaciones en la asociación maíz-fríjol de temporal. (Use of mixtures of organic and mineral manures at low rates in rainfed maize-bean association). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 94p. Span., Sum. Span., 48 Refs., Illus.

Phaseolus vulgaris. Intercropping. Zea mays. Dung. Fertilizers. Yields. Mexico.

Between 1975-77, 3 field expt. were conducted at the U. Autónoma de Chapingo, Mexico, to gather information on the use of mixtures of organic

manures (chicken, bovine, and ovine manures) and mineral fertilizers in maize (H-30) and beans (H-28, Negro 66, and Negro 150) in association. Mixtures of organic and mineral manures at low rates were more efficient than their individual application; therefore, resources are better used. [CIAT]

See also 0529 0547 0548 0672 0673 0737 0752 0755 0786 0789

005 Seed Production

0611

[illegible] MOYA, J.; FIZZORNO, P. 1984. Producción de semilla básica de fríjol (*Phaseolus vulgaris*). (Production of basic bean seed). Ciencia y Técnica en la Agricultura. Portalizas, Papa, Granos y Fibras 1(1):49-57. Span., Sum. Span., Engl., 9 Refs. [Estación Experimental de Granos El Lagunín, Ministerio de la Agricultura, La Habana, Cuba]

Phaseolus vulgaris. Seed production. Selection. Cuba.

Aspects of basic seed production, such as var. degeneration and maintenance, are discussed. Fundamental agrotechnical aspects that should be considered for the production of basic bean seed are listed and briefly analyzed. [CIAT]

See also 0547 0787

005 Varietal Trials

0612

[illegible] BUEBI, S.; GARCIA, C.M.; ARANA, E.; TRECE R., F.; MASAYA S., P.; TEMPLE, S. 1983. Resultados de los viveros de adaptación de fríjol negro y rojo sembrados en San Andrés, El Salvador; en Jutiapa, Guatemala; en Alajuela, Costa Rica; y en Valle de Zamastrán, Honduras, en septiembre, 1982. (Results of the red and black bean adaptation nurseries sown in San Andrés, El Salvador, in Jutiapa, Guatemala, in Alajuela, Costa Rica, and in the Zamastrán Valley, Honduras, in September 1982). In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 29a., Panamá, 1983. Memoria. Panamá. v.2. Sp. Span. [Inst. de Ciencia y Tecnología Agrícola, Apartado Postal 231 A, Guatemala]

Phaseolus vulgaris. Cultivars. Seed color. Adaptation. Selection. Honduras. Guatemala. Costa Rica. El Salvador.

A total of 46 black bean lines and 230 red bean lines from CIAT were evaluated to identify the best yielders to be used in future yield trials and in the evaluation for resistance. Red lines were sown in Honduras, El Salvador, and Costa Rica, and black lines were sown in El Salvador, Costa Rica, and Guatemala. Superior lines were identified in terms of yield. A list is presented which includes entry no., parents, and yields in the different localities. [CIAT]

0613

25319 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1985. Vivero Centroamericano de Adaptación y Rendimiento VICAR 1983 y 1984. (Central American bean yield and adaptation nursery, VICAR 1983 and 1984). Cali, Colombia. 89p. Span.

Phaseolus vulgaris. Cultivars. Yields. Adaptation. Uromyces phaseoli. Rhizoctonia solani. Xanthomonas phaseoli. Isariopsis griseola. Resistance. Selection. El Salvador. Costa Rica. Honduras. Nicaragua. Guatemala.

The results of the 1983 A and B and 1984 A and B Central American bean yield and adaptation nursery (VICAR) are presented. The nurseries were classified into red and black beans. The red bean 1983 A and B nurseries, composed of 12 materials and a control, were planted at 2 sites in Costa Rica, 2 in El Salvador, 1 in Nicaragua, and 3 in Honduras; yield results are detailed for 6 sites. The black bean 1983 A and B nurseries, composed of 15 materials and a control, were planted at 2 sites in Guatemala, 2 in Costa Rica, 2 in El Salvador, 3 in Honduras, and 5 in Nicaragua; yield results are detailed for 7 sites. The yields of the red bean 1984 A and B nurseries, composed of 15 materials and a control, are reported for 6 and 8 sites, resp. The reactions of the materials in the 1984 red and black nurseries to Uromyces phaseoli, Thanatephorus cucumeris, Xanthomonas phaseoli, and Isariopsis griseola are presented. [CIAT]

0614

22609 COSTA, M.S.S. DA; ALTMAYER, M.B.; PEDERZOLLI, R.C.D.; BRUSAMOLIN, E.P.; POSENATTO, E.I.; VIEIRA, S.A.; BEN, J.R. 1976. Ensaio preliminar de linhagens em rede. (Preliminary trial network of bean lines). In Reunião Técnica Anual do Feijão, 13a., Porto Alegre-RS, Brasil, 1976. Ata. Porto Alegre, Brasil, Instituto de Pesquisas Agronomicas. pp.98-101. Port.

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Brazil.

The results of the preliminary yield trials to evaluate bean lines at 3 sites in Rio Grande do Sul (Encruzilhada do Sul, Osorio, and Viamao) and 1 site in Santa Catarina (Chapeco), Brazil, in 1975, are presented. Sixteen bean lines were evaluated in 4 latin square designs using cv. 51052 as the control. The only results considered were those obtained in Encruzilhada do Sul and Osorio, since yields were too low at the other sites due to unfavorable climatic conditions. In Osorio, Preto 19 and I 100/62 outyielded the control (1113 and 1016 vs. 968 kg/ha, resp.), but in terms of relative yield, lines 51051-5-388 and I 76/62 were superior to the control. A higher incidence of Colletotrichum lindemuthianum and Xanthomonas phaseoli was commonly observed compared with that of Uromyces phaseoli. In Encruzilhada do Sul the av. yield (1321 kg/ha) was higher. Eight var. were similar in yields to the control; Turrialba 4 was 6% higher than the control (1667 vs. 1579 kg/ha, resp.). X. phaseoli was the only pathogen observed. [CIAT]

0615

22610 COSTA, M.S.S. DA; ALTMAYER, M.B.; PEDERZOLLI, R.C.D.; BRUSAMOLIN, E.P.; VIEIRA, S.A.; BEN, J.R. 1976. Ensaio regional de variedades. (Regional varietal trials). In Reunião Técnica Anual do Feijão, 13a., Porto Alegre-RS, Brasil, 1976. Ata. Porto Alegre, Brasil, Instituto de Pesquisas Agronomicas. pp.101-108. Port.

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Brazil.

The regional bean var. trials were conducted in 5 locations of Rio Grande do Sul and 7 of Santa Catarina, Brazil, in 1975-76. Sixteen bean cv. were evaluated; a combined analysis for both regions indicated that the outstanding materials were Rio Tibagi, 51052, and Carioca with 1381, 1374, and 1370 kg/ha, resp. In 2 yr of trials in the same regions, cv. Carioca and Rio Tibagi were tolerant to the most prevalent diseases, Colletotrichum lindemuthianum and Xanthomonas phaseoli, and produced av. yields of 1915 and 1911 kg/ha, resp.; therefore, both are recommended for release. [CIAT]

0616

25320 EMPRESA BRASILEIRA DE PESQUISA AGROPECUARIA. 1984. Resultados de pesquisa com a cultura do feijao em 1983. (Bean research results in 1983). Dourados-MS, Brasil, Unidade de Execucao de Pesquisa de Ambito Estadual de Dourados. Documentos, 10. 22p. Port.

Phaseolus vulgaris. Germplasm. Cultivars. Planting. Timing. Yields. Adaptation. Brazil.

The results of bean research conducted during 1983 on (1) germplasm introduction, evaluation, and utilization and (2) planting time are presented. Outstanding yielders at Unidade de Execucao de Pesquisa de Ambito Estadual (UEPAE)-Dourados were ICA Col 10103, H 754-B-5-CM (9B), PR-R-42-1, Porrillo 70, ICA Pijao, and Rio Tibagi with 1284, 1238, 1065, 1053, 1038, and 1025 kg/ha, resp. In Indapolis, the highest yielders were H 754-B-5-CM (989) and ICA Col 10103 (1927 and 1865 kg/ha, resp.). Xanthomonas phaseoli and Colletotrichum lindemuthianum were observed at both locations, in addition to Isariopsis griseola in Dourados and BGMV in Indapolis. Diabrotica speciosa and a Curculionidae were the most serious pests at both sites. Agronomic characteristics and reactions to pests and diseases are given for all 16 materials. At UEPAE-Dourados the highest av. yield (862 kg/ha) among the 4 cv. used in the expt. on planting time was obtained when plantings were conducted on May 2; in Indapolis there were no statistical differences among yields of the 4 cv. nor between both planting dates (April 19 and May 3), with av. yields of 2002 kg/ha. [CIAT]

0617

24660 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1974. Triage de variétés de haricot en culture seche et irriguee a Karama (1971-1974). [Bean varietal selection under dry and irrigated conditions in Karama (1971-74)]. Rubona. Resultats d'Essais no.1. 18p. Fr.

Phaseolus vulgaris. Germplasm. Cultivars. Selection. Dwarf beans. Climbing beans. Yields. Irrigation. Rwanda.

Recapitulative tables are presented of the selection of 121 bean var. in Karama (Rwanda) between 1971 (station A) and 1974 (station B). The trials were carried out with bush, semiclimbing, and climbing var. in lake colluvium (with and without sprinkler irrigation) or dry valley colluvium. Var. 11 was the control for the bush var. and Wulma for semiclimbing and climbing var. Under Maze conditions, the best climbing bean var. were Var. 11, Princesse Cordon, and Var. 122. Among semiclimbing and climbing bean var., Farikabarenl, Quarentino, 60-4-60, 18, 5644, Mutiki, 86, and Sabre a rames were outstanding. Under irrigated conditions, the following bush bean var. were outstanding: Main Beau Port, Coco Main Rose, Conserva Monel, 141 (Gx), Var. 122, Saxa, and Var. 11. Outstanding semiclimbing and climbing bean var. were Nyiramahoro, 18, 78, 86, Caraotas, Vera Cruz 78, 37, 10C, 15C, 54, Bayo 158, 7093, 7095, 7096, and Wulma. [CIAT]

0618

22586 LLANO G., A.; TAPIA B., H.; PELAEZ, D. 1983. Estabilidad del rendimiento de 10 variedades de frijol común rojo en 5 ambientes en Nicaragua. (Yield stability of 10 red bean varieties in five environments of Nicaragua). In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 29a., Panamá, 1983. Memoria. Panamá. v.2. 15p. Span., 5 Refs., illus. [Ministerio de Desarrollo Agropecuario y Reforma Agraria, Apartado 592, Managua, Nicaragua]

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Nicaragua.

The yield stability of 10 local bean var., improved lines, and commercial lines from different Central American countries was evaluated at 5 sites representing the most productive bean growing regions of Nicaragua. Parameters of stability, regression from deviation, and regression coefficient were calculated. The highest yields corresponded to BAT 289, Acacias 4, and Revolución 79. Var. BAT 289 performed well in all environments; Revolución 81 had an av. performance in both favorable and unfavorable environments. CIAT 1valco, Honduras 46, and Rojo Nacional were outstanding in unfavorable environments. [CIAT]

0619

22585 LLANO G., A.; TAPIA B., H.; PELAEZ, D. 1983. Estabilidad del rendimiento de 7 variedades de frijol común rojo en 6 ambientes en Nicaragua. (Yield stability of seven red bean varieties in six environments in Nicaragua). In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 29a., Panamá, 1983. Memoria. Panamá. v.2. 15p. Span. Sum. Span., 6 Refs., illus. [Ministerio de Desarrollo Agropecuario y Reforma Agraria, Apartado 592, Managua, Nicaragua]

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Germplasm. Nicaragua.

Trials were planted at 4 sites representing the most productive bean growing regions of Nicaragua, during 2 different planting seasons, to study the adaptation and yield of the 1982 IBYAN germplasm. The characteristics of the evaluated genotypes are described as a function of their stability and yield. BAT-1217 was superior at all sites, Topaz and BAT 36 showed yields higher than av. in favorable environments, and Chorotega and BAT-1192 showed lower yields at all sites. Cerovicl and BAT-1217 responded to favorable environments. [CIAT]

0620

22966 MARTINEZ H., L.H. 1977. Prueba de adaptación y rendimiento de doce variedades de frijol (Phaseolus vulgaris) en la zona de la costa del Estado de Nayarit. (Yield and adaptation trials of twelve bean varieties in the coastal zone of the state of Nayarit). Tesis Ing.Agr. Jalisco, México, Universidad de Guadalajara. 52p. Span., Sum. Span., 41 Refs., illus.

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Mexico.

An expt. was conducted at the Santiago Ixcuintla exptl. field (Nayarit, Mexico) during the winter of 1971-72 to evaluate the yield and adaptation of 12 bean var. The var. recommended preliminarily were II-407-M-M, Jamapa, 716-6-2-2-2-M, and Japonés Bola. A highly significant difference was found between var., the C.V. being equal to 16.89%. The local var. showed susceptibility to rust. [AS (extract)-CIAT]

0621

22965 MENDOZA M., C. 1974. Ensayo de rendimiento de 9 variedades de fríjol en la Península de Yucatán. (Yield trial of nine bean varieties in the Yucatan Peninsula). Tesis Ing.Agr. Jalisco, México, Universidad de Guadalajara. 49p. Span., Sum. Span., 15 Refs.

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Mexico.

An expt. was conducted during the winter cycle of 1973 at the Centro de Investigaciones Agrícolas para la Península de Yucatán (Mexico) to compare the yields of 9 bean var. (Guatemala 526, Jamapa, Guatemala 401, Veronic 2, Venezuela 63, I-65, Arribeño, I-59, and Arriaga). Based on the statistical analysis performed, the evaluated var. did not show significant differences among themselves, but according to the av., Guatemala 526 was the best and the earliest maturing var. [AS (extract)-CIAT]

0622

23889 MICHELLON, R.; HUBERT DE FRAISSE, C. 1979. Essais varietaux de haricots rouges. (Varietal trials with red kidney beans). In Institut de Recherches Agronomiques Tropicales et des Cultures Vivrieres. Rapport Annuel 1978. Saint Denis, Reunion. pp.67-68. Fr., 4 Refs.

Phaseolus vulgaris. Cultivars. Selection. Yields. Reunion.

Results are given of var. trials with dwarf and climbing red bean var. in Colimacons and Bretagne (Reunion) in 1978. The production of climbing beans in monoculture with props and phytosanitary control was not highly superior to that of dwarf beans: 863.0 kg/ha (Petit Rouge) vs. 817.2 kg/ha (Marlat). For the high alt. regions best yields were obtained at the end of the rainy season, and for the coastal regions, during the cool season. [CIAT]

0623

25876 MIER C., R. 1984. Estabilidad en rendimiento de fríjol Phaseolus vulgaris L. en la zona templada húmeda de México. (Bean yield stability in the temperate humid zone of Mexico). Agricultura Técnica de México 10(2):133-151. Span., Sum. Span., 20 Refs., Illus.

Phaseolus vulgaris. Adaptation. Cultivars. Yields. Mexico.

During 1981 the yield stability of 21 bean var. was evaluated in a uniform trial in 10 localities of the temperate humid zone of Mexico, to identify materials with overall and specific adaptation and to select those with best performance and production stability and use them as parents in breeding programs. Of 16 var. evaluated, 8 showed acceptable response in all environments studied since their estimated regression coefficient was significatively equal to the unit. Likewise, these treatments were consistent, since their response can be predicted for the localities under consideration; that is, they had a value in the regression deviation equal to 0. Five var. performed acceptably in all environments; however, they are considered undesirable because their regression deviation was higher than 0 and, thus, their performance cannot be predicted. Var. Canario Guanajuato 43 showed an acceptable response in unfavorable environments, although it also presented this inconsistency. Bayo 400 and 997-CP-73 gave an acceptable response only in favorable environments. [CIAT]

0624

22973 NAVARRO S., F.J. 1969. Prueba de adaptación y rendimiento de 12 variedades de fríjol en la zona centro del Estado de Tamaulipas.

(Adaptation and yield trials of 12 bean varieties in the central zone of the state of Tamaulipas). Tesis Ing.Agr. Jalisco, México, Universidad de Guadalajara. 84p. Span., Sum. Span., 14 Refs., Illus.

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Mexico.

An expt. was carried out in the Jimenez farming community, Mexico, to evaluate 12 bean var. for adaptation and yield under irrigated conditions. A highly significant difference was found between var., the C.V. being equal to 59.9% and the min. significant difference, 286.7 kg/ha. [AS (extract)-CIAT]

0625

24652 NYABYENDA, P.; MPABANZI, A. 1980. Resultats de deux essais comparatifs varietaux, sur haricots nains (RHC_1 77-79) et volubiles (RHC_2 77-79) a Rubona. [Results of two comparative varietal trials with bush (RHC_1 77-79) and climbing (RHC_2 77-79) beans in Rubona]. Rubona, Institut des Sciences Agronomiques du Rwanda. Resultats d'Essais no.5. 17p. Fr., 3 Refs., Illus.

Phaseolus vulgaris. Cultivars. Adaptation. Dwarf beans. Climbing beans. Yields. Rwanda.

During 1977-78 a trial with bush beans was carried out at the Rubona Station (Rwanda) to find higher yielding var. than var. Saxa and without threshing problems. Var. Emma and Munyu outyielded Bataaf, and Caru 3 was equivalent to Bataaf. Var. Emma presented a high protein content, earliness, and resistance to cryptogamic diseases and to lodging, in addition to good seed size and color. However, it adapted better to good soils than to poor soils. In another similar trial with climbing var., 8 var. of different phenotypic characteristics were compared to identify a higher yielding var. than var. 54. Var. Gisenyi 1 was statistically superior to the check with 1939, 656, 1502, and 1376 kg/ha for 4 cropping seasons. Var. Gisenyi 2 was also outstanding. [CIAT]

0626

22574 PANIAGUA G., C.V.; MATEO, M. DE J. 1983. Vivero interdisciplinario y multi ugar de adaptación de líneas avanzadas de habichuelas en República Dominicana. (Interdisciplinary and multilocational adaptation nursery of advanced snap bean lines in Dominican Republic). In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 29a., Panamá, 1983. Memoria. Panamá. v.2. 10p. Span., Sum. Span., 3 Refs. [Apartado 213, San Juan de la Maguana, República Dominicana]

Phaseolus vulgaris. Cultivars. Snap beans. Plant introductions. Agronomic characters. Resistance. Uromyces phaseoli. Bean golden mosaic virus. Yields. Adaptation. Dominican Republic.

Two advanced trials were sown at 2 localities of the San Juan de la Maguana Valley (Dominican Republic) to compare improved snap bean lines and var. from Puerto Rico, Nebraska and Michigan (USA), CIAT, and local checks. The genotype was studied for various agronomic characteristics and reaction to diseases. BAT-1274 and BAT 271 showed the highest seed wt. Bean rust was present in all the lines, including the previously resistant B-190. This disease developed to a lesser extent in the Dominican lines Pompadour and Constanza; MITA B-190, BAT-1274, A-193, and BAT-271 showed less than 5% rust infection; Pinto 1 and Venezuela 44 (both susceptible) showed less than 25% leaf infection. All the lines presented infection by BGMV. [CIAT]

0627

25805 RAMIREZ G., D.; DESSERT, M. 1984. Evaluación del potencial genético en habichuela. (Evaluation of the genetic potential of snap beans). Acta Agronomica 34(1):14-20. Span., Sum. Span., Engl., 9 Refs.

Phaseolus vulgaris. Snap beans. Cultivars. Adaptation. Yields. Colombia.

An expt. was carried out in Palmira, Saladito, and Popayán (Colombia) to evaluate the yield and adaptation of 15 snap bean accessions and a local check (Blue Lake). A randomized complete block design with 3 replications was used at each location. Snap bean accessions Meteor, Top Crop, Bountiful, and True Green had the earliest pod set at all 3 locations. Accessions Habichuela 2234, Blue Lake, True Green, Bountiful, and Tender Long gave the highest yields with 8876, 6104, 3173, 3087, and 3002 kg/ha, resp. Under Palmira conditions, the accessions Habichuela 2234, Blue Lake FM 1, Bountiful, and True Green were the best adapted; in Saladito, Blue Lake, Habichuela 2234, True Green, and Wavero; and in Popayán, Blue Lake, Stringless Blue Lake, Bountiful, and Tender Long. [CIAT]

0628

22937 REYES G., J. 1977. Prueba de adaptación y rendimiento de 49 variedades de fríjol (Phaseolus vulgaris L.) en Gral. Escobedo, N.L. ciclo tardío 1976. (Adaptation and yield trials with 49 bean varieties in Gral. Escobedo, N.L. late cycle 1976). Tesis Ing.Agr. Monterrey, México, Universidad Autónoma de Nuevo León. 85p. Span., Sum. Span., 22 Refs.

Phaseolus vulgaris. Cultivars. Yields. Yield components. Adaptation. Mexico.

An expt. was carried out at the agricultural exptl. field of the U. Autónoma de Nuevo León, Mexico, to evaluate the performance of 49 bean var. The following data were recorded: plant height, no. of seeds/pod, no. of pods/plant, height of the 1st pod, damage by frost, pests, diseases, and yield. The highest yield was obtained with var. Lef-1-RB. All the independent variables showed a highly significant correlation. The multiple regression analysis indicated that yield is determined by the no. of pods/plant and plant height. [AS (extract)-CIAT]

0629

22153 SALMERON E., J. 1979. Evaluación de la adaptación de 25 genotipos de fríjol (Phaseolus vulgaris L.) provenientes de diferentes orígenes, en el Valle de Iguala Gro. (Evaluation of the adaptation of 25 bean genotypes of diverse origin, in the Iguala Gro. Valley). Tesis Ing.Agr. Guerrero, México, Instituto Superior Agropecuario Autónomo del Estado de Guerrero. 87p. Span., Sum. Span., 34 Refs., Illus.

Phaseolus vulgaris. Genotypes. Adaptation. Plant habit. Yields. Mexico.

Twenty-five bean genotypes with different growth habits, obtained from CIAT and the Instituto Nacional de Investigación Agrícola (INIA), were evaluated at the exptl. field of the Instituto Superior Agropecuario Autónomo del Estado de Guerrero, Mexico, to determine their adaptation and yield under irrigated conditions. The genotypes with the highest yields were 5105i, PI 313-624, PI 309-804, ICA Pijao, and Venezuela 2 (from CIAT), followed by genotypes Villa Gre-1 and Jamapa (from INIA). Through regression techniques, it was determined that the no. of pods/m² is the component that influences yield the most. [AS (extract)-CIAT]

0630

25615 SIVIERO, M.E.; MELHORANCA, A.L.; LEAL, J.A. 1985. Comportamento de cultivares e linhagens de feijao (Phaseolus vulgaris L.), safra da seca de 1980 a 1984, em tres municipios do Mato Grosso do Sul. (Performance of bean lines and cultivars during the dry seasons of 1980-84 in three municipalities of Mato Grosso do Sul). Dourados-MS, Brasil, Empresa Brasileira de Pesquisa Agropecuária. Unidade de Execucao de Pesquisa de Ambito Estadual de Dourados. Comunicado Tecnico no.22. 8p. Port., 3 Refs. [Unidade de Execucao de Pesquisa de Ambito Estadual de Dourados, Caixa Postal 661, 79.800 Dourados-MS, Brasil]

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Brazil.

A total of 15 bean lines and cv. were compared with the local check Carioca at Unidade de Execucao de Pesquisa de Ambito Estadual in Dourados, Fatima do Sul, and Indapolis (Mato Grosso do Sul, Brazil) for performance (yields and reaction to Uromyces phaseoli, Colletotrichum lindemuthianum, Isariopsis griseola, and Xanthomonas phaseoli) from 1980 to 1984. The analysis of the results obtained during the period indicated that the outstanding lines were CNF 0010, ICA Col 10103, H 753-B5-CM (9B), and H 753-7-CM (7B). Bean yields for all cv. in Dourados ranged between 739-1192 kg/ha, in Fatima do Sul between 1187-1566 kg/ha, and in Indapolis between 1216-1927 kg/ha. Leaf disease ratings in Dourados are given for all cv. [CIAT]

0631

25177 SIVIERO, M.E.; MELHORANCA, A.L.; LEAL, J.A. 1985. Ensaio preliminar de rendimento de feijao (Phaseolus vulgaris L.) grupo Mulatinho, na UEPAE de Dourados, em 1984. [Preliminary bean (mulatinho group) yield trial at UEPAE, Dourados, in 1984]. Dourados-MS, Brasil, Empresa Brasileira de Pesquisa Agropecuária. Unidade de Execucao de Pesquisa de Ambito Estadual de Dourados. Comunicado Tecnico no.20. 9p. Port. [Unidade de Execucao de Pesquisa de Ambito Estadual de Dourados, Caixa Postal 661, 79.800 Dourados-MS, Brasil]

Phaseolus vulgaris. Cultivars. Yields. Germplasm. Selection. Adaptation. Brazil.

At Unidade de Execucao de Pesquisa de Ambito Estadual (Dourados, Brazil) 100 bean lines and cv. were evaluated in 1984, in the 1st preliminary bean (mulatinho group) yield trial, compared with the check cv. Carioca. Data for each germplasm material are presented for yields, days from plant emergence to flowering, to pod set, and to physiological maturity, plant height, guide shoots, flower color, and incidence of pests and diseases. For each material ratings are given for leaf diseases caused by Uromyces phaseoli, Colletotrichum lindemuthianum, Isariopsis griseola, and Xanthomonas phaseoli. Bean lines and cv. selected for their good yields and agronomic characteristics, and promoted for the 1985 bean yield regional trials, were Carioca 80, Aroana 80, A 281, A 255, Cultivar 7310, Cultivar 1055, BAT 332, IPA I, MD 93, A 245, A 249, A 372, JALO EEP 558, A 338, A 351, EMP 117, A 250, A 242, Cultivar 7012, BAT 336, Rico Pardo 896, A 62, A 282, A 295, A 294, A 241, A 352, A 377, Cultivar 6191, A 268, A 353, and A 75. [CIAT]

0632

25442 SIVIERO, M.E.; MELHORANCA, A.L.; LEAL, J.A. 1985. Ensaio preliminar de rendimento de feijao (Phaseolus vulgaris L.) grupo Roxo-Rosinha, na UEPAE de Dourados, em 1984. [Preliminary bean (red-pink group) yield trial at UEPAE, Dourados, in 1984]. Dourados-MS, Brasil, Empresa

Brasileira de Pesquisa Agropecuária. Unidade de Execucao de Pesquisa de Ambito Estadual de Dourados. Comunicado Tecnico no.19. 6p. Port. [Unidade de Execucao de Pesquisa de Ambito Estadual de Dourados, Caixa Postal 661, 79.800 Dourados-MS, Brasil]

Phaseolus vulgaris. Cultivars. Yields. Uromyces phaseoli. Colletotrichum lindemuthianum. Isariopsis griseola. Xanthomonas phaseoli. Resistance. Selection. Brazil.

Forty-nine bean lines and cv. were evaluated at Unidade de Execucao de Pesquisa de Ambito Estadual (Dourados, brazil) in 1984, in the 1st preliminary bean (red-pink group) yield trial, compared with the check cv. CNF 0010. Data for each germplasm material are presented for yields, days from plant emergence to flowering, to pod set, and to physiological maturity, plant height, guide shoots, flower color, and incidence of pests and diseases. For each mater al ratings are given for leaf diseases caused by Uromyces phaseoli, Colletotrichum lindemuthianum, Isariopsis griseola, Xanthomonas phaseoli, and BCMV. Bean lines and cv. selected for their good yields and agronomic characteristics, and promoted for the 1985 bean yield regional trials, were LPM 10092, IAIO EEP 896, LPM 10100, BAT 1512, BAT 1458, BAC 57, BAT 1550, LPM 10033, BAT 258, BAT 363, BAT 614, Roxao RG, LPM 10034, BAC 37, IPA 74-19, and LPM 30013. [CIAT]

0633

26024 VERMEULEN, J. 1983. The effects of disease-control, fertility and density on a traditional and an improved variety of bush beans (Phaseolus vulgaris L.) in farmers' fields of Nariño, Colombia. Ing.Thesis. Netherlands, Agricultural University Wageningen. 60p. Engl., Sum. Engl., 32 Refs., Illus.

Phaseolus vulgaris. Cultivars. Fertilizers. Disease control. Cultivation systems. Planting. Spacing. Transfer of technology. Yields. Economics. Colombia.

Exploratory trials were conducted on 5 farms in the areas of El Tambo and Funes (Nariño, Colombia) to identify for each area which of 4 factors (disease control, fertilizer, plant density, var.) limited bean production. Three factors at 2 levels, disease control, fertilizer, and plant density, were tested on traditional (Limoneño) and on improved var. (BAT 1235 and Ancash 66). Each trial was planted according to the predominant cropping system of each region. Field data were taken during the growing season and bean yield after harvest. Not only was a statistical analysis conducted for each farm on the basis of a split plot design, but also a preliminary economic evaluation of all 16 treatments for each region in order to make agronomical yield data more valuable. The plant density factor was not positive but rather negative, economically as well as agronomically, for all var. in both El Tambo and Funes. However, fertilizer alone or higher disease control alone was most profitable, economically and agronomically, although a combination of both factors was equally desirable in both areas. Other improved var. or further study on BAT 1235 might be desirable in El Tambo in the future. There the local var. Limoneño was profitable, particularly in combination with fertilizer and higher disease control. In Funes, however, the opposite situation developed. A new improved var. introduced as Ancash 66 would be of more value. If small farmers have access to inputs and capital, this new var. will be even more profitable with a complete package of fertilizer, higher disease control, and high plant density. A general approach to future research is also described. [AS extract)]

0634

25376 VIEIRA, C.; CHAGAS, J.M.; SILVA, C.C. DA 1982. Performance of the black bean lines BAT-64 and BAT-65 in the Zona da Mata area, state of Minas Gerais, Brazil. Bean Improvement Cooperative. Annual Report 25:69-70. Engl. [Univ. Federal de Vicosa & Empresa de Pesquisa Agropecuária de Minas Gerais, 36.570 Vicosa-MG, Brasil]

Phaseolus vulgaris. Cultivars. Yields. Selection. Brazil.

Black bean lines BAT-64 and BAT-65 were outstanding among 20 lines in yield evaluations conducted in Meres (both in monocrop and in association with maize during the rainy season) and Coimbra (in monocrop during the dry season) in the Zona da Mata region (Minas Gerais, Brazil). Av. yields for the different cropping systems were 3311, 1539, and 1039 kg/ha for BAT-64 and 3073, 1567, and 1060 kg/ha for BAT-65, resp. Both lines showed resistance to Colletotrichum lindemuthianum, Uromyces phaseoli, root rot, and Empoasca kraemeri, but were somewhat susceptible to Isariopsis griseola. [CIAT]

0635

23624 VOYSEST, O.; GARCIA, J.; CRESPO, J.; MARTINEZ, N.; SANTACRUZ, D. 1982. Vivero internacional de rendimiento y adaptación de fríjol (Phaseolus vulgaris). IBYAN 1982: fríjol arbustivo. (International Bean Yield and Adaptation Nursery, IBYAN 1982: bush beans). Cali, Colombia, Centro Internacional de Agricultura Tropical. 177p. Span., Illus. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Cultivars. Plant introductions. Germplasm. Adaptation. Yields. Flowering. Seed color. Latin America. Caribbean. Africa. Asia.

The results of the IBYAN distributed in 1982 are reported. These totalled 223 expt. in 41 countries in Latin America and the Caribbean, North America, Africa, and Asia; however, data were received only from 108 expt. in 22 countries. Detailed information is given on the bean germplasm distributed, exptl. design recommended, and data collected (yield, plants harvested, days to flowering, days to physiological maturity, and reaction to diseases). Detailed results are presented grouped by color types as follows: small black beans, small red beans, intermediate and large red mottled beans, small white beans, small and intermediate cream and cream stripped beans, mulatinho (small cream beans) type beans, and carioca (small and intermediate cream stripped beans) type beans. [CIAT]

See also 0559 0561 0566 0752 0805

E00 PLANT PATHOLOGY

0636

24426 PADILLA B., F.G. 1984. Enfermedades del frejol (Phaseolus vulgaris). (Bean diseases). In Curso sobre el cultivo de frejol usando la metodología Aprender Haciendo, 1o., Pimampiro, Ecuador, 1984. Conferencias. Quito, Instituto Nacional de Investigaciones Agropecuarias. Programa de Leguminosas de la Estación Experimental Santa Catalina. pp.43-54. Span. [Depto. de Fitopatología, Estación Experimental Santa Catalina, Inst. Nacional de Investigaciones Agropecuarias, Apartado 340, Quito, Ecuador]

Phaseolus vulgaris. Symptomatology. Disease control. Fusarium oxysporum. Rhizoctonia solani. Sclerotium rolfsii. Uromyces phaseoli. Colletotrichum

lindemuthianum. Isariopsis griseola. Ascochyta phaseolorum. Ascochyta boltshouseri. Cercospora vanderisti. Erysiphe polygoni. Alternaria. Pseudomonas phaseolicola. Xanthomonas phaseoli. Xanthomonas phaseoli var. fuscans. Bean common mosaic virus. Ecuador.

Major bean diseases in Ecuador are briefly described, including symptoms and control measures for each. These include those caused by Fusarium oxysporum, Rhizoctonia solani, Sclerotium rolfsii, Uromyces phaseoli, Colletotrichum lindemuthianum, Isariopsis griseola, Ascochyta phaseolorum, A. boltshouseri, Cercospora vanderisti, Erysiphe polygoni, Alternaria spp., Pseudomonas phaseolicola, Xanthomonas phaseoli, X. phaseoli var. fuscans, and BCMV. [CIAT]

See also 0492 0526 0556 0582 0633 0740 0765 0777 0809 0813

E02 Bacterioses

0637

26004 BEAN/COWPEA COLLABORATIVE RESEARCH SUPPPORT PROGRAM. U.S.A. 1984. Biology, epidemiology, genetics and breeding for resistance to bacterial and rust pathogens of beans (Phaseolus vulgaris L.). In _____. 1984. Annual Report. 1. Technical summary. East Lansing, Michigan State University. pp.74-85. Engl.

Phaseolus vulgaris. Cultivars. Resistance. Xanthomonas phaseoli. Germplasm. Uromyces phaseoli. Agricultural projects. Dominican Republic.

The results of project activities in 1984 to (1) develop methodologies, (2) identify pathogen strain variation and resistant bean germplasm, and (3) determine genetic information and strategies that will lead to incorporation of high levels of more stable resistance to Xanthomonas, Pseudomonas, and Uromyces in the Dominican Republic are presented. General aspects of the project are discussed. Seed of the new, white-seeded, rust-resistant dry bean var. Arroyo Loro No. 1 is now available. New germplasm resistant to rust and common blight was identified and is being used in breeding programs both in the USA and Dominican Republic. Training objectives and outputs and expected short-term research outcomes are summarized. Research plans for 1985 are included. [CIAT]

0638

24904 CLINTON, P.F.S. 1961. Field recognition of plant diseases in Tanganyika. Dar es Salaam, Tanzania, Ministry of Agriculture. Bulletin no.8. 98p. Engl., illus.

Phaseolus vulgaris. Pseudomonas phaseolicola. Bean common mosaic virus. Bean yellow mosaic virus. Uromyces phaseoli. Whetzelinia sclerotiorum. Macrophomina phaseoli. Isariopsis griseola. Sclerotium rolfsii. Corynebacterium flaccumfaciens. Xanthomonas phaseoli. Etiology. Symptomatology. Disease control. Tanzania.

A list of diseases and their etiology, symptoms, and control measures for different crops in Tanganyika is presented in order to aid farmers and field officers to identify the most common diseases and their control. Diseases found attacking Phaseolus vulgaris (pages 13-21) include those caused by Pseudomonas medicaginis var. phaseolicola. Colletotrichum lindemuthianum, BCMV, BYMV, Uromyces appendiculatus, Sclerotinia

sclerotiorum, Macrophomina phaseoli, Isariopsis griseola, oily pod (unknown cause), Sclerotium rolfsii, Corynebacterium flaccumfaciens, and Xanthomonas phaseoli. Diseases found attacking P. lunatus include those caused by P. medicaginis var. phaseolicola and M. phaseoli. While P. acutifolius is a possible alternate host for several common bean diseases, no such occurrences are recorded in Tanganyika. Diseases caused by C. flaccumfaciens and X. phaseoli are described but they have not been recorded in the country. A plant disease information format, instructions on how to send diseased specimens, and a list of commercially available fungicides (with their resp. formulations and suppliers) are provided. [CIAT]

0639

25363 LEYNA, H.K.; COYNE, D.P.; SCHUSTER, M.L. 1982. Comparison of inoculation methods on leaves and pods of Phaseolus vulgaris cultivars using different isolates of Xanthomonas phaseoli (E. F. Smith). Bean Improvement Cooperative. Annual Report 25:9-10. Engl. [Univ. of Nebraska, Lincoln, NB 68583, USA]

Phaseolus vulgaris. Xanthomonas phaseoli. Inoculation. Pathogenicity. Races. Cultivars. USA.

Three methods of inoculation of Xanthomonas phaseoli on bean leaves (water-soaking, multiple needle, and razor blade-cutting) and 4 methods on pods (same as for leaves + dissecting needle) were evaluated under greenhouse conditions. Three X. phaseoli isolates (Xp-Ek-11, Xp-Br, and Xpi-UI) were used to inoculate 4 bean cv. (GN Emerson, GN 1140, GN Harris, and Charlevoix). The severity of disease reaction varied among inoculation methods, pathogenic strains, and cv. In general, when using more than 1 isolate, the multiple needle and dissecting needle techniques were more practical in evaluating cv. for leaf and pod reactions, resp. [CIAT]

0640

22522 LINDEMANN, J.; ARNY, D.C.; UPPER, C.D. 1984. Epiphytic populations of Pseudomonas syringae pv. syringae on snap bean and nonhost plants and the incidence of bacterial brown spot disease in relation to cropping patterns. Phytopathology 74(11): 1329-1333. Engl., Sum. Engl., 23 Refs., Illus. [Advanced Genetic Sciences, Inc., 6701 San Pablo Avenue, Oakland, CA 94608, USA]

Phaseolus vulgaris. Snap beans. Pseudomonas syringae. Epidemiology. Host range. USA.

Plots were established at 11 locations on a 64-km E-W transect through the major bean-growing area of central Wisconsin, USA. Bacterial brown spot disease epidemics occurred in 4 of 6 plots within and in none of 5 plots outside the bean-growing area even though the bean seed lot was naturally infested with the pathogen. Epiphytic populations of Pseudomonas syringae pv. syringae pathogenic to bean (Psb) were greater on symptomless bean leaflets and maize leaves from the bean-growing area than from portions of the transect where there was no commercial snap bean production. The pathogen was detected on hairy vetch samples from the bean-growing area only. Leaves of oak, black locust, rye, and sow thistle near commercial snap bean fields supported epiphytic populations of Psb. Differences in disease incidence on beans and differences in epiphytic populations of Psb on both host and nonhost plants in different portions of the transect are probably the result of the intensive cropping of snap beans in the central part of the transect. [AS]

0641

22512 LINDEMANN, J.; ARNY, D.C.; UPPER, C.D. 1984. Use of an apparent infection threshold population of Pseudomonas syringae to predict incidence and severity of brown spot of bean. Phytopathology 74(11):1334-1339. Engl., Sum. Engl., 16 Refs., Illus. [Advanced Genetic Sciences, Inc., 6701 San Pablo Avenue, Oakland, CA 94608, USA]

Phaseolus vulgaris. Snap beans. Pseudomonas syringae. Epidemiology. USA.

A single seed lot of snap bean was planted at 11 sites along an E-W transect in central Wisconsin, USA. Epiphytic population sizes of naturally occurring Pseudomonas syringae pv. syringae pathogenic to bean (Psb) on symptomless bean leaflets differed among these sites. Bacterial brown spot was not detected at any site at which $\log_{10}$ (epiphytic Psb population size) was less than 4.0 on every bean leaflet sampled. Thus, 10^4 colony-forming units/g of leaflet tissue may represent an apparent infection threshold population of Psb. The frequency with which Psb populations exceeded the apparent infection threshold level was estimated graphically. A model based on this frequency estimate was highly predictive of brown spot incidence 1 wk. after full flower. The presence of very high Psb populations was a more reliable predictor of disease severity than was disease incidence. The predictive model based on infection threshold is presented as preferable to models based on mean pathogen populations because infections occur on individual plant parts, rather than on some theoretical mean plant part. [AS]

0642

24793 ROBINSON, R.A. 1960. Notes on Kenya agriculture. 8. Important plant diseases. East African Agricultural Journal 25:131-146. Engl.

Phaseolus vulgaris. Uromyces phaseoli. Colletotrichum lindemuthianum. Pseudomonas phaseolicola. Ascochyta phaseolorum. Isariopsis griseola. Corynebacterium flaccumfaciens. Bean common mosaic virus. Symptomatology. Disease control. Kenya.

Approx. 300 major diseases affecting different crops in Kenya are described in table form, including symptoms, diagnosis, and control. Bean diseases described (page 134) include those caused by Uromyces appendiculatus and U. phaseolorum, Colletotrichum lindemuthianum, Pseudomonas medicaginis f. sp. phaseolicola, Ascochyta phaseolorum, Isariopsis griseola, BCMV, and Corynebacterium flaccumfaciens. [CIAT]

0643

25369 STEADMAN, J.R.; SCHWARTZ, H.F. 1982. Rust and halo blight epidemics, and the first report of bacterial brown spot in western Nebraska and eastern Colorado. Bean Improvement Cooperative. Annual Report 25:36. Engl.

Phaseolus vulgaris. Uromyces phaseoli. Pseudomonas syringae. Pseudomonas phaseolicola. Symptomatology. USA.

High incidence of Uromyces phaseoli and Pseudomonas syringae pv. phaseolicola was reported in Pinto and Great Northern bean fields in SW Nebraska and NE Colorado (USA) in 1981. Pinto beans showed other symptoms that, after isolation and tests, were found to be caused by P. syringae pv. syringae. [CIAT]

0646

25658 TURNER, J.G.; MITCHELL, R.E. 1985. Association between symptom development and inhibition of ornithine carbamoyltransferase in bean leaves treated with phaseolotoxin. Plant Physiology 79(2):468-473. Engl., Sum. Engl., 31 Refs., Illus. [School of Biological Sciences, Univ. of East Anglia, Norwich NR4 7TJ, England]

Phaseolus vulgaris. Pseudomonas phaseolicola. Toxins. Enzymes. Leaves. Chlorosis. Amino acids. United Kingdom.

The hypothesis that inhibition of ornithine carbamoyltransferase (OCTase) is the primary action of phaseolotoxin that leads to chlorosis (a symptom characterizing halo blight) is examined. Chlorotic spots appeared on the primary leaves of Phaseolus vulgaris seedlings during the 2 days following leaf prick application of a min. of 40 picomole phaseolotoxin. OCTase in extracts of the lesions was reduced to 20% or less, of the activity in controls. Four hours after the application of phaseolotoxin the concn. of free ornithine increased more than 2-fold. Chlorophyll remained at a constant level in the phaseolotoxin-treated tissue and the appearance of chlorosis was due to the increase in chlorophyll in the surrounding unaffected tissue. Clear halo symptoms developed only on primary leaves of the youngest seedlings (treated 6-7 days after germination). Lesions did not develop on primary leaves of seedlings more than 14 days old, in which the chlorophyll concn. had reached a max. OCTase also was inhibited in the symptomless tissue from older leaves treated with phaseolotoxin, but there was no accumulation of amino acids, including ornithine. A single application of 200 nanomoles arginine resulted in the complete regreening of the chlorosis caused by phaseolotoxin. Soluble protein was lower in the chlorotic tissue than in the controls, but increased to greater than the control value following the application of arginine. These results suggest that phaseolotoxin-induced chlorosis results from reduced chlorophyll synthesis that is associated with arginine-starvation in the tissue where OCTase is inhibited. [AS]

0665

25607 VALLADARES, M.; COYNE, D.P.; SCHUSTER, M.L.; HOFF, B. 1977. Reaction of Phaseolus germplasm to different strains of Xanthomonas phaseoli and X. phaseoli var. fuscans. Bean Improvement Cooperative. Annual Report 20:74-75. Engl.

Phaseolus vulgaris. Germplasm. Cultivars. Isolation. Xanthomonas phaseoli. Resistance. Pathogenicity. Crossbreeding. Inheritance. Phaseolus acutifolius. USA.

The reaction of Phaseolus germplasm to a collection of Xanthomonas phaseoli isolates from Uganda, Colombia, Brazil, and USA was investigated. Beans PI 169725, PI 197657, PI 167399, PI 163117, PI 207262, PI 325677, PI 325684, PI 325691, CS Nebr. #1 sel. 27, and Guali were included as well as P. coccineus PI 165421 and P. acutifolius Tepary and Nebr. acc #10. Great variation in the virulence of the different isolates was observed. Crosses were made between CS Nebr. #1 sel. 27 and several sources of tolerant germplasm to determine if increased levels of tolerance to the Brazilian isolate could be obtained through transgressive segregation which was identified in progeny from some crosses and will be utilized in breeding programs in South America. P. acutifolius is the most tolerant germplasm to use in a breeding program for resistance to X. phaseoli. [CIAT]

0646

25309 WAGER, V.A. 1936. Bacterial wilt and blight of French beans. Pretoria, South Africa, Department of Agriculture and Forestry. Plant

Industry Series no.14. Science Bulletin no.149. 19p. Engl., Sum. Engl., 24 Refs., Illus.

Phaseolus vulgaris. Pseudomonas phaseolicola. Symptomatology. Disease transmission. Disease control. Cultivars. Resistance. Selection. South Africa.

Symptomatology, identification of bacteria, and disease incidence of bacterial blight (Phytomonas medicaginis pv. phaseolicola) of French beans are described. Infection expt. carried out with stems, leaves, and infected seed and soil are discussed. Control measures included seed treatments and the use of disease-free seed, 2-3 yr old, and of resistant var. Thirty-three bean var. have been grown since 1933 and 3 generations of selections have been made from the best ones. The following var. have been found to be comparatively resistant and to produce marketable green beans: Magpie, Superlative, Abondant, Ne Plus Ultra, Unrivalled, Asgrow's Black Valentine, Sutton's Prince, Black Prince, Vilmorin's Dwart Lignereux, and Black Wonder. The last 4 var. mentioned are the best and conform with South African market requirements, being heavy bearers of long straight pods, and can be recommended to growers as a solution to the blight problem. The var. Black Wonder has been grown on a large commercial scale during the past 2 seasons with great success. [AS (extract)]

0645

25882 ZAPATA, M.; FREYTAG, G.F.; WHEELESS, E.E. 1985. Evaluation for bacterial blight resistance in beans. Phytopathology 75(9):1032-1039. Engl., Sum. Engl., 21 Refs., Illus. [Crop Protection Dept., Univ. of Puerto Rico, Mayagüez 00708, Puerto Rico]

Phaseolus vulgaris. Xanthomonas phaseoli. Races. Inoculation. Cultivars. Serology. Isolation. Phaseolus coccineus. Phaseolus acutifolius. Hybridizing. Resistance. Pathogenicity. Puerto Rico.

Strains of Xanthomonas isolated from Phaseolus vulgaris, P. coccineus, Vigna unguiculata, and Glycine max were differentiated according to pathogenicity and serological relationships. Each strain was inoculated on primary leaves of young plants, trifoliolate leaves on plants in the flowering stage, and on detached trifoliolate leaves and pods. Several inoculation methods were compared. Inoculations at the vegetative stage of plant development were less reliable than those at the reproductive stage. X. campestris pv. phaseoli [(X. campestris pv. phaseoli and X. campestris pv. vignicola, but not X. campestris pv. phaseoli (from P. coccineus) and X. campestris pv. phaseoli (var. fuscans)] induced symptoms during the reproductive stage only. Inoculation of detached leaves did not produce reliable results. Of various inoculation methods, the needle-scratch on pods gave the quickest and most uniform results. In early tests, field selection 235-1 from an interspecific cross (P. vulgaris x P. coccineus) and several breeding lines from Cornell showed significantly higher resistance to all pathogen strains compared with susceptible local cv. La Vega and W-117. Subsequent tests with X. campestris pv. phaseoli (var. fuscans) and X. campestris pv. phaseoli (from P. coccineus), chosen for virulence in a wide range of hosts, confirmed this high level of resistance. These highly resistant lines also showed field resistance in Puerto Rico. [AS]

0648

22582 ZAPATA, M.; FREYTAG, G.F.; LOPEZ P., J.H.; MELENDEZ, P.L. 1983. Virulencia de Xanthomonas phaseoli (E.F. Smith) Dowson y de X. phaseoli var. fuscans (Burkh.) Starr y Burkh. sobre los tejidos foliares y de la

vaina de Phaseolus coccineus L. (Virulence of Xanthomonas phaseoli and X. phaseoli var. fuscans on leaf and pod tissues of Phaseolus coccineus). In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 29a., Panamá, 1983. Memoria. Panamá. v.2. 9p. Span., 23 Refs. [Univ. de Puerto Rico, Mayagüez, Puerto Rico 00708, Puerto Rico]

Phaseolus coccineus. Xanthomonas phaseoli. Xanthomonas phaseoli var. fuscans. Pathogenicity. Leaves. Pods. Cultivars. Germplasm. Puerto Rico.

At the U. of Puerto Rico in Mayaguez, the virulence of Xanthomonas phaseoli and X. phaseoli var. fuscans was determined on leaf and pod tissues of 54 Phaseolus coccineus selections. Leaf age influenced the virulence of both pathogens. The symptoms of the 1st trifoliate leaf were more evident than those of the 3rd trifoliate leaf. X. phaseoli was significantly more virulent than X. phaseoli var. fuscans on the 1st and 3rd trifoliate leaves. However, differences were not observed regarding the virulence of these 2 agents on the pods; there was no association between the symptoms induced by the pathogens, which indicates the presence of distinct genetic factors. Resistance to both pathogens was identified. [CIAT]

See also 0504 0613 0630 0680 0738 0739 0742 0756 0764 0769 0772 0775 0776 0786

E03 Mycoses

0649

25373 AGBO, F.M.O.; WOOD, D.R. 1982. Response to white mold disease of F5 populations of dry beans in Colorado. Bean Improvement Cooperative. Annual Report 25:51-52. Engl. [Dept. of Agronomy, Colorado State Univ., Ft. Collins, CO 80523, USA]

Phaseolus vulgaris. Whetzelinia sclerotiorum. Cultivars. Yields. Resistance. USA.

Six F_5 populations derived from Pinto x Aurora beans and commercial cv. that served as controls were evaluated for yield performance under stress due to Sclerotinia sclerotiorum and in disease-free conditions. Yields with and without fungicide protection and the tolerance index are given for each F_5 population and the parental lines. At the low level of disease occurrence, the tolerance indices were relatively high (range 0.79-0.95) for all F_5 populations. Path coefficient analysis indicated that yield ability affected yield the most under disease stress, followed by disease severity. The ratio of seed wt. of diseased plant seeds:seed wt. of protected plant seeds also exerted a negative effect on yield under disease stress. Aerial infection also exerted a negative effect whereas date of maturity had no effect. [CIAT]

0650

25864 BAKER, C.J.; STAVELY, J.R.; MOCK, N. 1985. Biocontrol of bean rust by Bacillus subtilis under field conditions. Plant Disease 69(9): 770-772. Engl., Sum. Engl., 17 Refs., Illus. [United States Dept. of Agriculture, Agricultural Research Service, Plant Pathology Laboratory, Beltsville, MD 20705, USA]

Phaseolus vulgaris. Uromyces phaseoli. Disease control. Biological control. Chemical control. USA.

In field tests at Beltsville (Maryland, USA), bean rust severity was reduced at least 75% in 1982 and 1983 with 3 applications/wk. of Bacillus subtilis. Two isolates of B. subtilis were tested. Isolate PPL-3 had an inhibitory effect on yield and a stimulatory effect on plant growth. Isolate APPL-1 had no apparent effect on plant growth. In some tests, treatments with B. subtilis were more effective than the weekly application of the fungicide mancozeb. [AS]

0651

26003 BEAN/COWPEA COLLABORATIVE RESEARCH SUPPORT PROGRAM. U.S.A. 1984. Improved techniques for development of multiple disease resistance in Phaseolus vulgaris L. In _____. 1984. Annual Report. 1. Technical summary. East Lansing, Michigan State University. pp.55-63. Engl.

Phaseolus vulgaris. Resistance. Colletotrichum lindemuthianum. Isariopsis griseola. Bean common mosaic virus. Inoculation. Uromyces phaseoli. Agricultural projects. Brazil.

The results of project activities in 1984 to develop improved techniques, research strategies, and methodologies for achieving multiple disease resistance in beans in Brazil are presented. General aspects of the project are discussed. Promising results were obtained when sequential inoculations were used in the field and greenhouse, and simultaneous inoculations in the greenhouse and growth chambers, to test for multiple disease resistance. A new technique using dry rather than liquid inoculum for field inoculation of beans with Colletotrichum lindemuthianum or Isariopsis griseola was confirmed to be reliable and repeatable. The presence of strains or races of BCMV, I. griseola, C. lindemuthianum, and Uromyces appendiculatus was evaluated; all isolates of BCMV were identified as strain 1. I. griseola symptoms can now be duplicated with greenhouse or growth chamber inoculations. Training objectives and outputs and expected short-term research outcomes are summarized. Research plans for 1985 are included. [CIAT]

0652

25375 BOLAND, G.J.; HALL, R. 1982. Effect of numbers of apothecia of Sclerotinia sclerotiorum on white mold of white bean. Bean Improvement Cooperative. Annual Report 25:62-63. Engl. [Dept. of Environmental Biology, Univ. of Guelph, Guelph, Ontario, Canada N1G 2W1]

Phaseolus vulgaris. Whetzelinia sclerotiorum. Disease physiology and biochemistry. Canada.

The effect of the no. of apothecia of Sclerotinia sclerotiorum on the subsequent no. of white bean plants (var. Seafarer) infected with white mold was investigated in Guelph, Canada, in 1981. Low to moderately high regression coefficients (0.07-0.67) were obtained between no. of apothecia and disease. High regression coefficients were found between no. of apothecia on 2 date counts (July 22 and 31) and % of infected plants throughout Aug. The results suggest that most of the disease within an area of 105 m^2 was caused by apothecia that were produced in that area and which appeared before the epidemic started. [CIAT]

0653

25699 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1985. Vivero Internacional de Roya del Frijol; resultados 1983-1984. (International Bean Rust Nursery; results for 1983-84). Cali, Colombia, Documento de Trabajo no.9. 45p. Span., Engl., Illus.

Phaseolus vulgaris. Cultivars. Uromyces phaseoli. Resistance. Latin America. USA. Africa.

The results of the 1983-84 International Bean Rust Nursery (IBRN), distributed by CIAT to 40 collaborators in 24 sites of Latin America, USA, and Africa, are presented. However, results of only 12 sites are reported; 100 bean cv. were included of which 41 var. were used as monitor controls. The objectives were to (1) identify bean cv. and breeding lines resistant to a wide spectrum of Uromyces phaseoli pathogenic races, (2) detect new and more virulent race complexes, (3) identify rust differential var., (4) obtain information on rust race geographical distribution patterns, and (5) determine the stability of different types of rust resistance in time and space. The germplasm was evaluated for rust resistance from preflowering to mid-flowering and from mid-flowering to pod formation (20-40 and 40-60 days after planting, resp.). No material was found to be immune and 66% were susceptible in 1 or more sites. Fifteen materials that have exhibited resistance to rust pathotypes since 1975 are listed. Comparisons are made to illustrate the applicability of the IBRN data to study the pathogenic variability inherent in the rust fungus. [CIAT]

0654

25868 DIAZ F., A. 1985. Macrophomina phaseolina (Tassi) Goid, agente causal de la pudrición carbonosa del frijol, Phaseolus vulgaris L., en el norte de Tamaulipas. (Macrophomina phaseolina, causal agent of ashy stem blight of beans in northern Tamaulipas). Agricultura técnica en México 10(3):87-98. Span., Sum. Span., 13 Refs., Illus.

Phaseolus vulgaris. Macrophomina phaseoli. Symptomatology. Etiology. Pathogenicity. Mexico.

An expt. was carried out during 1982-83 in northern Tamaulipas, Mexico, to study symptoms of ashy stem blight, determine the causal agent, assess its pathogenicity, and study some aspects related to the physiology of the pathogen. Macrophomina phaseolina was identified as the causal agent. The greatest growth and production of fungal sclerotia was obtained in the PDA culture medium. Optimum mycelial growth was registered at a pH of 4, while production of sclerotia was the same for a pH range between 4-6. The sources of carbohydrate where the fungus developed best were dextrose, fructose, saccharose, and galactose although the max. no. of sclerotia was obtained in saccharose, followed by dextrose. [AS (extract)-CIAT]

0655

25869 EPSTEIN, L.; LACCETTI, I.; STAPLES, R.C.; HOCH, H.C.; HOOSE, W.A. 1985. Extracellular proteins associated with induction of differentiation in bean rust uredospore germlings. Phytopathology 75(9):1073-1076. Engl., Sum. Engl., 24 Refs., Illus. [Boyce Thompson Inst., Cornell Univ., Tower Road, Ithaca, NY 14853, USA]

Phaseolus vulgaris. Uromyces phaseoli. Etiology. USA.

Enzymes were used to identify extracellular polymers that may be involved in thigmodifferentiation of uredospore germlings of the bean rust fungus (Uromyces appendiculatus), which has a contact-sensitive response to the stoma, the fungal penetration site on a leaf. Stomatal recognition is followed by mitotic nuclear division and differentiation of the 1st infection structure, the appressorium. Evidence suggests that proteins in the extracellular matrix of the germ tube may be involved in the thigmotropic response. Nuclear division of germlings incubated in vitro on a normally inductive scratched surface was significantly reduced by 500

micrograms of either pronase E or trypsin/ml but not by heat-denatured enzymes, trypsin mixed with trypsin inhibitor, or 500 micrograms of either alpha- or beta-glucosidase, alpha-mannosidase, or lipase/ml. Incubating germlings with pronase E at any time prior to nuclear division inhibited germling response to the scratched surface. Pronase E at 200 micrograms/ml did not decrease rates of germination or germ tube elongation, but adhesion of the germlings to the substrate was significantly reduced. The data suggest that extracellular proteins may bind the germ tube to an inductive surface, and that binding may be necessary for induction of infection structures. [AS]

0656

25892 EVRARD, P.; LEPOIVRE, P. 1983. Effet du dichlorure de triphénylbismuth vis-a-vis de la rouille du haricot et de la rouille de la féverole. (Effect of triphenylbismuth dichloride on haricot bean rust and broad bean rust). Parasitica 39(3):117-127. Fr., Sum. Fr., Engl., 3 Refs., Illus. [Faculté des Sciences Agronomiques de l'Etat a Gembloux, Laboratoire de Pathologie Végétale, Avenue Maréchal Juin, 13, B-5800 Gembloux, Belgique]

Phaseolus vulgaris. Uromyces phaseoli. Disease control. Chemical control. Belgium.

In greenhouse trials, preventive preinoculation treatments of leaves with triphenylbismuth dichloride at 16 micrograms/ml reduced by more than 90% the no. of pustules of Uromyces phaseoli on beans and the causal agent of rust on broad bean. [CIAT]

0657

25870 GUERRA, D.; ANDERSON, A.J. 1985. The effect of iron and boron amendments on infection of bean by Fusarium solani. Phytopathology 75(9):989-991. Engl., Sum. Engl., 10 Refs. [United States Dept. of Agriculture, Agricultural Research Service, Northern Regional Center, 1815 N. Univ., Peoria, IL 61604, USA]

Phaseolus vulgaris. Fusarium solani phaseoli. Micronutrients. Fe. B. Growth. Pathogenicity. Isolation. Nutrient solution. Plant nutrition. USA.

The effects of Fe and B nutrition on disease severity and lignin formation in beans infected by Fusarium solani f. sp. phaseoli were studied. Hydroponic culture was used to obtain precise control of Fe and B supplied to the plants. Lesion size was increased 39-91% by growing bean seedlings in hydroponic solutions containing lower (5 micromolar $FeCl_3$) rather than higher (50 micromolar $FeCl_3$) Fe content. Absence of B in the nutrient solutions caused a 47-75% increase in lesion size compared with those in seedlings grown with 25 micromolar borate. In nutrient solutions lacking B but containing 5 micromolar $FeCl_3$, the lesion size was 183% larger than for plants grown with 50 micromolar $FeCl_3$ and 25 micromolar borate. Although Fe and B deficiencies both contributed to increased lesion size, low availability of these nutrients differentially affected the accumulation of lignin. Absence of B increased the accumulation of polymerized phenolics in the lesion area by about 10%; whereas, low Fe availability reduced lignin formation by about 30%. [AS]

0658

25387 HEATH, M.C. 1984. Relationship between heat-induced fungal death and plant necrosis in compatible and incompatible interactions involving the bean and cowpea rust fungi. Phytopathology 74(10):1370-1376. Engl.,

Sum. Engl., 27 Refs., Illus. [Botany Dept., Univ. of Toronto, Toronto, Ontario, Canada M5S 1A1]

Phaseolus vulgaris. Uromyces phaseoli. Snap beans. Heat treatment. Leaves. Disease control. Canada.

Postinoculation heat treatment of bean and cowpea leaves infected with their resp. compatible rust fungi (Uromyces phaseoli var. typica and vignae, resp.) resulted in the seemingly rapid death of the fungus and the encasement of haustoria. Browning of invaded cells was rare and, although discolored flecks developed on bean leaves heated during uredium formation, this was caused by the browning of the fungus and cell walls of the plant, rather than the plant cytoplasm. The results suggest that these fungi do not release products during death that cause significant necrosis in susceptible tissue. In an incompatible combination of bean and the bean rust fungus, and in infections of the same fungus in the nonhost species, cowpea, fluorescence microscopy revealed no signs of haustorium death before that of the invaded plant cell. Postinoculation heat treatment applied to these plant-fungus combinations inhibited the normal plant cell necrotic reaction if applied early enough. Heat treatment applied later had no effect on the frequency or extent of plant browning, indicating either that the browning had been irreversibly triggered prior to heating or that the fungus had reached a stage of development at which recently-formed, constitutive, necrosis-causing factors were released during fungal death. It is suggested that the former hypothesis is the more likely and that the initiation of plant necrosis in the incompatible interactions examined requires some activity of the living fungus. [AS]

0659

23601 HOCH, H.C.; STAPLES, R.C. 1984. Evidence that cAMP initiates nuclear division and infection structure formation in the bean rust fungus, Uromyces phaseoli. Experimental Mycology 8(1):37-46. Engl., Sum. Engl., 40 Refs., Illus. [Dept. of Plant Pathology, New York State Agricultural Experiment Station, Cornell Univ., Geneva, NY 14456, USA]

Phaseolus vulgaris. Uromyces phaseoli. Disease physiology and biochemistry. USA.

Nuclear division was efficiently induced in urediospores of Uromyces phaseoli germinated in the presence of fairly high concn. of cyclic adenosine monophosphate (cAMP) or its derivatives. Nuclear DNA synthesis was also started but appearance of appressoria was inhibited. At a lower concn. appressoria developed, but at a low frequency, this cell differentiation being accompanied by nuclear division. Two inhibitors of cAMP phosphodiesterase readily induced both nuclear division and cell differentiation. The presence in the spore of a cAMP regulatory device is suggested. [Review of Plant Pathology]

0660

25269 HOKSBERGEN, F.A.; BEEVER, R.E. 1984. Control of low-level dicarboximide-resistant strains of Botrytis cinerea by dicarboximide fungicides. New Zealand Journal of Agricultural Research 27(1):107-111. Engl., Sum. Engl., 15 Refs., Illus. [Dept. of Scientific and Industrial Research, Plant Diseases Division, Private Bag, Auckland, New Zealand]

Phaseolus vulgaris. Botrytis cinerea. Chemical control. New Zealand.

The dicarboximide fungicide iprodione gave a high degree of control of infection by low-level dicarboximide-resistant strains of Botrytis cinerea

on detached leaves of French bean when the inoculum was in the form of conidia, but not when a mycelial plug inoculum was used. This difference in response partially explains how low-level dicarboximide-resistant strains can be present in crops where dicarboximide fungicides are in use, without causing obvious losses of disease control. [AS]

0661

24901 HOWLAND, A.K. 1963. Progress report on bean rust. Kikuyo, Kenya, East African Agriculture and Forestry Research Organization. 2p. Engl.

Paper presented at Meeting of the Specialist Committee on Agricultural Botany, 10th., Nairobi, Kenya.

Phaseolus vulgaris. Uromyces phaseoli. Races. Kenya. Uganda. Tanzania.

Uromyces appendiculatus races found affecting beans in the districts of Tanganyika, Kenya, and Uganda are reported. The districts in which races A, B, C, and D were found (12 in Tanganyika, 7 in Kenya, and 12 in Uganda) are presented in table form. [CIAT]

0662

25885 HUNTER, J.E.; PEARSON, R.C.; SEEM, R.C.; SMITH, C.A.; PALUMBO, D.R. 1984. Relationship between soil moisture and occurrence of Sclerotinia sclerotiorum and white mold disease on snap beans. Protection Ecology 7(4):269-280. Engl., Sum. Engl., 18 Refs. [Dept. of Plant Pathology, New York State Agricultural Experiment Station, Cornell Univ., Geneva, NY 14456, USA]

Phaseolus vulgaris. Snap beans. Whetzelinia sclerotiorum. Soil moisture. Rainfall. Disease control. USA.

Twelve snap bean fields in the state of New York (USA) were monitored weekly during the growing season in 1978, 1979, and 1980 for environmental and biological factors associated with deposition of inoculum of Sclerotinia sclerotiorum on bean leaves and incidence of white mold. The soil matric potential in and around bean fields was measured with a portable, quickly equilibrating tensiometer. Contingency tables and a nonparametric statistical test called the phi coefficient were used to determine which soil matric potential best predicted the occurrence of inoculum and disease. The av. of the soil matric potential measurements made 30 and 37 days, or 37 and 44 days, after planting was a good predictor of availability of inoculum during bloom (the susceptible period) and disease at harvest. Rainfall was not as good a predictor. For snap bean growing areas with a history of white mold, a proposal is made that disease be anticipated whenever the av. soil matric potential is equal to or greater than -30 kPa. for a 1- to 2-wk. period just prior to or during bloom. The feasibility of using an ascospore production forecast compared with a disease forecast in a practical pest management program is discussed. Ways to improve these types of forecast are also considered. [AS]

0663

25383 ISSA, E. 1983. Efeito da época de aplicacao de fungicida no controle de doencas do feijoeiro (Phaseolus vulgaris L.). (Effect of times of fungicide application on the control of bean diseases). Biológico 49(3):69-73. Port., Sum. Port., Engl., 7 Refs., Illus. [Secao de Doencas das Plantas Alimentícias Básicas e Olerícolas, Inst. Biológico, Avda. Cons. Rodrigues Alves 1252, Caixa Postal 7119, Sao Paulo, Brasil]

Phaseolus vulgaris. Colletotrichum lindemuthianum. Alternaria alternata. Disease control. Chemical control. Brazil.

In field trials in Campinas, Brazil, with 4 maneb sprays in the rainy season, anthracnose (Colletotrichum lindemuthianum) was best controlled in bean cv. Carioca by spraying at 10-day intervals and pod infection by Alternaria alternata by applications every 15 days. [Review of Plant Pathology]

0664

23610 KAMINSKYJ, S.G.W.; DAY, A.W. 1984. Chemical induction of infection structures in rust fungi. 1. Sugars and complex media. Experimental Mycology 8(1):63-72. Engl., Sum. Engl., 18 Refs., Illus. [Univ. of Western Ontario, Dept. of Plant Sciences, London, Ontario N6A 5B7, Canada]

Phaseolus vulgaris. Uromyces phaseoli. Canada.

Complex media components were found to induce formation of infection structures in germinated urediospores, the frequency of these structures being much higher in Uromyces phaseoli var. typica from bean and Puccinia helianthi from sunflower than in U. phaseoli var. vignae from cowpea and P. sorghi from maize. The structures were morphologically identical to those induced by host plants. Analysis of 1 complex component suggested that the active substances were likely to include simple sugars. Sucrose and glucose (and to a much lesser extent trehalose and fructose) could induce differentiation. Complex components or combinations of inducers were more effective than single sugars. Infection strictures increased in length between 24-48 h, indicating uptake and utilization of exogenous nutrients. [AS (extract)]

0665

23612 KAMINSKYJ, S.G.W.; DAY, A.W. 1984. Chemical induction of infection structures in rust fungi. 2. Inorganic ions. Experimental Mycology 8(3):193-201. Engl., Sum. Engl., 17 Refs. [Univ. of Western Ontario, Dept. of Plant Sciences, London, Ontario N6A 5B7, Canada]

Phaseolus vulgaris. Uromyces phaseoli. Canada.

K^+ and Mg^{2+} strongly induced differentiation in bean rust (Uromyces phaseoli var. typica) and sunflower rust (Puccinia helianthi) while Ca^{2+}, Mn^{2+}, and Na^+ were only weak inducers. With increasing concn. of K^+, differentiation frequency increased and up to 70% of germinated spores formed infection structures. Most K salts gave similar induction frequencies, indicating the relative unimportance of anion effects; though iodide and nitrate appeared to interfere with the induction process and virtually eliminated infection structure formation while permitting good germ tube growth. Induction by salts was sensitive to total buffer concn. and to surface phenomena possibly related to aeration or humidity. Combined low levels of K and Ca or K and sucrose had synergistic effects. [AS (extract)]

0666

23922 KISTLER, H.C. 1983. Phaseollin metabolism and tolerance in Fusarium solani f. sp. phaseoli. In _____. Phytoalexin metabolism and implications for phytoalexin tolerance and virulence in two plant pathogenic fungi. Ph.D. Thesis. Ithaca, N.Y., Cornell University. pp.10-41. Engl., 40 Refs., Illus.

Phaseolus vulgaris. Fusarium solani phaseoli. Phaseollin. Pathogenicity. Resistance. Races. USA.

The bean root rot pathogen Fusarium solani f. sp. phaseoli was chosen to investigate further the possible relationship between phytoalexin degradation and tolerance. A strain of F. solani f. sp. phaseoli, T-232, capable of causing severe disease was used in all expt. The virulence of the isolate was checked on Phaseolus vulgaris cv. Top Crop approx. twice each year. The fungus, reisolated from these plants, was then used in subsequent studies. The most definitive test for the contribution of phaseollin metabolism to phaseollin tolerance in F. solani f. sp. phaseoli would be to inhibit specifically and completely this enzymatic process by chemical or genetic means, and then determine the effect on the expression of phaseollin tolerance. [CIAT]

0667

25336 KUSHALAPPA, A.C.; SANTOS, D.P.; AKUTSU, M.; LUDWIG, A.; EUCLIDES, R.F. 1984. Patterns of host growth and rust progress curves in bean and coffee. Fitopatologia Brasileira 9(1):45-49. Engl., Sum. Engl., Port., 9 Refs. [Depto. de Fitopatologia, Univ. Federal de Vicosa, 36.570 Vicosa-MG, Brasil]

Phaseolus vulgaris. Uromyces phaseoli. Hosts and pathogens. Growth. Brazil.

Suitability of growth models were tested for transformation of disease progress and host growth curves, in various bean and coffee rust epidemics. In bean the 8 disease progress curves based on proportion of infected leaflet area and leaves all fitted the Gompertz model. The 4 host growth curves based on leaflets all fitted the logistic model. [AS (extract)]

0668

24690 LEAKEY, C.L.A. 1964. Some recent fungicide and other trial results on beans in Uganda compared with those from other countries and their relevance to field practice. Kampala, Uganda, Department of Agriculture. Technical Communication no.16. 13p. Engl., Sum. Engl., 3 Refs.

Phaseolus vulgaris. Seed production. Disease control. Chemical control. Colletotrichum lindemuthianum. Isariopsis griseola. Uromyces phaseoli. Uganda.

Evidence is presented indicating that the application of fungicides to beans can give economic returns in the more fertile areas of Uganda or under conditions where reasonable basic yields can be obtained with the assistance of other treatments and methods of cultivation. The advantages in using fungicides from the point of view of clean seed production as well as from that of yield is stressed. The decision as to whether or not to use fungicides must take into account economic considerations and fixed and variable costs which cannot be validly estimated from exptl. plots. It is pointed out that measures intended to effect crop improvement may be most valuable when they are taken together even though each applied separately may be less easy to justify or may fail to give sufficiently striking results to be convincing. This makes the transition from peasant methods to fully committed modern farming a transition that is difficult to make in small single steps. Results obtained in different fungicide trials carried out in Uganda are given in table form. [AS]

0669

25370 LINDGREN, D.T.; STEADMAN, J.R. 1982. Rust control on beans in response to fungicides, method of application and rate. Bean

Improvement Cooperative. Annual Report 25:37. Engl. [Univ. of Nebraska, Lincoln, NE 68583, USA]

Phaseolus vulgaris. Uromyces phaseoli. Disease control. Chemical control. Yields. USA.

A trial was carried out in 1981 with bean cv. Pinto U.I. 114 in North Platte (Nebraska, USA) to evaluate the application rates and methods of an exptl. product containg tetrachloroisophthalonitrate and a S formulation to contro. Uromyces phaseoli. All treatments reduced visual rust ratings compared with the control. The highest yield was obtained with the exptl. product applied with the Solo sprayer (2470 kg/ha), but rust ratings were lower with the other treatments. [CIAT]

0670

25656 MILLER, D.E.; BUREE, D.W. 1985. Effects of low soil oxygen on Fusarium root rot of beans with respect to seedling age and soil temperature. Plant Disease 69(4):328-330. Engl., Sum. Engl., 6 Refs., Illus. [Soil & Water Management & Vegetable Crops Production, Agriculture Research Service, United States Dept. of Agriculture, Prosser, WA 99350, USA]

Phaseolus vulgaris. Fusarium solani phaseoli. Soil temperature. Seedlings. Soil requirements. USA.

Growth room studies determined the response of bean plants growing in Fusarium-infested soil to temporary low soil O_2 levels as affected by seedling age and temp. Age of seedlings (7, 12, or 19 days after transplanting) when subjected to low soil O_2 had a minor effect on shoot or root growth and water use. Temporary low soil O_2 increased injury by F. solani f. sp. phaseoli regardless of seedling age. Temp. regime had a major effect on plant growth. When temp. was increased or decreased midway in the growth period, the initial temp. affected root and shoot yields more than the final one. Temporary low soil O_2 increased root rot in all temp. regimes, but the effect was usually greater at higher temp. [AS]

0671

25655 MILLER, D.E.; BUREE, D.W. 1985. Effects of soil physical factors on resistance in beans to Fusarium root rot. Plant Disease 69(4): 324-327. Engl., Sum. Engl., 9 Refs., Illus. [Soil & Water Management & Vegetable Crops Production, Agriculture Research Service, United States Dept. of Agriculture, Prosser, WA 99350, USA]

Phaseolus vulgaris. Cultivars. Fusarium solani phaseoli. Soil temperature. Drainage. O. Growth. Soil moisture. Resistance. USA.

Growth room studies were conducted to determine the responses of dry bean cv. differing in levels of genetic resistance to Fusarium solani f. sp. phaseoli as affected by stresses caused by low soil O_2, low temp., soil compaction, and low water potentials when grown in Fusarium-infested soil. The responses of a susceptible (Red Mexican UI-36), a moderately resistant (Gloria Pink), and a resistant (NY-2114-12) cv. were compared. Root rot resistance inherent in Gloria Pink and NY-2114-12 was effective in well-aerated soil, but was largely overcome by short periods of poor soil aeration. NY-2114-12 compensated for impeded root penetration more than the susceptible cv. by increasing root growth above the impedance. [AS]

0672

25311 MORA B., J.E. 1985. Evaluación del ataque de telaraña (Thanatephorus cucumeris (Frank) Donk, = Rhizoctonia solani Khun) en cultivares de fríjol en asociación de relevo con maíz. [Evaluation of web blight (Thanatephorus cucumeris = Rhizoctonia solani) attack in bean cultivars in relay association with maize]. Tesis Ing.Agr. San José, Universidad de Costa Rica. 50p. Span., Sum. Span., 43 Refs., Illus.

Phaseolus vulgaris. Cultivars. Resistance. Rhizoctonia solani. Relay crops. Disease control. Chemical control. Yields. Costa Rica.

During 1984 in Esparza, Costa Rica, the development of web blight (Thanatephorus cucumeris) was evaluated in a bean cv. (Porrillo 70, Mexico 80, Bruneca, and Tuetar) in monoculture and relay cropped with maize, with and without the application of benomyl at doses of 1.2 g/l. The % of diseased foliage was estimated visually. In both cropping systems the disease reached a height close to 40 cm, but the disease progressed faster in the monocrop. The susceptibility and tolerance of the cv. did not vary in either of the 2 systems; however, in association with maize, susceptible cv. with climbing capacity were not affected severely by web blight due to aeration and the reduced % of inoculum splash that reached the leaves. Web blight susceptibility and grain production plot were negatively correlated. Fungicide application increased av. yields/plot by 43%. [AS (extract)-CIAT]

0673

25654 MORENO, F.A.; MORA, L.E. 1985. Cropping pattern and soil management influence on plant diseases. 2. Bean rust epidemiology. Turrialba 34(1):41-45. Engl., Sum. Engl., Span., 13 Refs. [Centro Agronómico Tropical de Investigación y Enseñanza, Turrialba, Costa Rica]

Phaseolus vulgaris. Uromyces phaseoli. Cultivation systems. Intercropping. Zea mays. Land preparation. Epidemiology. Costa Rica.

Bean rust (Uromyces appendiculatus) affected a greater no. of leaves (incidence) and a larger leaf area (severity) in beans planted in monoculture than when associated with maize. Av. values of daily rate of increase of both incidence and severity of bean rust for the whole exptl. period were always higher in retrocropped beans than in beans associated with maize. Soil management influenced both the incidence and severity of bean rust, particularly at the onset of the epidemic. More beans were infected in soil preparation treatments with mechanical plowing and rotary tillage than with the min. tillage and zero tillage practices. [AS]

0674

24899 MUTITU, E.W.; MUFUNYA, D.N. 1979. Epidemiology and control of bean scab caused by Elsinoe phaseoli Jenkins in Kenya. Nairobi, Kenya, University of Nairobi. 16p. Engl., Sum. Engl., 6 Refs., Illus.

Paper presented at the Symposium on Grain Legume Improvement in East Africa, Kenya, 1979.

Phaseolus vulgaris. Elsinoe phaseoli. Epidemiology. Disease control. Chemical control. Kenya.

Bean scab caused by Elsinoe phaseoli was found to be disseminated by wind and contact in field plots in Katumani and Kabete, Kenya. Wind was found to be less efficient than contact. Diseased plants incurred yield losses up to 70% compared with healthy plants in the same plots. Fungicide

sprays resulted in higher bean yields with benomyl giving the highest increase, approx. 13% over the water-sprayed control. [AS]

0675

26087 NIEUWOUDT, C.J.L. 1984. Baycor, a new foliar applied fungicide for the control of rust caused by Uromyces appendiculatus (Pers.) Unger on beans (Phaseolus spp.). Pflanzenschutz-Nachrichten Bayer 37(1):21-33. Engl., Sum. Engl., Fr., Span., 7 Refs., Illus.

Phaseolus vulgaris. Uromyces phaseoli. Disease control. Chemical control. South Africa.

Results of field trials comparing various rates and formulations of bitertanol with triforine during 1977-82 in South Africa are given. The current formulation, Baycor 300 EC, is registered for use at 420 ml/ha (126 g a.i./ha) for ground application and 840 ml/ha (252 g a.i./ha) for aerial application. In each case addition of Agri-Dex spreader-sticker at 625 ml/ha is recommended. [Review of Plant Pathology]

0676

24837 OLARTE M., D.F.; OSORIO O., G. DE J. 1979. Mecanismos de transmisión de la antracnosis (Colletotrichum lindemuthianum) en fríjol (Phaseolus vulgaris) en el oriente antioqueño. (Mechanisms of anthracnose (Colletotrichum lindemuthianum) transmission in beans in eastern Antioquia). Tesis Ing.Agr. Medellín, Colombia, Universidad Nacional. 77p. Span., Sum. Span., 43 Refs., Illus.

Phaseolus vulgaris. Colletotrichum lindemuthianum. Disease transmission. Disease control. Chemical control. Colombia.

Three trials were conducted at La Selva exptl. station, (Antioquia, Colombia) to determine the ways by which anthracnose (Colletotrichum lindemuthianum) is transmitted. The main mechanism of anthracnose transmission is by crop residues. In spite of the fact that the seed was not responsible for disease transmission, thiabendazole and benomyl gave good initial protection to the seedlings. [CIAT]

0677

22527 RIBEIRO, C.A.G.; FERRAZ, S. 1984. Resistencia varietal do feijoeiro (Phaseolus vulgaris L.) a Fusarium oxysporum f. sp. phaseoli. (Varietal resistance of bean to Fusarium oxysporum f. sp. phaseoli). Fitopatologia Brasileira 9(1):37-44. Port., Sum. Port., Engl., 7 Refs. [Programa Nacional de Melhoramento da Cana de Acucar, Secao de Melhoramento, Caixa Postal 344, 57.000 Maceió-Al, Brasil]

Phaseolus vulgaris. Cultivars. Resistance. Fusarium oxysporum. Pathogenicity. Brazil.

Fifty-one cv. were tested for resistance to Fusarium oxysporum f. sp. phaseoli in Vicosa, Brazil, in 1982. Fourteen cv. were highly resistant and 10 moderately resistant. No difference in pathogenicity was found when plants were inoculated either with chlamydospores or conidia. Among the culture media tested for F. oxysporum f. sp. phaseoli, bean seed extract-dextrose-agar was the best for macroconidia production. [AS]

0678

22939 ROSADO M., F.J. 1979. Impacto de los fitopatógenos del suelo al cultivo del fríjol, en suelos bajo diferentes manejos ubicados en La Chontalpa, Tabasco. (Impact of soil pathogens on beans, on soils under different management located in the Chontalpa, Tabasco). Tesis Ing.Agr. Tabasco, México, Colegio Superior de Agricultura Tropical. 53p. Span., Sum. Span., 54 Refs., Illus.

Phaseolus vulgaris. Fusarium. Pythium. Rhizoctonia solani. Nematodes. Soil fertility Mexico.

The effect of 5 management systems of agroecosystems on soil pathogens that affect beans under different and equal nutrient (NPK) conditions was evaluated in Chontalpa (Tabasco, Mexico). These were maize-beans rotation, maize in monoculture, maize in monoculture with burning, grass rotation, and plantain rotation of maize-legumes (beans or soybeans). Canopy dry wt., % of dead plants, and the incidence of Fusarium spp., Pythium spp., and Rhizoctonia solani were evaluated. Samplings were made before and after the expt. to determine nematode incidence. The maize-beans rotation and the monoculture of maize with burning showed the highest values of N, P, K, and OM, and the lowest no. of dead plants, the lowest incidence of soil pathogens, and a high dry wt. The agroecosystem plantain rotation of maize-legume showed the highest incidence of Fusarium spp. and Pythium spp. The nematodes Helicotylenchus and Tylenchus increased in the agroecosystem maize-beans rotation and the monoculture of maize. The impact of soil pathogens depends on soil management. [AS (extract)-CIAT]

0679

25358 SEDO L., J.I. 1985. Evaluación de la tolerancia de líneas de fríjol común a Thanatephorus cucumeris (Frank) Donk (Rhizoctonia solani Khuh) en Esparza, Puntarenas. [Evaluation of bean lines for tolerance to Thanatephorus cucumeris (Rhizoctonia solani) in Esparza, Puntarenas]. Tesis Ing.Agr. San José, Universidad de Costa Rica. 43p. Span., Sum. Span., 25 Refs., Illus.

Phaseolus vulgaris. Cultivars. Rhizoctonia solani. Resistance. Selection. Costa Rica.

The performance of 172 bean lines from crossings between cv. previously identified as showing good levels of tolerance to Thanatephorus cucumeris was studied in Esparza (Puntarenas, Costa Rica). The susceptible var. Rojo de Seda and the tolerant var. Porrillo 70 were planted every 5 and 10 rows of test lines, resp., for comparison purposes. In a 1st trial, 32 lines were selected based on production/plot. Later these lines were planted in a 2nd trial from which 2 were selected: HT 7716 CB (118)-18-M-M and HT 7719 CB (112)-15-M-M; these outyielded cv. Porrillo 70 and showed increased tolerance. Lines such as HT 7719 CB (112)-5-M-M and HT 7716 CB (118)-17-M-M and var. Huasteco performed similar to the tolerant control. The results indicated progress in the search for bean materials with resistance to the pathogen. [AS-CIAT]

0680

23207 SEPULVEDA R., P. 1983. Enfermedades del poroto causadas por hongos y bacterias. (Fungal and bacterial diseases of beans). In Curso Nacional de Frejoles, 1o., Talca, Chile, 1983. Trabajos presentados. Santiago, Organización de las Naciones Unidas para la Agricultura y la Alimentación. pp.95-106. Span.

Phaseolus vulgaris. Fusarium solani phaseoli. Rhizoctonia solani. Colletotrichum lindemuthianum. Alternaria. Erysiphe polygoni. Whetzelinia sclerotiorum. Xanthomonas phaseoli. Symptomatology. Disease control. Chile.

The symptoms and control measures of the following pathogens causing fungal and bacterial diseases in beans in Chile are described: Fusarium solani f. sp. phaseoli, Rhizoctonia solani, Colletotrichum lindemuthianum, Alternaria sp., Erysiphe polygoni, Sclerotinia sclerotiorum, Uromyces phaseoli, and Xanthomonas phaseoli. The practical field trips to Rio Claro and San Clemente to identify these diseases are briefly described. [CIAT]

0681

26082 SHAO, F.M.; TEFI, J.M. 1985. Yield losses in Phaseolus beans induced by anthracnose in Tanzania. Tropical Pest Management 31(1):60-62. Engl., Sum. Engl., 15 Refs., Illus. [Uyole Agricultural Centre, P.O. Box 400, Mbeya, Tanzania]

Phaseolus vulgaris. Colletotrichum lindemuthianum. Cultivars. Disease control. Chemical control. Yields. Resistance. Tanzania.

The extent of yield losses resulting from anthracnose was determined in 3 bean cv. planted as main plots in a split plot expt. in Uyole, Tanzania. Different levels of the disease were maintained in the subplots by spraying with the fungicide benomyl. There were highly significant differences in disease levels and yield between the resistant and susceptible cv. and between the sprayed and unsprayed plots. Highly significant yield losses of 86% occurred in the highly susceptible cv. T$_6$ and 27% in the moderately susceptible cv. Mexican 142. Estimated net gains/ha resulting from controlling anthracnose by benomyl and by growing an anthracnose-resistant cv. under Tanzanian conditions are given. [AS]

0682

25677 STRASHNOW, Y.; ELAD, Y.; SIVAN, A.; CHET, I. 1985. Integrated control of Rhizoctonia solani by methyl bromide and Trichoderma harzianum. Plant Pathology 34(1):146-151. Engl., Sum. Engl., 16 Refs., Illus. [Dept. of Plant Pathology & Microbiology, The Hebrew Univ. of Jerusalem, Faculty of Agriculture, Rehovot 76100, Israel]

Phaseolus vulgaris. Rhizoctonia solani. Integrated control. Disease control. Chemical control. Biological control. Trichoderma harzianum. Israel.

In the lab., isolate TH-203 of Thichoderma harzianum was tolerant of up to 20,000 ppm methyl bromide (MB) (vol./vol.), whereas Rhizoctonia solani was susceptible to less than 9000 ppm. Exposure to sublethal concn. of MB had no effect on the in vivo antagonistic ability of T. harzianum. Soil fumigation with MB at the equivalent of a commercial dose of 500 kg/ha did not reduce the population of Trichoderma in soil and allowed rapid Trichoderma colonization of the soil. In the greenhouse T. harzianum + a reduced dose of MB (equivalent to 200 kg/ha) completely controlled disease incidence of R. solani in bean seedlings compared with controls in untreated soils. Similar disease control was achieved with the recommended dose of MB. T. harzianum also prevented reinfestation by R. solani in fumigated soils. [AS (extract)]

0683

25686 SUMNER, D.R. 1985. Virulence of anastomosis groups of Rhizoctonia solani and Rhizoctonia-like fungi on selected germ plasm of snap bean,

lima bean, and cowpea. Plant Disease 69(1):25-27. Engl., Sum. Engl., 21 Refs. [Dept. of Plant Pathology, Univ. of Georgia, Coastal Plain Experiment Station, Tifton, GA 31793, USA]

Phaseolus vulgaris. Snap beans. Races. Rhizoctonia solani. Pathogenicity. Cultivars. Resistance. Germplasm. USA.

Rhizoctonia solani AG-4 and AG-2 type 2, indigenous to the Georgian coastal plain (USA), were highly virulent on cv. of snap and pole bean and cowpea. Snap bean breeding lines B4175, B4173-2X, 208-8R, 5181R, and Venezuela 54 were more resistant to high inoculum densities (187 and 492 colony forming units/100 g soil) of AG-4 than Eagle snap bean, but at 16 colony forming units/100 g soil, there were no significant differences. None of the snap bean breeding lines were resistant to R. solani AG-2 type 2. R. solani AG-2 type 1 was highly virulent on cowpeas and slightly-moderately virulent on beans. Rhizoctonia-like CAG-5 was moderately virulent on PI 165426 and Jackson Wonder lima bean. CAG-3 was highly virulent on cowpeas and CAG-4 was avirulent. [AS]

0684

25663 TU, J.C.; TAN, C.S. 1985. Infrared thermometry for determination of root rot severity in beans. Phytopathology 75(7):840-844. Engl., Sum. Engl., 19 Refs., Illus. [Agriculture Canada Research Station, Harrow, Ontario N0R 1G0, Canada]

Phaseolus vulgaris. Cultivars. Fusarium solani. Pythium ultimum. Rhizoctonia solani. Temperature. Leaves. Soil moisture. Water stress. Canada.

Bean plants were grown in soil infested with root rotting fungi (Fusarium, Pythium, and Rhizoctonia) and in pasteurized soil. Differences between leaf and air temp. taken with an infrared thermometer between 14:00-15:00 h on sunny days showed that green leaves of diseased beans were warmer than those of healthy ones even if the soil moisture was maintained at field capacity. Depending on the severity of root rot, leaves of diseased plants appeared to be either normal or slightly less turgid. Increases in root rot severity correlated closely with increases in leaf temp. ($P < 0.01$). This was most apparent at early stages of plant growth (1 or 2 trifoliate leaves). Diseased plants grown under water stress had much higher leaf-air temp. differentials than healthy ones. If plants were stressed almost to the wilting point and water was added to return the soil to field capacity, decreases in leaf temp. of healthy plants were larger than those of diseased plants. In diseased plants, decreases in leaf temp. subsequent to watering were inversely related to the severity of root rot. Thus, leaf temp. could be used not only to detect the presence of root rots but also to monitor disease severity in individual plants in soil without visually examining the roots. This technique can be used to screen segregating progeny from crosses of resistant and susceptible cv. [AS]

0685

25688 TU, J.C. 1985. Pink pod rot of bean caused by Trichothecium roseum. Canadian Journal of Plant Pathology 7(1):55-57. Engl., Sum. Engl., Fr., 6 Refs., Illus. [Research Station, Agriculture Canada, Harrow, Ontario N0R 1G0, Canada]

Phaseolus vulgaris. Trichothecium roseum. Symptomatology. Etiology. Canada.

Trichothecium roseum was identified as the causal agent of pink pod rot of bean in North Dakota, USA. The etiology and symptoms of this new disease are described. [AS]

0686

25659 TU, J.C. 1985. Tolerance of white bean (Phaseolus vulgaris) to white mold (Sclerotinia sclerotiorum) associated with tolerance to oxalic acid. Physiological Plant Pathology 26(1):111-117. Engl., Sum. Engl., 12 Refs., Illus. [Research Station, Agriculture Canada, Harrow, Ontario, N0P 1C0, Canada]

Phaseolus vulgaris. Whetzelinia sclerotiorum. Cultivars. Resistance. Plant toxins. Pathogenicity. Canada.

The possible role of oxalic acid, a phytotoxin, in the pathogenesis of Sclerotinia sclerotiorum was studied in tolerant and susceptible white bean cv. The growth of S. sclerotiorum was much slower in the tolerant cv. Ex Rico-23 than in the susceptible cv. Kentwood and Seafarer. The difference was paralleled by the rate of diffusion in leaf tissue of oxalic acid. Uptake of oxalic acid into excised leaves through the petiole resulted in more severe brown rot-like symptoms in the leaves of cv. Kentwood that in those of Ex Rico-23. When [^{14}C] oxalic acid was fed through petioles, radioactivity in the interveinal tissue of Kentwood was about 3 times higher than that in Ex Rico-23. Autoradiographs of leaves showed that radioactivity in Ex Rico-23 was confined to major veins and that activity in the interveinal tissue was low, whereas in Seafarer and Kentwood radioactivity did not accumulate in the veins but was distributed uniformly throughout the leaf tissue, with a slight accumulation along leaf margins. [AS]

0687

26025 VAN BRUGGEN, A.H.C.; ARNESON, P.A. 1984. Resistance in Rhizoctonia solani to tolclofos-methyl. Netherlands Journal of Plant Pathology 90(3):95-106. Engl., Sum. Engl., 18 Refs., Illus. [Dept. of Plant Pathology, Cornell Univ., Ithaca, NY 14853, USA]

Phaseolus vulgaris. Rhizoctonia solani. Disease control. Chemical control. Isolation. Pathogenicity. Races. USA.

Three isolates of Rhizoctonia solani were adapted in vitro to grow on a PDA medium amended with tolclofos-methyl at a concn. 500 times that which initially almost completely inhibited growth. Acquired resistance was retained after 5 transfers on a fungicide-free medium. Pathogenicity of resistant isolates on dry bean cv. Redkloud was not reduced, but their growth rates on PDA were significantly lower than those of the original isolates. Recovery of the resistant isolates was not improved on a selective medium amended with tolclofos-methyl at 400 micrograms/ml compared with unamended medium. [AS]

0688

25308 WESTHUIZEN, G.C.A. VAN DER; BOUBERT, M.S.; GROBLER, I.J. 1979. Sclerotinia rot in dry beans. Farming in South Africa (Dry Beans) F.1:1-3. Engl., Illus.

Phaseolus vulgaris. Whetzelinia sclerotiorum. Symptomatology. Etiology. Host range. South Africa.

General information on the symptoms, etiology, infection, spread, host range, distribution, and control of white mold in beans, caused by Sclerotinia sclerotiorum, is presented. The following practices are recommended to limit the spread and contamination of new bean fields by the disease: use of only high-quality clean seed, destruction of herbaceous weeds, harvesting of healthy crops before diseased crops, and use of crop

rotations with cereal species. Benomyl sprays at 1 kg a.i./ha 3-5 days before full flowering gives good control. [CIAT]

See also 0490 0504 0505 0547 0594 0613 0626 0630 0632 0637 0638 0642 0643 0727 0741 0742 0746 0748 0749 0751 0761 0763 0770 0773 0778 0781 0782

E04 Viroses

0689

25397 ABU-JAWDAH, Y.; KIMMERT, J. 1983. Effect of Aliette on AMV infection of bean leaves and on the resultant alterations in the patterns of proteins and peroxidases. Phytopathologische Zeitschrift 108(3-4): 294-303. Engl., Sum. Engl., Germ., 13 Refs., Illus. [Laboratoire de Pathologie Végétale, Faculté des Sciences Agronomiques, 5800 Gembloux, Belgium]

Phaseolus vulgaris. Leaves. Alfalfa mosaic virus. Enzymes. Belgium.

Increased peroxidase activity as well as changes in the patterns of soluble proteins and peroxidases were observed following infection of bean leaves with alfalfa mosaic virus. Foliar sprays with phosethyl Al at 2000 ppm a.i. delayed the appearance of necrotic local lesions and reduced their final no. on primary bean leaves following inoculation with alfalfa mosaic virus. The delay in the appearance of symptoms observed on phosethyl Al-treated inoculated leaves was correlative with a delay in all the above cited alterations, while reduction of final symptoms was correlative with a decrease of these alterations. [AS]

0690

25377 ANTUNES, I.F.; TEIXEIRA, M.G.; COSTA, J.G.C. DA; ZIMMERMANN, M.J. DE O.; RAVA, C.A.; SARTORATO, A. 1982. The golden mosaic virus as a limiting factor for bean (Phaseolus vulgaris L.) production in Brasil. Bean Improvement Cooperative. Annual Report 25:78-79. Engl. [Centro Nacional de Pesquisa em Arroz e Feijao, Caixa Postal 179, 74.000 Goiania-GO, Brasil]

Phaseolus vulgaris. Bean golden mosaic virus. Cultivars. Plant breeding. Brazil.

The development of BGMV as a bean production constraint in Brazil and the no. of entries tested against the pathogen from 1976 to 1981 by the breeding team at Centro Nacional de Pesquisa em Arroz e Feijao are briefly reported. The increasing importance of the disease was attributed to the expansion of soybean cultivation towards the SE and central-west regions since BGMV is transmitted by Bemisia tabaci that multiplies well on soybeans. In the dry season plantings (Feb.) beans are infested by B. tabaci which migrates from soybean fields sown in Oct.-Nov. Research activities defined as of major importance include the survey of the effects of BGMV and its distribution, wild and cultivated hosts of the virus, biology, ecology, and control of B. tabaci, breeding for resistance, etiology, and the study of Vigna spp. as a substitute for beans. [CIAT]

0691

22598 BAUCKE, O. 1976. Levantamento do mosaico dourado do feijoeiro no Rio Grande do Sul. (Survey of BGMV in Rio Grande do Sul). In Reuniao

Técnica Anual do Feijao, 13a., Porto Alegre-RS, Brasil, 1976. Ata. Porto Alegre, Brasil, Instituto de Pesquisas Agronomicas. pp.11-18. Port., 8 Refs.

Phaseolus vulgaris. Bean golden mosaic virus. Bemisia tabaci. Vectors. Brazil.

The project to detect the occurrence of BGMV and its vector Bemisia tabaci in bean crops in Rio Grande do Sul, Brazil, is described. Results of the surveys conducted during the 1975-76 crop year are also given. Neither BGMV nor B. tabaci were observed attacking beans in any of the microregions, indicating that Rio Grande do Sul continues to be free of this serious bean disease. [CIAT]

0692

25683 BLANCO S., N.; LASTRES G., N.; BENCOMO, I. 1984. Incidencia de las enfermedades virosas del fríjol en Cuba. (Incidence of viral diseases of bean in Cuba). Ciencias de la Agricultura no.19:21-32. Span., Sum. Span., Engl., 11 Refs. [Inst. de Investigaciones Fundamentales en Agricultura Tropical Alejandro de Humboldt, Calle 2, esq. a 1, Santiago de las Vegas, Cuba]

Phaseolus vulgaris. Cultivars. Bean golden mosaic virus. Bean yellow stipple virus. Bean common mosaic virus. Cowpea mosaic virus. Resistance. Plant injuries. Cuba.

Observations made in 1975-82 on 18 Phaseolus vulgaris cv. in 6 zones of Cuba showed BGMV and bean yellow stipple virus to be the main pathogens while BCMV and cowpea mosaic virus were locally important. Cuba C-25-9, Gurgutula, Cuba'4, and Canario were among the less affected cv. [Review of Plant Pathology]

0693

24558 GIL, F.; LASTRA, R. 1984. Función de los anillos fibrilares asociados con el núcleo de células infectadas con el mosaico dorado del fríjol. (Role of fibrillar rings associated with the nucleus of cells infected with bean golden mosaic virus). In Jornadas Venezolanas de Microscopía Electrónica, 1ras., Maracay, Venezuela, 1984. Memorias. Maracay, Universidad Central de Venezuela. pp.248-249. Span., Illus. [Inst. Venezolano de Investigaciones Científicas, Centro de Microbiología y Biología Celular, Apartado 1827, Caracas 1010 A, Venezuela]

Phaseolus vulgaris. Bean golden mosaic virus. Etiology. DNA. Venezuela.

The role of fibrillar rings observed under the microscope associated with the nucleus of BGMV-infected phloem cells is briefly reported. The 1st cytopathological expression observed in BGMV-infected plants is the occurrence of fibrillar rings in phloem cell nuclei 4-7 days after infection. The presence of DNA in the rings was confirmed, corresponding to the genetic material of the geminivirus group. [CIAT]

0694

23206 HERRERA G., G. 1983. Enfermedades del poroto causadas por virus. (Viral diseases of beans). In Curso Nacional de Frejoles, 1o., Talca, Chile, 1983. Trabajos presentados. Santiago, Organización de las Naciones Unidas para la Agricultura y la Alimentación. pp.85-94. Span.

Also in Investigación y Progreso Agropecuario La Platina (Chile) no.19: 10-13. 1983.

Phaseolus vulgaris. Bean common mosaic virus. Symptomatology. Races. Cultivars. Resistance. Disease transmission. Disease control. Bean yellow mosaic virus. Chile.

The symptoms, races, transmission, and control of the 2 main viral diseases of beans found in Chile, BCMV and BYMV, are described. The reaction of 16 bean var. to the BCMV Type and NY-15 races found in Chile is presented. The only effective control method currently available for both diseases is the use of resistant var. The field trips to Rio Claro and San Clemente to identify these diseases are described. [CIAT]

0695

26031 McLAUGHLING, M.R.; BARNETT, O.W.; GIBSON, P.B.; BURROWS, P.M. 1984. Enzyme-linked immunosorbent assay of viruses infecting forage legumes. Phytopathology 74(8):965-969. Engl., Sum. Engl., 29 Refs., Illus. [United States Dept. of Agriculture, Agricultural Research Service, Crop Science Research Laboratory, Dept. of Plant Pathology & Weed Science, Mississippi State Univ., P.O. Drawer PG, MS 39762, USA]

Phaseolus vulgaris. Bean yellow mosaic virus. Analysis. USA.

ELISA was adapted for detection of alfalfa mosaic, BYMV, clover yellow mosaic, clover yellow vein, peanut stunt, red clover vein mosaic, and white clover mosaic viruses. It was versatile, practical, and reliable in indexing legumes for viruses, and also differentiated between BYMV and clover yellow vein virus. The method was well suited for large-scale screening programs, and its potential was further extended by mailing sensitized ELISA plates between cooperating lab. [AS]

0696

25877 MORALES, F.J.; CASTAÑO, M. 1985. Effect of a Colombian isolate of bean southern mosaic virus on selected yield components of Phaseolus vulgaris. Plant Disease 69(9):803-804. Engl., Sum. Engl., 5 Refs. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Bean southern mosaic virus. Disease transmission. Yields. Yield components. Inoculation. Colombia.

The no. and wt. of seeds produced/plant were significantly (P = 0.01) reduced, 47.5 and 56.3%, resp., in Diacol-Calima bean plants infected with BSMV under screenhouse conditions. The no. of pods/plant, on the contrary, was often higher in systemically infected plants than in uninoculated controls. An av. of 17.4% of the pods produced by the BSMV-infected plants, however, did not produce seed. The virus was transmitted in 11.1% of the mature seeds produced by the BSMV-inoculated Diacol-Calima plants. [AS]

0697

25675 PROVVIDENTI, R.; SILBERNAGEL, M.J.; WANG, W.Y. 1984. Local epidemic of NL-8 strain of bean common mosaic virus in bean fields of western New York. Plant Disease 68(12):1092-1094. Engl., Sum. Engl., 13 Refs., Illus. [Dept. of Plant Pathology, New York State Agricultural Experiment Station, Cornell Univ., Geneva, NY 14456, USA]

Phaseolus vulgaris. Bean common mosaic virus. Cultivars. Isolation. Pathogenicity. Serology. USA.

A viral disease that severely affected fields of Sanilac bean in 2 areas of western New York (USA) in 1982 was caused by the NL-8 strain of BCMV,

identified using differential bean cv. and ELISA with antisera to specific strains of BCMV. It was demonstrated experimentally that NL-8 is seed-transmitted in Sanilac, but attempts to detect its presence in the seed lot used for field plantings were unsuccessful. Because NL-8 is one of the temp.-independent, necrosis-inducing strains of BCMV and is able to overcome resistance in some cv. with the I gene, the necessity to reassess the present approach to breeding for resistance is discussed. [As]

0698

22601 VIEIRA, S.A. 1976. Identificacao do mosaico dourado do feijoeiro e de seu vector (Bemisia tabaci Genn). (Identification of bean golden mosaic virus and its vector Bemisia tabaci). In Reuniao Técnica Anual do Feijao, 13a., Porto Alegre-RS, Brasil, 1976. Ata. Porto Alegre, Brasil, Instituto de Pesquisas Agronomicas. pp.31-34. Port., Illus.

Phaseolus vulgaris. Bean golden mosaic virus. Bemisia tabaci. Vectors. Brazil.

In 1975 a field survey was conducted in 244 bean crops in 31 municipalities distributed in 3 regions of Santa Catarina, Brazil, to detect the incidence of BGMV and its vector Bemisia tabaci. General results are given for 29 of the 31 municipalities. In regions 1 and 2, representing 82% of the crops surveyed, BGMV and B. tabaci were not detected. However, both were detected in 7 of the crops visited in region 3 but new surveys are recommended to confirm these results. [CIAT]

0699

22583 ZAPATA, M.; FREYTAG, C.F. 1983. Evaluación de una población seleccionada de Phaseolus coccineus inoculada con los virus causantes del mosaico dorado del fríjol, mosaico común del fríjol y mosaico del caupí en Puerto Rico. (Evaluation of a selected population of Phaseolus coccineus inoculated with the bean golden mosaic virus, bean common mosaic virus, and cowpea mosaic virus in Puerto Rico). In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 29a., Panamá, 1983. Memoria. Panamá. v.2. 7p. Span., 7 Refs. [Univ. de Puerto Rico, Mayaguez, Puerto Rico 00708]

Phaseolus coccineus. Cultivars. Inoculation. Bean common mosaic virus. Bean golden mosaic virus. Resistance. Puerto Rico.

The characteristics of resistance of Phaseolus coccineus to inoculation with BGMV, BCMV, and cowpea rugose mosaic virus (CPMV) were determined at the U. of Puerto Rico (Mayaguez, Puerto Rico). The % of survival of scions of P. coccineus in P. vulgaris was 100%. The no. of nodes and the height of the inoculated plant were significantly lower than those of the control. The resistance to the systemic expression of BGMV, BCMV, and CPMV was detected in 12% of the population; 5% was resistant to the systemic and latent expression of the 3 viruses. On the other hand, 56% of the population maintained a latent infection of BCMV and 44% immunity. CPMV induced systemic symptoms in 5% of the population, while 95% was resistant. Among the resistant materials, 35% carried the latent virus and 65% immunity. The potential risk of these diseases is highlighted. [CIAT]

See also 0490 0504 0505 0626 0638 0642 0651 0738 0739 0745 0754 0764 0775 0778 0788

0700

25518 McSORLEY, R.; POHROSKEZNY, K. 1984. Cost-effectiveness of nematode control by fumigation with SMDC on Rockdale soils. Proceedings. Soil and Crop Science Society of Florida 43:188-192. Engl., Sum. Engl., 20 Refs., Illus. [Univ. of Florida, Agricultural Research & Education Center, 18905 S.W. 280 St., Homestead, FL 33031, USA]

Phaseolus vulgaris. Nematodes. Nematode control. Chemical control. USA.

The efficacy of SMDC (sodium N-methyldithiocarbamate) [metham] applied as a preplant soil drench in 33-38 cm bands over the row site was evaluated on a fine sandy loam soil in southern Florida, USA. SMDC at 411 l/treated ha significantly reduced nematode populations in a site having initial populations of 207 Rotylenchulus reniformis, 29 Meloidogyne incognita, 36 Quinisulcius acutus, and 10 Helicotylenchus dihystera/100 cm³ soil. Yields of snap beans and yellow squashes planted in this site were significantly increased by fumigation. The extra crop value usually exceeded the cost of SMDC applied. Application of SMDC at various rates to a site having an initial R. reniformis level of 124/100 cm³ soil and an infestation of soil-borne plant pathogens (Rhizoctonia spp., Pythium spp., and Fusarium spp.) resulted in reduction of R. reniformis but no control of root and hypocotyl diseases. Yield increases were not obtained, indicating that soil drenches of SMDC under such conditions may be ineffective against soil-borne pathogens, and that use of this relatively expensive material could be cost-effective only against high nematode infestations. [AS]

0701

25875 MELAKEBERHAN, H.; BROOKE, R.C.; WEBSTER, J.M.; D'AURIA, J.M.D. 1985. The influence of Meloidogyne incognita on the growth, physiology and nutrient content of Phaseolus vulgaris. Physiological Plant Pathology 26(3):259-268. Engl., Sum. Engl., 29 Refs., Illus. [Centre for Pest Management, Dept. of Biological Sciences, Simon Fraser Univ., Burnaby, Vancouver, B.C., Canada, V5A 1S6]

Phaseolus vulgaris. Meloidogyne incognita. Snap beans. Growth. Minerals and nutrients. Canada.

One-wk.-old Phaseolus vulgaris cv. Topnotch Golden Wax plants were inoculated with 0, 1000, 5000, or 10,000 freshly hatched Meloidogyne incognita larvae/plant, and maintained under controlled conditions (21°C, 14-h day at 400 microeinsteins/m²/s; 16°C, 10-h night cycle). At 3 wk. after inoculation, leaf area, dry wt., no. of flowers, the total C, H, N, Ca, Cu, Fe, Mn, P, and Zn contents of shoots and roots, leaf chlorophyll content, and dark respiration and photosynthetic rates were measured. Respiration rate, % shoot N content, and Ca, Cu, and Fe contents (per unit wt. and on a shoot:root ratio basis) were significantly increased with increasing inoculum level. Other measured parameters were significantly decreased. Ca, Cu, and Fe in the shoot and P in the root increased/unit wt., while Cu and Zn in the roots decreased significantly as a result of nematode infection. However, the overall total content of the nutrient elements/plant was significantly decreased by nematode infection. Differences in the physiology and nutrient content of P. vulgaris plants, as they relate to altered growth and loss of yield of nematode-infected plants, are discussed. [AS]

0702

25931 MELTON, T.A.; NOEL, G.R.; JACOBSEN, B.J.; HAGEDORN, D.J. 1985. Comparative host suitabilities of snap beans to the soybean cyst

nematode (Heterodera glycines). Plant Disease 69(2):119-122. Engl., Sum. Engl., 20 Refs. [Dept. of Plant Pathology, Univ. of Illinois, Urbana, IL 61801, USA]

Phaseolus vulgaris. Snap beans. Cultivars. Resistance. Nematodes. Host range. USA.

Twenty-three bush-type snap bean lines were evaluated for their suitabilities as hosts for 2 populations of Heterodera glycines using naturally infested soil in a glasshouse. Except for its sister line WIS (RRR) 46, WIS (RRR) 36 was a less suitable host than all other snap beans. Populations of white females from 12 commercial snap bean cv. were equal to or greater than the susceptible soybean Williams 79 for the race 3 population. Additionally, 18 snap bean cv. supported the same no. of white females/plant as did Williams 79 for the 2nd population, which was similar to race 4. This wide range of host responses suggests that resistance is controlled by more than 1 gene. [AS]

See also 0742

E06 Physiological Disorders

0703

26225 RUBIN, B.; PENNER, D.; SAETTLER, A.W. 1983. Induction of isoflavonoid production in Phaseolus vulgaris L. leaves by ozone, sulfur dioxide and herbicide stress. Environmental Toxicology and Chemistry 2(3):295-306. Engl., Sum. Engl., 42 Refs. [Pesticide Research Center, Dept. of Crop & Soil Science, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Leaves. Ozone. Herbicides. SO_2. Phytoalexins. Plant injuries. Air pollution. USA.

The potential induction of phytoalexin production by stress following exposure to O_3, SO_2, and several herbicides was evaluated in bean cv. and lines varying in sensitivity to O_3 injury. The isoflavonoids, coumestrol, and several other coumestans were extracted from leaf tissue after various periods of exposure to O_3, SO_2, or application of various herbicides. Elicitation of isoflavonoid production varied with lines and cv., but generally increased with increasing plant injury caused by O_3, SO_2, or herbicide. [AS]

F00 PEST CONTROL AND ENTOMOLOGY

0704

25394 ARCOS C., G. 1983. Identificación y control químico de la babosa del fríjol en la Cuenca Baja del Papaloapan. (Identification and chemical control of the bean slug in the lower Papaloapan Basin). Tesis Ing.Agr. México, Universidad Autónoma de Tamaulipas. 96p. Span., Sum. Span., 32 Refs., Illus.

Phaseolus vulgaris. Veronicella moreleti. Pest control. Chemical control. Mexico.

An expt. was conducted in the area of influence of the Papaloapan exptl. station (Veracruz, Mexico) to identify the slug damaging bean crops and to

evaluate 2 control alternatives: granulated systemic insecticides applied at planting and poisoned baits. The slug specimens were identified as Veronicella moreleti. The highest % of plants attacked by slugs generally occurred during the 1st 10 days after plant emergence. No significant differences were observed among the granulated systemic insecticides tested. Significant differences were observed between the poisoned baits and the check treatment. [CIAT]

0705

25621 CAMPBELL, A.S. 1925. Agromyzid fly in beans. Lingnaam Agricultural Review 2:16-17. Engl.

Phaseolus vulgaris. Ophiomyia phaseoli. Insect biology.

The biological cycle and damage caused to beans by Agromyza phaseoli in 1921 at College Gardens (Canton, China) are briefly described. Pupae were found to last 72 h before adult emergence and larvae, 5 days from eclosion. Adults appear to last only a few days. In Canton damage occurs only in Sept.-Oct. Destroying old bean plants and crop rotations are the recommended control measures. [CIAT]

0706

26097 THIERY, D.; JARRY, M. 1985. Hatching rhythm in the bean weevil Acanthoscelides obtectus and larval penetration of Phaseolus vulgaris seeds. Insect Science and its Application 6(1):33-35. Engl., Sum. Engl., Fr., 15 Refs., Illus. [IBEAS, LA CNRS 340, Université de Pau, Avenue Philippon, 64000 Pau, France]

Phaseolus vulgaris. Acanthoscelides obtectus. France.

Several 1st instar larvae of Acanthoscelides obtectus can use a hole made in the seed coat by a conspecific to enter the seed. The possibility that there could be differences in seed-coat piercing ability related to hatching rank was investigated on beans in the lab. The hatching rhythm was found to be well synchronized with imposed daily periodic conditions of photoperiod and temp., but the hatching rank had no influence on seed-piercing behavior. [Review of Applied Entomology]

See also 0490 0491 0492 0556 0813

F01 Injurious Insects, Mites and their Control

0707

22600 BAUCKE, O. 1976. Levantamento das pragas do feijoeiro. (Survey of bean pests). In Reuniao Técnica Anual do Feijao, 13a., Porto Alegre-RS, Brasil, 1976. Ata. Porto Alegre, Brasil, Instituto de Pesquisas Agronomicas. pp.23-30. Port., 23 Refs.

Phaseolus vulgaris. Pests. Brazil.

The 1st results of a survey conducted in 1975 to identify insect pests attacking beans in Rio Grande do Sul, Brazil, are presented. A list of 29 species was identified, based on a literature review and field observations. The list includes order, family, species, synonyms (if applicable), common name, and bibliographic references. [CIAT]

0708

22599 BAUCKE, O. 1976. Notas sobre a biologia e controle de Bemisia tabaci (Genn.) Homoptera-Aleyrodidae, mosca branca do feijoeiro. (Notes on the biology and control of the bean whitefly, Bemisia tabaci). In Reuniao Técnica Anual do Feijao, 13a., Porto Alegre-RS, Brasil, 1976. Ata. Porto Alegre, Brasil, Instituto de Pesquisas Agronomicas. pp.19-22. Port.

Phaseolus vulgaris. Bemisia tabaci. Insect biology. Insect control. Brazil.

The biological cycle and control measures of Bemisia tabaci, with special reference to conditions in Brazil, are briefly reviewed. The greatest damage caused by B. tabaci is not its direct effect by sap sucking but the transmission of viral infections. Cultural control measures are directed toward avoiding bean crops near malvaceous plants (at least 1000 m apart), planting 50-m strips of other crops (e.g., cassava, maize) between beans and grass pastures, erradicating whitefly host plants, and delaying as much as possible the bean planting date. Applications of systemic phosphorated insecticides are recommended. [CIAT]

0709

25629 BERNSTEIN, C. 1984. Prey and predator emigration responses in the acarine system Tetranychus urticae-Phytoseiulus persimilis. Oecologia 61(1):134-142. Engl., Sum. Engl., 38 Refs., Illus. [Université Claude Bernard Lyon I, Laboratoire de Biométrie, 69622 Villeurbanne Cedex, France]

Phaseolus vulgaris. Tetranychus urticae. Predators and parasites. United Kingdom.

Some of the processes influencing the emigration of prey and predacious mites from bean plants were investigated experimentally in the United Kingdom using Tetranychus urticae and Phytoseiulus persimilis. The emigration of the prey depended on the damage it caused to the plants and on predator density. The emigration rate of the predator was a decreasing function of prey density, and did not change, or decreased slightly, when no. of prey and predator were increased while maintaining the same prey:predator ratio. The probability of emigration of the predators was independent of their own density when prey was absent and density-dependent when prey density was kept constant. Of the variability in the predator's instantaneous rate of emigration, 42% was accounted for by a 2-parameter negative exponential function of capture rate (no. of prey eaten/predator and per unit of time). [AS]

0710

23886 BURNETT, C.I.; ILE, C.W.; PARE, P.O. 1965. Aerial spraying of insecticide concentrates. World Crops 17(2):72-74. Engl., Illus.

Phaseolus vulgaris. Heliothis zea. Acanthomia horrida. Insect control. Chemical control. Tanzania.

The aerial application of 18.7 l DDT emulsion/ha containing 427 g DDT was compared with the aerial application of 4.7 l/ha of an oil solution concentrate containing 45% g DDT to control Heliothis armigera and Acanthomia horrida in bean fields in Tanganyika (Tanzania). Spraying height of the concentrate was about 3.05 m above the crop. The 2 types of low-volatile oils were not phytotoxic at the levels used. The oil solution killed 99% of H. armigera and 99% of A. horrida, while the emulsion killed 96 and 92%, resp., but the differences were not significant. In similar conditions, the oil solution concentrate is at least as effective as the

usual commercial emulsion spray and the proportion of expended insecticide recovered at crop level is usually higher. If the pests are equally well controlled considerable amounts of insecticide will be saved. [CIAT]

0711

25384 CAMPOS, T.R.; TAKEMATSU, A.F.; RODRIGUES NETO, S.M.; BITRAN, F.A.; OLIVEIRA, P.A.; CHIBA, S. 1984. Controle químico do díptero minador Liriomyza sp. em feijoeiro (Phaseolus vulgaris L.). (Chemical control of the leaf miner Liriomyza sp. in beans). Biológico 50(2):33-38. Port., Sum. Port., Engl., 16 Refs., Illus. [Secao de Pragas das Plantas Alimentícias Básicas e Olerícolas, Inst. Biológico, Caixa Postal 7119, Sao Paulo, Brazil]

Phaseolus vulgaris. Liriomyza. Insect control. Chemical control. Predators and parasites. Brazil.

Field tests were conducted in Sao Paulo, Brazil, on the chemical control of Liriomyza sp. mining the leaves of beans. The best results (significant reductions in the no. of infested leaves, as compared with the other chemical treatments tested or the check) were obtained with sprays of an emulsifiable concentrate containing 2.5% deltamethrin applied at 0.41 l/ha, an emulsifiable concentrate containing 50% chlorthiophos applied at 2.0 l/ha, and a mixed spray containing the deltamethrin emulsifiable concentrate and one containing 50% triazophos applied at 0.4 and 1.0 l/ha, resp. Field-collected pupae were found to be parasitized by Opius weldriventris and Chrysocharis parilea. [Horticultural Abstracts]

0712

25447 CHANDLEE, I. 1984. Crop life table studies of the pests of beans (Phaseolus vulgaris L.) at Goiania, Goiás. Revista Ceres 31(176): 284-298. Engl., Sum. Engl., Port., 35 Refs. [Dept. of Entomology, Purdue Univ., West Lafayette, IN 47907, USA]

Phaseolus vulgaris. Plasmopalpus lignosellus. Acanium. Diabrotica speciosa. Agriotes. Conoderus. Ceuthophilus. Spodoptera frugiperda. Epitta dimidiata. Etiella zinckenella. Megalotorus parvus. Plant injuries. Predators and parasites. Brazil.

On the basis of studies carried out on beans in Goiania (Goiás, Brazil), in 1975-77 to develop a crop life table approach to research on the insect pests of this crop, the insect pests present in Goiania are discussed, with special reference to those not previously or not commonly recorded in Brazil. Two crop life tables are presented. The pests that occurred in the exptl. plots (in the order of their appearance) were Plasmopalpus lignosellus, Diplatys sp., a beetle of the genus Acanium, Diabrotica speciosa, Agriotes sp., Conoderus sp., Ceuthophilus sp., Spodoptera frugiperda, Epitta dimidiata, Etiella zinckenella, and the alydid Megalotorus parvus. [Seed Abstracts]

0713

25588 FRAMOPADO, E.; RODRIGUEZ, F.; BEEBE, S. 1983. Reacción de varias líneas de trifol al ataque de Asphondylia sp en La Entrada, Copán, Honduras en enero 1983. (Reaction of several bean lines to Asphondylia sp. attack in La Entrada, Copán, Honduras, in January of 1983). In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 29a., Panamá, 1983. Memoria. Panamá. v.2. 6p. Span., Sum. Span., 4 Refs.

Phaseolus vulgaris. Cultivars. Asphondilia. Plant injuries. Seed. Pods. Honduras.

Forty-four bean lines were evaluated for their resistance to Asphondilia sp. in La Entrada (Copán, Honduras) in Jan. of 1983. The commercial var. Desarrural V.B., Zamorano, Porrillo, and Criollo local were used as controls. Growth habit, days to flowering and to physiological maturity, diseases, and reproductive adaptation were evaluated. There were considerable differences in tolerance to Asphondilia: 42-78% damaged pods and 17-63% damaged seed. The best materials were APN 67, BAT 1235, Salamá, BAT 1232, EMP 60, APN 71, EMP 87, Llama, and APN 70 with a seed damage of 17, 25, 25, 27, 28, 30, 34, 34, and 35%, resp. BAT 1235 and EMP 60 showed the best adaptability. Among the control var., Desarrural V.B. was the most susceptible with 49% damaged seed. Pest incidence could be related to planting date (15 days after the optimum date) and to the crop environmental conditions. [CIAT]

0714

25687 HEYER, W.; CRUZ, R. 1983. Influencia de la temperatura y la planta hospedera sobre el desarrollo de los estadios biológicos de Diabrotica balteata Lec. (Coleoptera:Chrysomelidae). [Influence of the temperature and the host plant on the development of the biological stages of Diabrotica balteata (Coleoptera:Chrysomelidae)]. Ciencias de la Agricultura no.17:31-40. Span., Sum. Span., Engl., 8 Refs., Illus.

Phaseolus vulgaris. Diabrotica balteata. Temperature. Host range. Insect biology. Cuba.

From studies in Cuba of the influence of temp. on the duration of the preadult stages of Diabrotica balteata, it was calculated that the thresholds for development were 13.4, 11.9, and 12.2°C for the eggs, larvae, and pupae, resp., and that the sums of effective temp. above those thresholds were 98, 200, and 83°C, resp. The duration of the prepupal stages, which last for an av. of 6.8 days, did not appear to be temp.-dependent. The duration of development was similar on maize and on beans. [Review of Applied Entomology]

0715

25385 HOUGH-GOLDSTEIN, J.A.; HESS, E.A. 1984. Seedcorn maggot (Diptera: Antomyiidae) infestation levels and effects on five crops. Environmental Entomology 13(4):962-965. Engl., Sum. Engl., 14 Refs. [Dept. of Entomology & Applied Ecology, Univ. of Delaware, Newark, DE 19717-1303, USA]

Phaseolus vulgaris. Delia platura. Snap beans. Yields. Plant injuries. USA.

During 2 yr of field expt. in Delaware, USA, 5 crops showed consistent differences in their response to Delia platura. Watermelons and melons (cantaloupes) showed greatest stand losses, snap beans and lima beans were intermediate, and sweet maize appeared to be unaffected despite a seed infestation level of at least 70%. More than twice as many larvae and pupae were collected from lima beans than from the melon crops. The smallest no. of larvae and pupae were taken from plots where no seeds were planted. In these plots, larvae that were present either immigrated before pupation or developed on organic soil debris and weed seeds. In 1982, the bean and maize plots produced heavier pupae than the melon plots. Thus, populations of D. platura may build up more rapidly in bean and maize crop areas than in those planted with melons, although stand loss may be more evident in the latter. [AS]

0716

24922 KAREL, A.K. 1983. Integrated pest management on beans in East Africa. Morogoro, Tanzania, University of Dar es Salaam. 3p. Engl. [Univ. of Dar es Salaam, P.O. Box 643, Morogoro, Tanzania]

Paper presented at the International Workshop in Integrated Pest Control of Grain Legumes, Goiania, Brazil, 1983.

Phaseolus vulgaris. Integrated control. Ophiomyia phaseoli. Aphis fabae. Ootheca. Thysanoptera. Maruca testulalis. Heliothis armigera. Acanthomia. Acanthoscelides obtectus. Tanzania.

The strategies of an integrated pest management (IPM) model developed for East Africa are presented, including a schematic model of the IPM program. The major insect pests for which the IPM model was developed are Ophiomyia phaseoli, Aphis fabae, Ootheca spp., Taeniothrips sjostedti, Maruca testulalis, Heliothis armigera, Acanthomia sp., and Acanthoscelides obtectus. The overall strategies of IPM include the use of economic threshold levels as the basis for insecticide use; the periodic assessment of insect pest populations and their natural enemies; the increase of natural enemy populations (parasites, predators, and insect pathogens); intercropping; var. resistance to O. phaseoli, Ootheca spp., T. sjostedti, M. testulalis, and H. armigera; and the selective use of min. application rates of selective or nonselective insecticides when economic threshold levels are exceeded. [CIAT]

0717

25624 MORGAN, W.I. 1940. The bean fly. (Agromyza phaseoli). Agricultural Gazette of New South Wales 51:103-104. Engl., Illus.

Phaseolus vulgaris. Ophiomyia phaseoli. Insect control. Chemical control. Australia.

Damage symptoms and recommended chemical control measures of Agromyza phaseoli, a bean pest, are given. Nicotine sulfate 40% (28.4 g) + white oil emulsion (184.5 g) + water (15.1 l) should be applied; the 1st application should take place 3 days after plant emergence followed by a 2nd application 3 days later and subsequent applications at 4-day intervals. The bean fly is mainly a summer and fall pest in Australia. [CIAT]

0718

25623 MORGAN, W.I. 1938. For bean fly control use white oil-nicotine sulphate mixture. Agricultural Gazette of New South Wales 49:22-24. Engl., Illus.

Phaseolus vulgaris. Snap beans. Ophiomyia phaseoli. Insect biology. Insect control. Chemical control. Australia.

Damage symptoms of the bean fly are described, and observations on its biological cycle are given in addition to chemical control recommendations. Under warm conditions larvae last 6-9 days and pupae, 9-10 days. In fall and winter eggs last 4-7 days, larvae 3-4 wk., and pupae 2-3 wk.; adults live 3-4 wk. The av. no. of eggs laid by 17 females was 99. A mixture of nicotine sulfate (1:800 dilution) + white oil emulsion (1:100 dilution) applied 4 days after plant emergence, and then at 4-day intervals, is recommended. [CIAT]

0719

75620 MURGUIDO, C. 1983. Efectividad de varios insecticidas sobre el saltahojas de los frijoles (Empoasca sp., Homoptera:Cicadellidae). [Effectivity of several insecticides against the bean leafhopper (Empoasca sp. Homoptera:Cicadellidae)]. Ciencia y Técnica en la Agricultura. Protección de Plantas 6(4):67-77. Span., Sum. Span., Engl., 4 Refs. [Inst. de Investigaciones de Sanidad Vegetal, Ministerio de la Agricultura, La Habana, Cuba]

Phaseolus vulgaris. Empoasca. Insect control. Chemical control. Yields. Cuba.

The effectivity of 5 insecticides (methamidophos, dimethoate, carbaryl, malathion, and cartap) against the bean leafhopper was evaluated in 3 field trials in Cuba. In the 1st, the period of protection offered by the insecticides was studied in order to establish the time interval between applications; in the other 2, the performance of the chemicals was appraised in a program of applications with intervals of 10 days up to 56-62 days after seed germination. Methamidophos at a rate of 0.6 l/ha and dimethoate at 0.8 l/ha had a good efficacy up to 10 days after the treatment, and their biological effect varied little during their use in the program. Carbaryl at 1.5 kg/ha showed low efficacy 5 days after application, and during the program its effect progressively decreased from day 34 onwards after seed germination. [AS (extract)]

0720

75619 MURGUIDO, C. 1983. Efecto comparado de algunos insecticidas organofosforados en el control de la mosca blanca (Bemisia tabaci) y del saltahojas (Empoasca sp.) en el cultivo del frijol. (Comparative effect of some organophosphorus insecticides in the control of the whitefly Bemisia tabaci and the leafhopper Empoasca sp. in beans). Ciencia y Técnica en la Agricultura. Protección de Plantas 6(4):59-65. Span., Sum. Span., Engl., 5 Refs. [Inst. de Investigaciones de Sanidad Vegetal, Ministerio de la Agricultura, La Habana, Cuba]

Phaseolus vulgaris. Bemisia tabaci. Empoasca tabae. Insect control. Chemical control. Cuba.

Seven organophosphorus insecticides at 2 different application rates were evaluated for control of the whitefly (Bemisia tabaci) and the leafhopper (Empoasca sp.) in beans as to their efficacy and possibility of use when both pests are found attacking the same field. With respect to Empoasca sp., none of the insecticides at their resp. application rates showed significant differences among themselves. Nevertheless, in the whitefly control favorable results were obtained with the highest application rates of mevinphos, fenthion, and monocrotophos. [AS]

0721

75618 MURGUIDO, C.; BELTRAN, C. 1983. Incidencia y daños del saltahojas (Empoasca sp.) (Homoptera:Cicadellidae) y otras plagas en seis variedades de frijol. [Incidence of and damage caused by the leafhopper Empoasca sp. (Homoptera:Cicadellidae) and other pests in six bean varieties]. Ciencia y Técnica en la Agricultura. Protección de Plantas 6(4):31-38. Span., Sum. Span., Engl., 17 Refs., Illus. [Inst. de Investigaciones de Sanidad Vegetal, Ministerio de la Agricultura, La Habana, Cuba]

Phaseolus vulgaris. Empoasca. Cultivars. Diabrotica balteata. Resistance. Yields. Yield components. Plant development. Entomology. Cuba.

The incidence of and damage caused by the leafhopper in bean var. Bonita 11, Bolita 42, Diacol Calima, M-112, Ica Pijao, and Red Kloud were studied in the Delicias Grandes exptl. station (Cuba). The var. were planted following a randomized block design with 4 replicates. The no. of leafhoppers on the plants was determined 19, 24, 31, 45, 61, and 69 days after germination. The damage was also evaluated by means of a graduated scale prepared for this purpose. At the end of the cropping cycle, the yield of each var. was determined as well as its components and the % of decrease in each case as compared with the healthy plants in the control plots. It was ascertained that the red bean var. (Red Kloud, Diacol Calima, and M-112) showed the highest degrees of damage and yield loss. No relationship was found between the infestation level and the degree of damage to the plants. The yield decrease in the red bean var. varied from 84.01 to 91.19%, in black beans from 79.00 to 80.00%, and in the white beans only 65.00%. [AS]

0722

25603 PENDAS, F.; SERRANO, M.S. 1984. Determinación del porcentaje de parasitismo por Anagrus sp. (Hymenoptera:Mymaridae) sobre Empoasca kraemeri (Homoptera:Cicadellidae) por medio de la técnica de aclaramiento de tejidos vegetales. [Determination of Anagrus sp. (Hymenoptera: Mymaridae) parasitism percentage on Empoasca kraemeri (Homoptera: Cicadellidae) by plant tissue decolorization technique]. Ciencia y Técnica en la Agricultura. Hortalizas, Papa, Granos y Fibras 3(2):7-14. Span., Sum. Span., Engl., 9 Refs., Illus. [Estación Experimental de Granos El Toneguín, Ministerio de la Agricultura, La Habana, Cuba]

Phaseolus vulgaris. Empoasca kraemeri. Predators and parasites. Cuba.

The % of Anagrus sp. parasitism (4.52) and Empoasca kraemeri nymphal emergence (58.9) were determined in an exptl. field sown with bean var. BAT 41, based on a plant tissue decolorization procedure described by Carlson and Hibbs (1962) and modified by Wilde et al. (1976). The technique is described in detail and is shown to be a practical and reliable method. [AS]

0723

23208 QUIROZ I., C. 1983. Plagas del porote en los primeros estados de desarrollo. (Bean insect pests in early developmental stages). In Curso Nacional de Frejoles, 1o., Talca, Chile, 1983. Trabajos presentados. Santiago, Organización de las Naciones Unidas para la Agricultura y la Alimentación. pp.107-121. Span.

Also in Investigación y Progreso Agropecuario La Platina (Chile) no.13: 14-15.

Phaseolus vulgaris. Elasmopalpus lignosellus. Agrotis. Hylemya. Homoptera. Empoasca camara. Tetranychus. Liriomyza quadrata. Epinotia aporema. Acanthoscelides obtectus. Zabrotes subfasciatus. Insect control. Chile.

Bean insect pests commonly found in Chile are briefly described; data on their growth cycle, damage caused, and control are given. Insect pests attacking beans in early growth stages include Hylemya spp., Elasmopalpus lignosellus, Agrotis spp., and other cutworms. Foliage and pod insect pests include Kakiphlugia sp., Syngrapha gamoides, aphids, Empoasca camara, Tetranychus spp., Liriomyza quadrata, and Epinotia aporema. Storage pest include Zabrotes subfasciatus and Acanthoscelides obtectus. The practical field and lab. observations on the topic are briefly described. [CIAT]

0724

22587 RODRIGUEZ, F.; BEEBE, S. 1983. Evaluación de líneas de fríjol Phaseolus vulgaris por su resistencia al picudo de la vaina Apion godmani durante los años 1981-1982 en Danlí, Honduras. (Evaluation of Phaseolus vulgaris lines for their resistance to the bean pod weevil Apion godmani during 1981-82 in Danlí, Honduras). In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 29a., Panamá, 1983. Memoria. Panamá. v.2. 7p. Span., Sum. Span., 10 Refs.

Phaseolus vulgaris. Cultivars. Resistance. Apion godmani. Plant injuries. Adaptation. Honduras.

Bean materials from CIAT (International Apion Nursery) were evaluated for their resistance to the bean pod weevil (Apion godmani) in El Barro and El Tablón (Danlí, Honduras) in 1981-82. The commercial var. Desarrural V.B. was used as the susceptible control. There were significant differences regarding the resistance of the evaluated materials. The % of seed damage was 0-50.4% and 0-40.4% in El Tablón and El Barro, resp. The susceptible control showed the highest % of seed damage. The materials G 3982 (Amarillo 254), G 11406 (Línea 17), G 11566 (Mexico 1790), and G 5767 (Negro 150) were resistant. It is recommended to evaluate the bean pod weevil in early generations to obtain improved adaptability in the materials and to use artificial infestation along with the natural infestation. [CIAT]

0725

25625 TRYON, H. 1892-1894. The bean maggot. Transactions of the Natural History Society of Queensland 1:4-7. Engl.

Phaseolus vulgaris. Oscinis phaseoli. Insect biology. Injurious insects. Australia.

Damage symptoms and a description of the pupae, larvae, and adults of Oscinis phaseoli, which attacks beans in Australia, are presented. Whenever the pest is detected, the entire bean crop should be destroyed and a different crop species should be planted. Two unidentified hymenopterans were observed preying on the pest. [CIAT]

0726

24425 VASQUEZ A., V.; GALLEGOS, P. 1984. Insectos del frejol. (Bean insect pests). In Curso sobre el cultivo de frejol usando la metodología Aprender Haciendo, 1o., Pimampiro, Ecuador, 1984. Conferencias. Quito, Instituto Nacional de Investigaciones Agropecuarias. Programa de Leguminosas de la Estación Experimental Santa Catalina. pp.37-42. Span. [Depto. de Entomología, Estación Experimental Santa Catalina, Inst. Nacional de Investigaciones Agropecuarias, Apartado 340, Quito, Ecuador]

Phaseolus vulgaris. Plant injuries. Agrotis ipsilon. Tetranychus. Empoasca. Ophiomyia. Liriomyza. Phyllonorycter. Acanthoscelides obtectus. Ecuador.

A brief description of bean insect pests and their damage is given, with emphasis on species found in Ecuador. These are Agrotis ipsilon, Empoasca sp., whiteflies (unidentified species), Tetranychus sp., Melanagromyza sp., Liriomyza sp., Phyllonorycter sp., and Acanthoscelides obtectus. [CIAT]

0727

25364 WEINZIERL, R.; FISHER, G.; FOLEFELL, P. 1982. Oregon State University's extension pest management program for snap bean production.

Bean Improvement Cooperative. Annual Report 25:14-15. Engl. [Oregon State Univ., Corvallis, OR 97331, USA]

Phaseolus vulgaris. Snap beans. Diabrotica undecimpunctata. Scutigerella immaculata. Insect control. Whetzelinia sclerotiorum. Botrytis cinerea. Disease control. USA.

Work carried out by the extension pest management program for snap bean production in Oregon State U. (USA), and plans for 1983, are reported. Brief information is provided on Scutigerella immaculata, Diabrotica undecimpunctata, molds (Sclerotinia sclerotiorum and Botrytis cinerea), and other problems. [CIAT]

See also 0505 0526 0548 0577 0777 0779 0822

G00 GENETICS AND PLANT BREEDING

0728

25884 BAETA, J.M.P.; PAISANO, M.F.S. 1983. A influencia da taxa de hibridacao natural em feijoeiro (Phaseolus vulgaris L.) na manutencao de coleccoes vivas. (Effect of the rate of natural hybridization in beans on the maintenance of field collections). Agronomia Lusitana 42(1-2): 45-53. Port., Sum. Port., Engl., 14 Refs. [Inst. Nacional de Investigacao Agraria, Depto. de Horticultura e Floricultura, 2780 Oeiras, Portugal].

Phaseolus vulgaris. Cross-pollination. Cultivars. Genes. Hybridizing. Portugal.

The rate of natural cross-pollination between bean cv. Guanajuato, carrying marker gene V for violet corolla, and Catarino, with pink corolla, was 0.8% under field conditions without chemical pest or disease treatments. This low rate enables field collections to be adequately maintained by taking a few simple precautions, such as varying the relative position of cv. from year to year and placing together those with different cycles and corolla color. [Plant Breeding Abstracts]

0729

22611 COSTA, L.G.C. DA; ZIMMERMANN, M.J.O.; RAVA, C.A.; OLIVEIRA, I.P. DE; CARDONA, O. 1976. Melhoramento de feijao no C.N.P.A.F. (Bean improvement at Centro Nacional de Pesquisa de Arroz e Feijao). In Reuniao Técnica Anual do Feijao, 13a., Porto Alegre-RS, Brasil, 1976. Ata. Porto Alegre, Brasil, Instituto de Pesquisas Agronomicas. pp.109-127. Port., Illus.

Phaseolus vulgaris. Plant breeding. Agricultural projects. Brazil.

The bean improvement project at Centro Nacional de Pesquisa de Arroz e Feijao (Brazil) is described. Priorities for bean improvement are indicated for NE Brazil, with emphasis on diseases, insect pests, and Al toxicity. The crossbreeding plans are described based on the aforementioned priorities; likewise, germplasm distribution policies, training activities, information dissemination, evaluation and reporting of results, and basic research strategies are described. The breeding strategy (mechanism, materials, and processes) is outlined. [CIAT]

0730

25356 GOMES, M.M.; LEAL, N.R.; CORDEIRO, A.R. 1984. Padroes eletroforéticos em progenitores e linhagens de feijao-de-vagem (Phaseolus vulgaris L.). (Electrophoretic patterns in French bean lines and their progenitors). Revista Ceres 31(1 6):231-237. Port., Sum. Port., Engl., 15 Refs., Illus. [Estacao Experimental de Itaguaí, Estrada Rio-Sao Paulo km 47, 23.460 Seropédica, Itaguaí-RJ, Brasil]

Phaseolus vulgaris. Snap beans. Enzymes. Proteins. Brazil.

Extracts from seedlings and germinating seeds of 3 dwarf French bean var. (Bush Blue Lake 274, Green Isle, and Cascade) and 4 breeding lines (6204, 6163, 6185-C, and 6185-CA) were investigated by horizontal polyacrylamide gel electrophoresis. No differences were found in peroxidase or acid phosphatase electrophoregram patterns. Bush Blue Lake 274 differed from Green Isle and Cascade in the patterns presented by leucine aminopeptidase and soluble nonenzyme proteins. Line 6204 displayed the same patterns as Cascade, while the common pattern of the other 3 lines was different again. Among them, 6163 differed from 6185-C and 6185-CA in its esterase pattern. It was concluded that the differences found among the materials studied were slight because of the narrow genetic base, the system of reproduction, and convergent selection. Nevertheless, comparison on this basis could serve as a useful complement to morphological and agronomic features in the characterization of cv. [Plant Breeding Abstracts]

0731

25692 HIDALGO, R., ed. 1984. Catálogo de germoplasma de fríjol común Phaseolus vulgaris L. (Common bean germplasm catalog). Cali, Colombia, Centro Internacional de Agricultura Tropical. Unidad de Recursos Genéticos. 345p. Span.

Phaseolus vulgaris. Germplasm. Seed color. Seed characters. Plant habit. Colombia.

Complete key information of over 16,000 common bean accessions multiplied by CIAT's Genetic Resources Unit is presented. Specific information provided includes CIAT no., identification, local registration, origin, primary and secondary seed colors, seed size, shape, and brilliance, mixtures, and growth habit. [CIAT]

0732

25386 HOOVER, E.E.; BRENNER, M.L.; BRUN, W.A. 1985. Partitioning of ^{14}C-photoassimilates within seeds of Phaseolus coccineus (Lam.) and Phaseolus coccineus x Phaseolus vulgaris L. Plant Growth Regulation 3(1):63-69. Engl., Sum. Engl., 15 Refs. [Dept. of Horticultural Science & Landscape Architecture, Univ. of Minnesota, St. Paul, MN 55108, USA]

Phaseolus vulgaris. Hybridizing. Seeds. Embryo. Phaseolus coccineus. Crossbreeding. Cultivars. USA.

The partitioning within seeds of ^{14}C-photoassimilates at 3 stages of seed development in 2 Phaseolus crosses, P. coccineus selfed and P. coccineus x P. vulgaris, was determined. Abortion of the interspecific embryos occurred when the seed reached 10 mm seed length. When expressed as sink strength (% dpm) or sink activity (% dpm/dry wt.) there were no differences in partitioning of ^{14}C-photoassimilates when whole seeds were analyzed. If the seed was divided into seed coat, liquid endosperm, and embryo, the sink activity of the interspecific embryo was higher than that of the embryo in

the selfed seed. Therefore, abortion of these interspecific Phaseolus embryos appeared not to be caused by a lack of photoassimilates. [AS]

0733

25374 MARSH, L.; DAVIS, D.W.; LI, P.H.; SILBERNAGEL, M.J. 1982. Two methods of evaluating genotypes of Phaseolus vulgaris under high temperature stress. Bean Improvement Cooperative. Annual Report 25:55-56. Engl., 1 Ref. [Dept. of Horticultural Science & Landscape Architecture, Univ. of Minnesota, St. Paul, MN 55108, USA]

Phaseolus vulgaris. Genotypes. Temperature. Cultivars. Production. USA.

Two methods were compared for evaluating 5 bean genotypes (80 BP-6, 80 BP-2, BBI 47, 5 BP 7, and PI 271998) under high temp.: electrical conductivity and hot water dip. The conductivity method indicated that 5 BP 7, 80 BP-2, and PI 271998 were tolerant and had higher killing times (100, 105, and 120 min at 50°C). Similar results were observed in the hot water dip method at 31 and 33°C. [CIAT]

0734

22524 PEREIRA FILHO, I.A.; CAVARIANI, C. 1984. Taxa de hibridacao natural do feijoeiro comum em Patos de Minas, Minas Gerais. (The rate of natural hybridization in common beans in Patos de Minas, Minas Gerais). Pesquisa Agropecuária Brasileira 19(9):1181-1183. Port., Sum. Port., Engl., 6 Refs. [Empresa de Pesquisa Agropecuária do Estado de Minas Gerais, Fazenda Experimental de Patos de Minas, Caixa Postal 135, 38.700 Patos de Minas-MG, Brasil]

Phaseolus vulgaris. Cultivars. Cross-pollination. Hybridizing. Brazil.

To evaluate the frequency of natural hybridization in common beans, 2 bean var. were planted in Patos de Minas, Brazil, in alternate rows in the rainy and dry seasons of the 1982-83 crop year. A hybridization rate of 1% was found in both seasons. Numerous thrips were observed during crop growth; these were probably the vectors responsible for natural cross-pollination. [AS]

0735

25381 ROBERTS, M.H.E. 1982. List of genes - Phaseolus vulgaris L. Bean Improvement Cooperative. Annual Report 25:109-119. Engl.

Phaseolus vulgaris. Genetics. Genes. Plant breeding.

A complete list of approx. 200 bean gene symbols and their connotations is given in alphabetical order. [CIAT]

0736

24829 SINGH, S.P.; GUTIERREZ, J.A. 1984. Geographical distribution of the DL_1 and DL_2 genes causing hybrid dwarfism in Phaseolus vulgaris L., their association with seed size, and their significance to breeding. Euphytica 33:337-345. Engl., Sum. Engl., 9 Refs. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Hybrids. Plant breeding. Seed characters. Plant habit. Cultivars. Crossbreeding. Hybridizing. Genes. Colombia.

Dwarfism in F_1 hybrids was observed in over 100 crosses of dry beans at CIAT (Cali, Colombia). In each cross, one parent always had small seeds

and the other parent either medium or large ones. This apparent incompatibility between the 2 groups of germplasm was controlled by 2 complementary, dominant genes: DL_1 and DL_2. Small-seeded bean lines carried gene DL_1 and originated in Brazil, Colombia, Guatemala, and Mexico; medium- or large-seeded bean lines carried gene DL_2 and were from Bolivia, Brazil, Chile, Colombia, Turkey, USA, and West Germany. These 2 genes have probably played an important role in the evolution of dry bean forms of different seed sizes by serving as a genetic barrier or isolating mechanism, thus limiting free genetic recombination between the 2 germplasm groups. Apparent differences in the adaptiveness and yielding ability of the 2 groups of bean germplasm, small- vs. medium- and large-seeded, and some breeding implications for manipulation of the genes causing F_1 hybrid dwarfism were also discovered. [AS]

0737

21940 ZIMMERMANN, M.J.O.; ROSIELLE, A.A.; FOSTER, E.W.; WAINES, J.G. 1985. Gene action for grain yield and harvest index of common bean grown as sole crop and in intercrop with maize. Field Crops Research 12:319-329. Engl., Sum. Engl., 16 Refs. [Centro Nacional de Pesquisa de Arroz e Feijao, Caixa Postal 179, 74.000 Goiania-GO, Brasil]

Phaseolus vulgaris. Cultivars. Intercropping. Zea mays. Yields. Genes. Crossbreeding. Plant breeding. Brazil.

The genetic control of grain yield and HI in 3 common bean crosses grown in intercrop and sole crop were studied by generation means analysis. Each cross had Turtle Soup (TS39) as the male parent, and the female parents were 2602, 7775, and Gloria. For each cross, 6 generations were grown, namely, parents (P_1, P_2), F_2s, F_3s, and F_2s from backcrosses to both parents (BC_1 and BC_2). Genetic effects for grain yield and HI were different for each cross in each system. Generally, there were more significant genetic effects in intercrop than in sole crop for both traits, the only exception being for grain yield in the cross Gloria x TS39. Additive gene action was significant for grain yield in 2 crosses in intercrop and for 1 cross in sole crop. For HI, additive effects were significant for 2602 x TS39 in sole crop, for 7775 x TS39 in intercrop, and for Gloria x TS39 in both systems. Dominance was significant for all crosses and traits in intercrop. In sole crop, dominance was important for grain yield in the cross Gloria x TS39 and for HI in the cross 7775 x TS39. Significant epistasis occurred in all crosses for both traits and in all cases interacted with cropping systems. Most significant epistatic effects for grain yield occurred in sole crop; however, for HI they occurred in intercrop. Significant additive x additive epistasis for grain yield occurred for the cross Gloria x TS39 in sole crop. The HI showed significant additive x additive epistasis in the same cross in intercrop and in 2602 x TS39 in sole crop. [AS (extract)]

See also 0485 0556

G01 Breeding, Seleccion and Germplasm

0738

25318 ALLAVENA, A. 1984. Miglioramento varietale del fagiolo da granella. (Bean varietal improvement). L'Informatore Agrario 40(48):39-41. Ital., Sum. Ital., 10 Refs., Illus.

Phaseolus vulgaris. Cultivars. Seed color. Resistance. Bean common mosaic virus. Pseudomonas phaseolicola. Selection. Italy.

Information is given on 4 investigations on bean var. improvement in Montanaso (Milan, Italy) to obtain resistance and/or tolerance to BCMV and Pseudomonas phaseolicola; suitability for mechanized harvesting and agronomic validity were also sought. The trials included line selection by a modified pedigree breeding scheme, agronomic comparison, and technological and bioagronomical evaluations. Although resistance factors to BCMV have been easily transferable to the new selections, the same did not occur with the resistance to P. phaseolicola due to the presence of this factor in wild or nontraditional genotypes and to the close relationship between this and other characters (e.g., seed coloration). Information is given on the 1st Italian white bean var. (Montebianco, Niveo, Montalbano, and Mogano) with resistance to BCMV and a short vegetative cycle. Hopefully, these new var. will encourage the cultivation of this legume. [CIAT]

0739

25366 ALLAVENA, A.; SORESSI, G.P. 1982. Release of new dry bean varieties resistant to BCMV and Pseudomonas phaseolicola. Bean Improvement Cooperative. Annual Report 25:26-27. Engl. [Experimental Inst. on Vegetable Crops, Via Paullese, 28 - 20075 Montanaso Lombardo (Milano), Italy]

Phaseolus vulgaris. Bean common mosaic virus. Pseudomonas phaseolicola. Cultivars. Resistance. Yields. Italy.

The reaction to BCMV and Pseudomonas phaseolicola and data on yield, seed wt. and shape, and cropping cycle are given for bean var. Giulia, Lena, Minia, Monoviso, and Morena, compared with the controls Mary and Taylor's Horticultural. Data was based on trials carried out for 2 yr at 3 sites in northern Italy. Monoviso and Morena were resistant to both diseases, whereas Giulia, Lena, and Minia were resistant only to BCMV. [CIAT]

0740

24635 ALLEN, D.J.; NDUNGURU, B.J. 1984. Recent advances in control of legume diseases. In Hawksworth, D.L., ed. Advancing Agricultural Production in Africa, Arusha, Tanzania, 1984. Proceedings. Farnham Royal, Slough, England, Commonwealth Agricultural Bureaux. pp.101-105. Engl., 19 Refs. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Plant breeding. Bean common mosaic virus. Colletotrichum lindemuthianum. Isariopsis griseola. Uromyces phaseoli. Pseudomonas phaseolicola. Disease control. Tanzania.

Overall progress achieved in the control of legume diseases worldwide, with emphasis on groundnuts, beans, and cowpeas, is reviewed. Diseases, as production constraints, are discussed, stressing CIAT's bean improvement strategy that has given high priority to BCMV, Colletotrichum lindemuthianum, Isariopsis griseola, Uromyces phaseoli, and Pseudomonas phaseolicola. The overall strategy of host plant resistance is discussed within the context of recent advances in disease management. Disease resistance breeding appears to have been based on the extensive collections of germplasm held at the international centers, improved methods of evaluation of the available genetic diversity, the use of off-season nurseries to accelerate breeding, and the establishment of multi-disciplinary research teams working on a single commodity. Future challenges are discussed. [CIAT]

0741

25365 BAGGETT, J.R.; HYDE, M. 1982. Field tests of bean lines and cultivars for susceptibility to white mold. Bean Improvement Cooperative. Annual Report 25:24-25. Engl. [Dept. of Horticulture, Oregon State Univ., Corvallis, OR 97331, USA]

Phaseolus vulgaris. Whetzelinia sclerotiorum. Cultivars. Resistance. Selection. USA.

Field tests for resistance to Sclerotinia sclerotiorum were conducted in 1980 and 1981 in Corvallis (Oregon, USA) with 64 bean lines and cv. and 1 Phaseolus coccineus line. Results are given for each material on a 0-5 scale. P.I. 361520 showed some resistance but not as much as Black Turtle Soup and B 3749. Var. Midnight and Astro also showed resistance. [CIAT]

0742

26005 BEAN/COWPEA COLLABORATIVE RESEARCH SUPPORT PROGRAM. U.S.A. 1984. Improvement of bean production in the Dominican Republic through breeding for multiple disease resistance. In _____. 1984 Annual Report. I. Technical summary. East Lansing, Michigan State University. pp.86-97. Engl.

Phaseolus vulgaris. Plant breeding. Cultivars. Adaptation. Yields. Resistance. Uromyces phaseoli. Xanthomonas phaseoli. Germplasm. Meloidogyne incognita. Agricultural projects. Dominican Republic. Puerto Rico.

The results of project activities in 1984 to improve bean production in the Dominican Republic and Puerto Rico, through breeding for multiple disease resistance, are presented. General aspects of the project are discussed. Advanced lines have yielded well and have shown good disease resistance under local conditions; genotype 8241-372 showed low levels of infection by Uromyces phaseoli and Xanthomonas phaseoli. Techniques for conducting a field crossing block were refined. Approx. 400 kg of basic seed of the white-seeded var. Arroyo Loro No. 1 were given to the Ministry of Agriculture for certified seed production. Germplasm resistant to 2 races of Meloidogyne incognita was identified as well as high-yielding black- and white-seeded bean lines with stable performance over a wide range of environmental conditions. Training objectives and outputs and expected short-term research outcomes are summarized. Research plans for 1985 are included. [CIAT]

0743

25651 CASAS D., E. 1958. Herencia de tres caracteres morfológicos en frijol y su relación con la obtención de variedades puras. (Inheritance of three morphological characteristics in beans and its relationship to the obtainment of pure varieties). Tesis Ing.Agr. Chapingo, México, Secretaría de Agricultura y Ganadería. Escuela Nacional de Agricultura. 48p. Span., Sum. Span., 20 Refs., Illus.

Phaseolus vulgaris. Cultivars. Inheritance. Genes. Plant habit. Flowers. Stems. Mexico.

The inheritance of the characteristics of growth habit and flower and stem color was studied in 5 pure lines (Pue.-40-2, Hgo.-48-A-1, Mich.-68, Zav.-9-A-6, and Hgo.-48-A-1). Thirty crosses were made in the greenhouse and the seeds obtained were sown in the field, obtaining an F_2 generation. The inheritance of growth habit was simple due to a pair of allelomorphic genes. The inheritance of flower color, taking 2 colors at a time, was simple, purple dominating over pink and white, and in turn, pink dominating

over white; a ratio of 3:1 always existed in any combination. The inheritance of stem color was also simple, dominating purple-colored or pigmented stem over green-colored or nonpigmented stem. [CIAT]

0744

25614 CHATEL, M. 1981. Amelioration varietale du pois du Cap (Phaseolus lunatus L.) a Madagascar. (Phaseolus lunatus varietal improvement in Madagascar). Agronomie Tropicale 36(3):294-298. Fr., 10 Refs., Illus. [Inst. de Recherches Agronomiques Tropicales et des Cultures Vivrieres, B.P. 853, Tananarive, Madagascar]

Phaseolus lunatus. Cultivars. Selection. Plant breeding. Genotypes. Yields. Madagascar.

Results of Phaseolus lunatus var. improvement in Madagascar are presented. Historical and botanical data, crop regions, monocrops and associated crops, yield and yield component data, and screening, carried out at the Tulear Station from 1970 to 1976, are included. The main selection criterion has been the absence of antocyanic spots on the seed due to the gradual disappearance of the white-seed type of P. lunatus, the reappearance of hybrids with stained seed, and a marked decrease of cultivated area (19,190 to 6790 ha), of production (19,377 to 8050 t), and of exports (16,476 to 8068 t) between 1975-78. Several phenotypes and their corresponding genotypes are described. The phenotype is white only when the gene of base coloration (C: chromogenic) is found in recessive homozygous state. Pedigree selection (controlled selfing) was carried out with 54 lines from 5 local ecotypes (Morombe, Ankikiloako, Betanimena, Fiherenana, and Manombo), 2 being selected for their vulgarization: Betanimena 117-15 (line 11) and Manombo 55-1 (line 8). The need to take measures to conserve the quality of these cv. is emphasized. [CIAT]

0745

25433 CONTI, I. 1985. Conclusive results of a selection programme for obtaining a dwarf bean (Ph. vulgaris) resistant to some viruses and characterized by agronomical qualities. Genetica Agraria 39(1):51-63. Engl., Sum. Engl., 21 Refs. [Fondazione Centro Lombardo di Orto-floro-frutticoltura, Istituto di Ricerche Orticole, Minoprio, Como, Italia]

Phaseolus vulgaris. Cultivars. Crossbreeding. Protein content. Yields. Yield components. Agronomic characters. Selection. Germplasm. Bean common mosaic virus. Bean yellow mosaic virus. Cucumber mosaic virus. Resistance. Plant breeding. Italy.

The selection program carried out to obtain new Borlotto-type bean was based on crosses between Degli Ortolani, which has a climbing habit, bronze-colored seeds, low protein content, and resistance to BCMV, BYMV, and cucumber mosaic virus, and Dwarf Borlotto, which has a medium to high protein content and high-quality seeds (pink background and dark-red variegation). The F_1, F_2, and backcross generations were studied for 11 characters in the field and were also assessed in the greenhouse using inoculation. From 600 dwarf F_2 types, 5 advanced generation lines were selected, of which line 218 had the highest seed yield/plant and high values for seed wt., no. of seeds/pod, and pod length. Line 338 had the highest protein content. These 2 lines have resistance to BCMV and tolerance to BYMV and cucumber mosaic virus; a 3rd promising line, 134, was resistant to LCMV and BYMV, with tolerance to cucumber mosaic virus. All these lines had high-quality seeds. [Plant Breeding Abstracts]

0746

25378 DICKSON, M.H.; HUNTER, J.E. 1982. Progress in breeding for white mold resistance. Bean Improvement Cooperative. Annual Report 25:100-101. Engl. [Depts. of Seed & Vegetable Sciences & Plant Pathology, New York State Agricultural Experiment Station, Geneva, NY, USA]

Phaseolus vulgaris. Plant breeding. Cultivars. Resistance. Whetzelinia sclerotiorum. Crossbreeding. Inheritance. USA.

Advances in breeding for resistance to Sclerotinia sclerotiorum in beans, using the juvenile stem test on 3-wk.-old plants and a mature plant-blossom test, are briefly reported. Data are given on the development of resistance to S. sclerotiorum as result of selection of resistant plants and setting up segregating populations of bean crosses using the juvenile stem test and segregation for resistance of F_3 lines from crosses of resistant selections from the 1st cycle. Results indicate that it was possible to pyramid genes for resistance starting with parents with little or no apparent resistance. [CIAT]

0747

25379 DICKSON, M.H.; BOETTIGER, M.A. 1982. Semi-hard seed in snap beans--a tool for selection for seed quality. Bean Improvement Cooperative. Annual Report 25:102-103. Engl. [New York State Agricultural Experiment Station, Geneva, NY, USA]

Phaseolus vulgaris. Snap beans. Seed characters. Crossbreeding. Cultivars. Inheritance. Selection. USA.

Screening for improved bean seed quality via selecting for semihard seed is briefly reported. Data on the segregation for semihard seed in a cross between the semihard-seeded line 887-191 and Galaslim and NY 8603, which did not exhibit the semihard seed character, are presented. Narrow sense heritability was 18 and 42%, resp. Selecting for improved seed quality via selecting for semihard seed may be easier than using the drop technique. It has been observed that the excellent seed coat results in reduced susceptibility to Pythium. Lines which have been identified as semihard seed seem to be completely free of seed defects. [CIAT]

0748

25380 DICKSON, M.H.; HUNTER, J.E. 1982. Sources of white mold resistance and breeding for resistance. Bean Improvement Cooperative. Annual Report 25:104-105. Engl. [Depts. of Seed & Vegetable Sciences & Plant Pathology, New York State Agricultural Experiment Station, Geneva, NY, USA]

Phaseolus vulgaris. Germplasm. Cultivars. Resistance. Whetzelinia sclerotiorum. Plant introductions. Crossbreeding. USA.

A list is given of 27 bean lines from a plant introduction collection in which 50% or more of the plants survived following inoculation of juvenil stems with Sclerotinia sclerotiorum. The segregation of F_3 lines for S. sclerotiorum resistance from crosses of susceptible x resistant parents is indicated. [CIAT]

0749

25608 DICKSON, M.H.; BOETTIGER, M.A. 1977. Screening plant introductions for Pythium and Fusarium resistance. Bean Improvement Cooperative. Annual Report 20:80-81. Engl.

Phaseolus vulgaris. Plant introductions. Selection. Resistance. Pythium ultimum. Fusarium. USA.

A total of 2971 Phaseolus vulgaris and P. coccineus accessions from Central and South America and 922 from Turkey and Ethiopia were screened for resistance to Pythium ultimum and Fusarium. Pythium and Fusarium ratings are given for 'superior' plant introductions. [CIAT]

0750

.5312 [illegible], F. 1982. Maintenance breeding of beans. In FAO/SIDA Technical Conference on Improved Seed Production, Nairobi, Kenya, 1981. Seeds: proceedings. Rome, Food and Agriculture Organization of the United Nations. FAO Plant Production and Protection Paper, no. 39, pp 140-150. Engl., Sum. Engl., Fr., Span., 12 Refs., Illus. [Inst. for Horticultural Plant Breeding, P.O.B. 16, 6700 AA, Wageningen, The Netherlands]

Phaseolus vulgaris. Plant breeding. Selection. Cultivation. Netherlands.

A selection scheme for maintenance breeding for bean var. is developed, based on a yearly recurrent line selection, and selection of pedigrees followed by 4 or 5 bulk increases with negative mass selection. The rate of cross-pollination and the isolation between the maintenance fields of different var. are discussed. A design of the field plots is given, while details of the agricultural practice (sowing, harvesting, threshing, and labelling of the seed lots) are described. Six selection rounds during line selection are distinguished for morphological and physiological characters. For seed-borne fungal, bacterial, and viral diseases are listed. Plants infected with these diseases must be removed during selection. Screenhouse tests of lines for resistance to some main diseases are mentioned. The different seed increases for selected lines for crop production are quantified with a numerical example. [27 (extract)]

0751

.5329 [illegible] R., R.; FEUYIAO, G.I.; SIEADMAN, J. 1984. Evaluación y selección de germoplasma de frijol resistente a la roya (Uromyces phaseoli). [Evaluation and selection of bean germplasm resistant to rust (Uromyces phaseoli)]. In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 29a., Panamá, 1984. Memoria. Panamá. v.1. 4p. Span., 4 Refs. [Univ. de Puerto Rico, Mayaguez, Puerto Rico 00708]

Phaseolus vulgaris. Cultivars. Germplasm. Resistance. Uromyces phaseoli. Selection. Panama.

A field trial was conducted at the Isabela Exptl. Farm, Puerto Rico, to evaluate and select sources of resistance to bean rust that could be combined with the material F-190 to obtain a polygenic type of resistance to the pathogen. Fifty-six lines from diverse origin (USA, Puerto Rico, and Colombia) were used in a randomized block design with 2 replications. A list of the rust-resistant and rust-susceptible lines is presented, which also includes information on line origin, pustule size (45 and 64 days after germination), and infection intensity (0-100%). [CIAT]

0752

.116 EDH, G.I.; MUGHOGHO, L.K.; KAO, Y.P. 1975. Bean improvement programme: 1974/75 experiments. Lilongwe, University of Malawi. Bunda College of Agriculture. Research Bulletin no.6. pp.51-100. Engl., Sum. Engl.

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Intercropping. Zea mays. S. Yield components. Fertilizers. Spacing. Planting. Resistance. Pseudomonas phaseolicola. Xanthomonas phaseoli. Uromyces phaseoli. Colletotrichum lindemuthianum. Malawi.

In var. trials in different areas of Malawi, Phaseolus vulgaris cv. 599/5 gave the highest seed yields (1.52 t/ha). Pure stands of maize and beans produced 10.35 t grain and 2.62 t seed/ha, resp., whereas a mixed crop produced 10.50 t/ha. Pusting of 3 bean cv. with S increased yield from 7.34 to 10.07 t/ha and the highest yield over all sites was given by 60 kg N + 25 kg S/ha. Chlorothalonil was the most effective fungicide tested, increasing seed yield from 1.15 to 1.87 t/ha. Competition from weeds reduced yields during the 1st 21-25 days after sowing. Although removal of 6 fully-expanded young leaves reduced seed yield by 9.4%, the total value of seed and fresh leaves was higher in defoliated plants than in untreated controls. Under irrigation, it was found that there was no advantage in sowing more than 1 seed/hill. Developmental and physiological patterns were studied under irrigated and rainfed conditions. [Field Crop Abstract.]

0753

25879 ESTRADA, S.; MUTSCHLER, M.A.; BLISS, F.A. 1984. Temperature-influenced instability in a genic male-sterile common bean. HortScience 19(3):401-402. Engl., Sum. Engl., 5 Refs. [Cornell Univ., Ithaca, NY 14853, USA]

Phaseolus vulgaris. Plant fertility. Sterility. Backcrossing. Inheritance. Temperature. USA.

Genic male sterilies of common bean showed an av. of 68% outcrossing. Outcrossing estimates are conservative due to selfing or sibbing made possible by unexpected fertility restoration in plants initially classified as male sterile. In growth chamber studies, a temp. regime of 30/18° C day/night for 2 wk. after flowering altered the expression of unstable sterile plants from partial sterile to male sterile. The reverse shift was conditioned by an 18/27° C day/night temp. regime. Sterility was restored again by returning plants to the higher temp. The sterile F_1 progenies of the cross male sterile x 'Wedish Brown-10' were all unstable. Temp.-stable sterilies were obtained by selfing cold-treated, unstable sterilies or by using these plants to pollinate stable sterilies. [AS]

0754

25889 FACCIOLI, G.; CERATO, C.; MAINES, G. 1984. Interventi fitopatologici per l'introduzione della resistenza al virus, nel fagiolo da industria. (Phytopathological measures to introduce virus resistance into beans for processing). Informatore Agrario 40(48):33-36. Ital., Sum. Ital., 28 Refs., Illus. [Istituto di Patologia Vegetale, Universita di Bologna, Italy]

Phaseolus vulgaris. Cultivars. Plant breeding. Crossbreeding. Resistance. Bean common mosaic virus. Bean yellow mosaic virus. Selection. Italy.

The breeding program in Phaseolus vulgaris for resistance to BCMV was based on crosses between resistant cv. Brando, Royal Red Kidney, Lisa, and Mary (from a cross involving Royal Red Kidney and Great Northern U1L5) and the lines of the Cannellino type 15/7, 46/79, and Lingot C1811, and also Taylor, of the Borlotto type. Following inoculation, BC_1 material from crosses involving 46/79, 15/79, and Royal Red Kidney was resistant to pathotypes II and IV of BCMV and 2 F_7 lines from Mary x Borlotto Taylor

were resistant to these 2 pathotypes of BCMV and also to cucumber mosaic virus and BYMV. In all the other crosses segregation for resistance was observed. [Plant Breeding Abstracts]

0755

5760 FRANCIS, C.A.; FLOR, C.A.; TEMPLE, S.R. 1975. Adapting varieties for intercropped systems in the tropics. Cali, Colombia, Centro Internacional de Agricultura Tropical. 36p. Engl., Sum. Engl., 37 Refs., Illus.

Paper presented in Multiple Cropping Symposium, American Society of Agronomy Annual Meeting, Knoxville, Tennessee, 1975.

Phaseolus vulgaris. Intercropping. Cultivars. Spacing. Planting. Timing. Weeding. Colombia.

Current methodologies and selection criteria used to screen and adapt var. for intercropping systems, especially beans/maize associations, in the tropics are reviewed. The overall importance of intercropping systems in the tropics is discussed as well as general plant characteristics useful for these systems. Relevant data taken from the literature are given to illustrate the potential of increasing bush and climbing bean yields in intercropping systems as well as results of expt. showing the effect on yields of intercropping beans/maize. Basic procedures followed at CIAT to screen new var. in beans/maize associations are described for bush beans (monoculture at 350,000 plants/ha and intercropped with maize at 350,000 and 40,000 plants/ha, resp.; beans planted 15 days before maize) and climbing beans (monoculture at 300,000 plants/ha and intercropped with maize at 300,000 and 40,000 plants/ha, resp.). Selection criteria for this breeding procedure are briefly discussed including photoperiod insensitivity, maturity, short and remodying plant types, population response, uniformity of flowering and maturity, insect and disease resistance, and yield potential. The final step consists of on-farm testing of new var. and cultural practices, and an evaluation of their impact on farm income and family nutrition. [CIAT]

0756

22581 FEFYTAG, G.F.; ZAPATA, M.; ECHAVEZ F., R. 1983. Avances en el mejoramiento del frijol para resistencia al tizón común (Xanthomonas) en Puerto Rico. [Advances in bean improvement for resistance to common blight (Xanthomonas) in Puerto Rico]. In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 29a., Panamá, 1983. Memoria. Panamá. v.?. 2p. Span., 5 Refs.

Phaseolus vulgaris. Germplasm. Xanthomonas phaseoli. Resistance. Cross-breeding. Selection. Puerto Rico.

The breeding program of Tropical Agriculture Research Station of the U. of Puerto Rico carries out bean germplasm evaluations to obtain resistance to various Xanthomonas strains. Resistant lines are mentioned, namely, 7931981, 7931987, and 7931945 (Cornell), and XR-235-1-1 (derived from a Phaseolus coccineus cross). The crosses made in the greenhouse in May of 1981 with advanced lines from Puerto Rico and Cornell in combination with 12 upright lines with multiple resistance are reported. It is indicated that 11 lines maintain high levels of resistance to common blight. Selections 8.1-177, -250, -472, and -409 are characterized for being upright plants with multiple disease resistance. [CIAT]

0757

21673 GUTIERREZ, J.A.; SINGH, S.P. 1985. Heterosis and inbreeding depression in dry bush beans, Phaseolus vulgaris L. Canadian Journal of Plant Science 65(2):243-249. Engl., Sum. Engl., Fr., 15 Refs. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Cultivars. Heterosis. Crossbreeding. Yields. Yield components. Colombia.

Heterosis and inbreeding depression in 13 crosses involving 10 dry bush bean lines and var. are reported for days to maturity, pods/plant, 100-seed wt., seeds/pod, and bean yield. Six crosses showed positive heterosis (27.5-47.3%) over the mid-parent value for bean yield. Parents in each of these heterotic crosses differed for growth habit, seed size, and geographical origin, but none of the F_1 hybrids yielded significantly better than the highest yielding parental line. None of the crosses showed heterosis for pods/plant. All significant heterotic values for seeds/pod were negative. For 100-seed wt., 3 crosses, both parents of which had small seeds, showed positive heterosis but 1 cross, which had a significant negative value, had 1 parent with small seeds and the other with large seeds. One heterotic cross each for bean yield and 100-seed wt. showed subsequent inbreeding depression, but 5 crosses for bean yield and 1 cross for 100-seed wt. showing positive heterosis did not exhibit reduction due to inbreeding. Also, some crosses which either had nonsignificant or negative heterotic values for bean yield and yield components showed positive effects of inbreeding, i.e. the F_2 outperformed the corresponding F_1 hybrids. Possible causes for these phenomena are discussed. [AS]

0758

25605 HAGHIGHI, E.; ZULUAGA, S.; ASCHER, P.D. 1984. Hybridization and rapid asexual propagation of Phaseolus vulgaris - P. acutifolius. Bean Improvement Cooperative. Annual Report 27:42-44. Engl., 5 Refs. [Dept. of Horticultural Science & Landscape Architecture, Univ. of Minnesota, St. Paul, MN 55108, USA]

Phaseolus vulgaris. Cultivars. Crossbreeding. Propagation. Hybridizing. Hybrids. Phaseolus acutifolius. USA.

The crossability of selected parental lines of Phaseolus, the rapid asexual propagation of sterile F_1 plants and parents, and a technique for proving hybridity at an early stage of growth, were studied using all possible crosses between 2 P. acutifolius accessions and 4 bean var. Fifty-one crosses produced 114 mature F_1 seeds. Some F_1 hybrids showed hybrid vigor and variegated leaves. Hybrids were verified by root peroxidase patterns. After 6 days, cuttings produced a greater no. and more elongated roots in perlite than in vermiculite. The crossability and subsequent embryo and plant development are influenced by the genotypes of both parents; much higher crossability of certain accessions demonstrates the importance of the maternal genotype. Root peroxidase patterns can identify hybrids very early. Root sampling for peroxidase assay of cuttings rooted in clear plastic pouches has advantages to cuttings rooted in the soil media. Viable hybrids can be propagated successfully. [CIAT]

0759

25890 JOSHI, P.D.; MEHRA, F.I. 1983. Genetic variability in French bean (Phaseolus vulgaris L.). Progressive Horticulture 15(1-2):109-111. Engl., Sum. Engl., 5 Refs. [National Bureau of Plant Genetic Resources, Regional Station, Phagli, Simla 171 021, India]

Phaseolus vulgaris. Snap beans. Genotypes. Agronomic characters. Inheritance. Genetics. Yields. Yield components. India.

Information is presented on genotypic and phenotypic coefficients of variation, heritability, and genetic advance for seed yield/plant and 10 related characters, based on an analysis of data from 42 geographically diverse French bean genotypes. Heritability estimates and expected genetic advance were high for 100-seed wt., plant height, pod no./plant, pod length, and seed yield/plant; selection based on these traits is recommended. [Plant Breeding Abstracts]

0760

25893 KELLY, J.D.; ADAMS, M.W.; SAETTLER, A.W.; BOSFIELD, G.L.; GHADERI, A. 1984. Registration of Laker navy bean. Crop Science 24(6):1210. Engl., 7 refs. [Crop & Soil Sciences, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Cultivars. Bean common mosaic virus. Uromyces phaseoli. Colletotrichum lindemuthianum. Seed characters. USA.

Phaseolus vulgaris cv. Laker originated from the 3-way cross Pijao/NEP2//[illegible] (W.70/Kentwood) made in 1976. It exhibits an upright, type I, determinate growth habit; plants are on av. 55 cm tall, about 20 cm taller than Seafarer, are erect, narrow in profile with a few basal branches and are highly resistant to lodging. Laker requires a full season (100-105 days) to reach maturity and has exceeded yields of the standard cv., Seafarer, by [illegible] over a yr and [illegible] sites in Michigan, USA. It is best adapted to highly productive sites which attain adequate heat units and where type II cv. tend to lodge. Laker carries the single dominant I gene form of resistance to all strains of BCMV, is resistant to the alpha race of Colletotrichum lindemuthianum, and is highly resistant to Uromyces phaseoli races prevalent in Michigan. It is also tolerant of O_3 pollution to which all standard cv. are susceptible. Seed wt., color, and cooked quality and texture are all acceptable. [Plant Breeding Abstracts]

0761

25600 LE MARCHAND, M.C. 1982. Essai de synthese sur l'orientation a donner a la sélection du haricot dans le cadre de l'aide aux pays en voie de développement. (Synthesis on the direction that bean selection should take in view of aid for developing countries). Bulletin d'Information de l'INIAC 11(4-6):247-260. Fr.

Phaseolus vulgaris. Selection. Cultivars. Yields. Disease control. Uromyces phaseoli. Zaire.

The ecological and technical conditions of bean selection in the mountainous regions of Kivu, Zaire, are briefly reported. Several results of selection trials and conclusions that can help direct the research on semiclimbing Phaseolus vulgaris are given. Tables on the productivity of the best var. (Bayo, Ibundu, Kisozi 0100, Colorado Fanra Kilo, Cuarentino Nain de Fyondo, Beurré d'Alger, Kulma Eaiko-Ini, and S.G. 44), plant sanitary treatments, resistance, and influence of ecological factors are included. [CIAT]

0762

25872 MARSH, L.F.; DAVIS, D.W.; II, P.H. 1985. Selection and inheritance of heat tolerance in the common bean by use of conductivity. Journal of the American Society for Horticultural Science 110(5):680-683. Engl.,

Sum. Engl., 15 Refs. [Dept. of Agr., Lincoln Univ., Jefferson City, MO 65101, USA]

Phaseolus vulgaris. Inheritance. Plant breeding. Temperature. Resistance. Cultivars. Crossbreeding. Selection. USA.

Inheritance and selection of heat tolerance were investigated in common bean. Parental, F_1, backcross, and F_2 populations from the crosses PI 271998 x BBL 47, PI 271998 x SO BP-6, and SBP-7 x BBL 47 were used in the inheritance study. Parental, F_2, F_3 and backcross populations of the cross PI 271998 x BBL 47 were used to estimate selection gain. Plants were evaluated for heat tolerance by the conductivity method after 32 days in the growth chamber at 30/15°C (day/night) and acclimation at 37°C for 24 h. The joint scaling test indicated that the additive-dominance model was adequate to explain heat tolerance in crosses PI 271998 x BBL 47 and S BP-7 x BBL 47. The major variation for tolerance for these 2 crosses may be controlled by a small no. of genes. The additive-dominance model was inadequate for PI 271998 x SOBP-6, however, and epistasis was present. Narrow sense heritability estimates ranged from 2.9 to 24.0%, indicating relatively small additive effects. Broad sense heritability estimates ranged from 0 to 71.6%, suggesting sizable environmental effects. Realized heritability from selection for tolerant F_2 plants was 7.9%. These estimates perhaps represent the lower limit of heritability for heat tolerance. The conductivity method could be considered for evaluating heat tolerance in a breeding program but should be more effective in screening F_3 families than individual F_2 plants. [AS]

0763

25472 MATTUSCH, P.; GERLAGH, M.; ESTER, A.; SPIEMAN, G. 1982. Screening of snap bean cultivars for resistance to Sclerotinia sclerotiorum. Bean Improvement Cooperative. Annual Report 25:48-50. Engl., 4 Refs. [Federal Biological Research Centre, Vegetable Protection Inst., Marktweg 60, 5030 Hürth-Fischenich, Federal Republic of Germany]

Phaseolus vulgaris. Whetzelinia sclerotiorum. Cultivars. Snap beans. Resistance. Selection. Germany Federal Republic. Netherlands.

Twenty-three snap bean cv. were tested for resistance to Sclerotinia sclerotiorum in Germany and the Netherlands in 1980 and 1981. It was clear that the reaction of different cv. was quite stable across locations and in time. Among the resistant cv. was Charlevoix which showed physiological resistance and architectural escape mechanisms. [CIAT]

0764

25321 MIIA, J.A.; FAURE, B. 1983. Avances del mejoramiento de variedades de frijol común Phaseolus vulgaris en El Tomeguin. (Highlights of bean varietal improvement in El Tomeguin). La Habana, Cuba, Centro de Información y Divulgación Agropecuario. 13p. Span., Illus.

Phaseolus vulgaris. Plant breeding. Cultivars. Resistance. Uromyces phaseoli. Bean common mosaic virus. Xanthomonas phaseoli. Selection. Yields. Yield components. Cuba.

The bean breeding methodology used at El Tomeguin exptl. station (Cuba) is diagramed and data on bean cv. improved up to 1983 are given in table form. The origin, parents, reaction to diseases (Xanthomonas phaseoli and BCMV), yields and yield components, and other agronomic characteristics are provided for ICA Pijao, M-112, Batuey, Red Kloud, ICTA Quetzal, Bat 58, Bat 518, Bat 304, Bat 482, Bat 93, and Batuey 23. [CIAT]

0765

24859 MUGHOGHO, L.K.; FOJE, O.T.; RAO, Y.P. 1979. Improvement of beans in Malawi. Lilongwe, University of Malawi. Bunda College of Agriculture. 32p. Engl., 9 Refs.

Paper presented at the Symposium on Grain Legume Improvement in Eastern Africa, Nairobi, Kenya, 1979.

Phaseolus vulgaris. Germplasm. Diseases and pathogens. Injurious insects. Fertilizers. N. P. Defoliation. Cultivation systems. Resistance. Weeding. Yields. Cultivars. Plant habit. Planting. Timing. Malawi.

Highlights on the results of bean research conducted in Malawi are presented. The main production constraints include the lack of suitable var. and improved production technology, diseases (especially those caused by Colletotrichum lindemuthianum, Pseudomonas phaseolicola, Phaeoisariopsis griseola, Sclerotium rolfsii, and Fromyces appendiculatus), and insect pests (Melanagromyza phaseoli, Ootheca mutabilis, Dicantha conifera, and Sylaris dicineta). High yielding bush and climbing cv. (over 1500 kg/ha) have been identified in the germplasm collection. A 20-20-0 NPK formulation at a rate of 200-600 kg/ha (depending on soil test results) is recommended. While leaf removal for food purposes reduces seed yield, this practice is economically feasible since the compound value of leaves and seed is higher than seed alone obtained from undefoliated beans. The highest yields of monocropped climbing beans are obtained when horizontal supports at a height of 1.5 m are used. Chemical control schemes for diseases are not recommended; resistance to major diseases have been found in local and introduced germplasm. Hand weeding has provided better results than the use of herbicides. The var. improvement program concentrates on disease resistance and the scheme used is described; improved lines have produced over 3000 kg/ha. A list of 9 bean lines considered for release and their characteristics (growth habit, type, seed color, yield, yield components, and days to flowering) is presented. [CIAT]

0766

25606 NELSON, L.M.; ASCHER, P.D. 1984. Influence of parental lines on making Phaseolus vulgaris-P. acutifolius hybrids. Bean Improvement Cooperative. Annual Report 27:40-41. Engl., 3 Refs. [Dept. of Horticultural Science & Landscape Architecture, Univ. of Minnesota, St. Paul, MN 55108, USA]

Phaseolus vulgaris. Phaseolus acutifolius. Crossbreeding. Hybrids. Pollination. USA.

The results of a crossing expt. to study the influence of parental lines on the production of Phaseolus vulgaris-P. acutifolius hybrids are presented. The performance ranking of 9 bean accessions as females and 15 P. acutifolius accessions as males in their interspecific cross is given based on the mean of the weighted av. of embryos/pollination. Bean accessions differed significantly as males but not as females. Significant differences appeared among P. acutifolius lines as males and as females. Data demonstrate differences in combining ability for both species in the interspecific cross. [CIAT]

0767

25589 NIENHUIS, J.; SINGH, S.P. 1983. Diallel analyses and correlations among yield and yield components in bush beans, Phaseolus vulgaris L. In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 29a., Panamá, 1983. Memoria.

Panamá. v.?. 12p. Engl., Sum. Span., 8 Refs. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Seed characters. Plant habit. Yields. Yield components. Crossbreeding. Genes. Inheritance. Colombia.

Diallel crosses were evaluated to (1) identify the principal types of gene action involved in the expression of yield and its components in beans and (2) determine the type and degree of association between these traits. A small-, a medium-, and a large-seeded cv. for each of a bush bean growth habits (type I, II, and III) were crossed in all possible combinations to complete a set of 72 F_1's. Parental, F_1, and reciprocal F_1 plants were grown at CIAT and Popayán (Colombia) in 1985. Combined analysis of variance and covariance were performed for all traits. Results suggest that additive, rather than nonadditive, gene action predominates in the expression of yield and its components, and that selection should be effective in changing the levels of expression of yield and its components. Significant positive phenotypic correlations were observed between yield and pods/m^2 and seeds/pod; in contrast, the phenotypic correlation between yield and wt./seed was negative. [CIAT]

87b8

25601 NYABYENDA, P.; NEABANZI, A. 1980. Resultats d'un essai d'induction de mutation de la couleur du tegument noir du haricot volubile Wulma. (Results of a mutation induction trial of the black tegument color of climbing bean Wulma). Rubona, Institut des Sciences Agronomiques du Rwanda. Note technique no.1. 11p. Fr., 4 Refs.

Phaseolus vulgaris. Mutation. Cultivars. Seed color. Flowers. Protein content. Yields. Rwanda.

A mutation induction trial of the black tegument color of var. Wulma was carried out at Rubona Station (Rwanda) during 1980. EMS (0.04-0.08 M for 6-12 h) was used for a total of 6 treatments with 200 seeds each. The soaked seeds were planted in the field (1st cropping season of 1979); only 600 seedlings were established, which were planted in pots in the greenhouse. Subsequently, plants with green hypocotyl were selected. The trial continued during 8 generations and a comparative trial was carried out with 19 stable lines. Several types of mutation were obtained, notably changes in flower and seed color and increases in 1000-seed wt. and protein content. The lines kept Wulma's vegetative cycle and also its susceptibility to viroses. Line Wuca 5 outyielded Wulma (not significantly) and had production stability. [CIAT]

0769

25361 OCFEMBOR, D.J.; CURRAH, L.; TAYLOR, J.D. 1982. Transfer of resistance to halo-blight (Pseudomonas phaseolicola) from Phaseolus vulgaris to P. coccineus. Bean Improvement Cooperative. Annual Report 25:84-85. Engl., 5 Refs. [National Vegetable Research Station, Wellesbourne, Warwick, England]

Phaseolus vulgaris. Phaseolus coccineus. Pseudomonas phaseolicola. Resistance. Genes. Hybridizing. Crossbreeding. United Kingdom.

Attempts made to transfer resistance to Pseudomonas phaseolicola from beans to Phaseolus coccineus are briefly reported. After attempts to obtain successful progeny from the P. vulgaris x P. coccineus (female) hybrid backcrossed to P. coccineus and the latter selfed to F_2 progenies, halo blight resistance from bean PI 150414 was successfully transferred to P.

coccineus. The resistant line is much more similar to P. coccineus than to P. vulgaris, but still shows morphological abnormalities and poor pod production. Perhaps 2 more backcrosses will be required to produce a good agronomic type. A brief note on the inoculation technique is presented. [CIAT]

0770

22580 OROZCO, S.H.; BEEBE, S.; DIAZ, J.M.; MASAYA, P. 1983. Rendimiento y reacción a roya de compuestos incluidos en el VICAR Negro en Chimaltenango, Guatemala en agosto 1982. [Yields and reaction to rust of composite mixtures included in the VICAR (black beans) in Chimaltenango, Guatemala, in August 1982]. In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 29a., Panamá, 1983. Memoria. Panamá. v.2. 6p. Span., Sum. Span., Illus. [Inst. de Ciencia y Tecnología Agrícola, Apartado Postal 231 A, Guatemala]

Phaseolus vulgaris. Cultivars. Varietal mixtures. Resistance. Uromyces phaseoli. Yields. Guatemala.

A composite mixture of 4 relatively stable bean var. (ICTA Quetzal, Talamanca, Porrillo Sintético, and CENTA Tazumal) was formed and 1 var. (D145), known as relatively unstable, was selected to measure the ability of the composite mixture to stabilize its yield. Rust attack was the limiting yield factor. D145 was resistant to the pathogen and the 4 var. of the composite mixture showed diverse degrees of susceptibility. Data are presented of yield and % of infection of the 4 var., the mixtures (D145 + composite mixture), and D147. [CIAT]

0771

25217 PACOVA, B.E.V. 1981. Medida de adaptacao e estabilidade em cultivares de especies vegetais. (Measurement of adaptation and stability of cultivars of plant species). Cariacica-ES, Brasil, Empresa Capixaba de Pesquisa Agropecuária. Boletim Técnico no.6. 20p. Port., 9 Refs., Illus. [Empresa Capixaba de Pesquisa Agropecuária, Caixa Postal 125, 29.154 Campo Grande, Cariacica-ES, Brasil]

Phaseolus vulgaris. Genotypes. Plant breeding. Adaptation. Seed characters. Genetics. Brazil.

The methodologies used by Finlay & Wilkinson and Eberhart & Russell to evaluate adaptability and stability of cv. of plant species are briefly described. Examples of calculations are given. Bean flower color and grain yield are used to briefly explain the monogenic and polygenic control of plant characters, resp. [CIAT]

0772

25611 PARK, S.J.; DHAMVANTARI, B.N. 1984. Breeding for resistance to common bacterial blight in interspecific crosses between Phaseolus vulgaris and P. coccineus. Bean Improvement Cooperative. Annual Report 27:179-180. Engl. [Research Station, Agriculture Canada, Harrow, Ontario, Canada NOR 1G0]

Phaseolus vulgaris. Crossbreeding. Phaseolus coccineus. Cultivars. Resistance. Xanthomonas phaseoli. Inheritance. Canada.

F_3 populations of 4 crosses between Phaseolus coccineus PI 165.421 and navy bean cv. Swan Valley, C-20, Harokent, and OAC Seaforth and their resp. parents were planted in a blight nursery, inoculated with local strains of

Xanthomonas phaseoli, and leaf reactions visually scored at 22 and 42 days after inoculation. F_2 plant reaction varied from high tolerance to susceptibility. Some plants that were highly tolerant had desirable agronomic characteristics such as determinate or semideterminate growth habit, early-intermediate maturity, and a fair amount of pods with small white seed. [CIAT]

0773

25371 PARK, S.J.; BUZZELL, R.I.; TU, J.C. 1982. A resistant gene for delta race of Colletotrichum lindemuthianum in NEP-2 bean. Bean Improvement Cooperative. Annual Report 25:40-41. Engl. [Research Station, Agriculture Canada Harrow, Ontario, Canada NOR 1GO]

Phaseolus vulgaris. Colletotrichum lindemuthianum. Genes. Cultivars. Races. Resistance. Canada.

The existence of a dominant gene for resistance to Colletotrichum lindemuthianum delta race that is different from the Are gene and present in NEP-2 beans is briefly reported. In 1981 F_1 seedlings of the cross Flectwood BC6-Are x NEP-2 were inoculated with delta inoculum in 2 tests; both gave a good fit to a 15:1 ratio which would be expected for 2 independent genes giving resistance. [CIAT]

0774

25691 PRATT, R.C.; BRESSAN, R.A.; HASEGAWA, P.M. 1985. Genotypic diversity enhances recovery of hybrids and fertile backcrosses of Phaseolus vulgaris L. x P. acutifolius A. Gray. Euphytica 34:329-344. Engl., Sum. Engl., 32 Refs., Illus. [Dept. of Horticulture, Purdue Univ., W. Lafayette, IN 47907, USA]

Phaseolus vulgaris. Phaseolus acutifolius. Hybridizing. Hybrids. Genotypes. Heterozygote. Homozygote. Cultivars. Crossbreeding. Backcrossing. Plant fertility. Genetics. USA.

Homozygous and heterozygous Phaseolus vulgaris and P. acutifolius parental genotypes were hybridized to determine if genotypic diversity would aid gene transfer between these species. Certain P. vulgaris female parents resulting from diverse intraspecific crosses increased the frequency of species hybrids obtained. From a total of 19 self-sterile hybrids, 20 backcross-1 (BC_1) lines (P. vulgaris recurrent parent) were produced from 4 partially female-fertile hybrids, each of which had a heterozygous P. vulgaris female parent. Heterozygous P. acutifolius male parents did not influence the frequency at which interspecific hybrids could be produced but apparently improved female fertility. Fertility of the F_1BC_1 generation was highly variable. The frequency of fertile individuals increased in each subsequent backcross generation (F_1BC_2 and F_1BC_3). [AS]

0775

26098 RANALLI, P.; NANNETTI, S. 1980. Fagiolo Borlotto e Cannellino da industria piu produttivi e resistenti al virus del mosaico comune. (Borlotto- and Cannellino-type beans for processsing, with higher yields and resistance to common mosaic virus). Informatore Agrario 40(48): 23-30. Ital, 22 Refs., Illus.

Phaseolus vulgaris. Plant breeding. Production. Cultivars. Bean yellow mosaic virus. Bean common mosaic virus. Cucumber mosaic virus. Pseudomonas phaseolicola. Xanthomonas phaseoli. Resistance. Italy.

The Italian program for breeding Phaseolus vulgaris of the Borlotto type (seeds with bright red markings on a pale background) or of the Cannellino type (long, white seeds) is described. Breeding aims include erect, determinate habit, synchronous ripening, and resistance to viruses (BCMV, BYMV, and cucumber mosaic virus) and bacteria (Pseudomonas phaseolicola and Xanthomonas phaseoli). The best lines obtained from the program combined resistance to BCMV, the Borlotto seed type, and synchronous ripening. Some lines also had a higher 1000-seed wt. than commercial cv. controls, or a higher no. of pods/plant. Cv. Amanda and Royal Red Kidney were useful sources of horizontal resistance to BCMV, and Great Northern UI.I. 123 was a useful source of race-specific resistance. [Plant Breeding Abstracts]

0776

25359 REDDEN, R.J.; ROSE, J.L.; GALLAGHER, E.C. 1985. The breeding of navy and culinary beans in Queensland. Australian Journal of Experimental Agriculture 25:470-479. Engl., Sum. Engl., 12 Refs. [Dept. of Primary Industries, Hermitage Research Station, Warwick, Qld. 4370, Australia]

Phaseolus vulgaris. Cultivars. Plant breeding. Seed color. Plant introductions. Resistance. Xanthomonas phaseoli. Australia.

Locally bred and introduced navy and culinary beans were grown in a series of trials across locations: Gatton, Hermitage, Inglewood, and Kingaroy (Australia). A wide range of the variables yield, canopy height and width was found in the introduced entries. These also displayed a range in disease resistances and tolerance to Zn deficiency equal to that in the locally bred entries. Sensitivity to low Zn levels and susceptibility to bacterial blight were both negatively correlated with height and yield. Days to flowering, lodging, and 100-seed wt. were also associated with various disease and growth expressions. The expected benefits of broadening the genetic base of the breeding program are discussed. [AS]

0777

22572 REUNION ANUAL DEL PROGRAMA COOPERATIVO CENTROAMERICANO PARA EL MEJORAMIENTO DE CULTIVOS ALIMENTICIOS, 29a., PANAMA, 1983. Memoria. (Proceedings). Panamá. v.2. 151p. Span., 100 Refs., illus.

Phaseolus vulgaris. Plant breeding. Adaptation. Hybridizing. Germplasm. Pest control. Resistance. Guatemala. Costa Rica. Honduras. Nicaragua. Dominican Republic. Panama. Puerto Rico. Colombia.

Research work on beans are presented for the following countries: Guatemala, Costa Rica, Honduras, Nicaragua, Dominican Republic, Panama, Puerto Rico, and Colombia. The following aspects are discussed: results of adaptation, interdisciplinary, and multilocational nurseries; interspecific hybridization with wild beans; utilization of paraquat; N and P fertilization in different types of soils; germplasm evaluation and selection; control of slugs; advances in the control of Xanthomonas, BGMV, BCMV, and cowpea mosaic virus; yield stability in different environments; evaluation of resistance to Apion godmani; reaction to Asphondilia sp. attack; diallelic analyses of yield and its components for bush beans. Individual papers are recorded in this publication under the following consecutive no.: 0493, 0507, 0528, 0530, 0612, 0618, 0619, 0626, 0648, 0699, 0713, 0724, 0751, 0756, 0767, 0770, and 0783. [CIAT]

0778

26228 SCHNEITER, A.A.; GRAFTON, K.F.; BURKE, D.W.; WEISER, G.C. 1984. Nodak, an early maturing pinto bean cultivar. North Dakota Farm Research 42(2):26. Engl.

Phaseolus vulgaris. Cultivars. Uromyces phaseoli. Bean common mosaic virus. Curly top virus. Resistance. Plant breeding. USA.

In trials at 9 locations in North Dakota (USA) in 1980-83, Phaseolus vulgaris cv. Nodak consistently outyielded UI-114 and Olathe and matured 9 and 8 days earlier, resp. Nodak has uniform seeds similar in size to those of Olathe and is resistant to bean rust, BCMV, and curly top virus. [Field Crop Abstracts]

0779

25700 SCHOONHOVEN, A. VAN; HALLMAN, G.J.; TEMPLE, S.R. 1985. Breeding for resistance to Empoasca kraemeri Ross and Moore in Phaseolus vulgaris L. In Nault, L.R.; Rodríguez, J.G., eds. The leafhoppers and planthoppers. London, Wiley & Sons. pp.405-422. Engl., 57 Refs., Illus. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Empoasca kraemeri. Resistance. Plant breeding. Insect biology. Plant injuries. Colombia.

Breeding for resistance to Empoasca kraemeri in beans is reviewed. Topics covered include the importance of beans in Latin America and of leafhoppers associated with beans, the biology of E. kraemeri, damage caused to beans, and factors other than resistance that affect the importance of the pest (climatic and biotic factors as well as cultural practices). A list of 23 Empoasca species and countries where they have been observed is provided. Methods of evaluating resistance and evaluation criteria currently used are discussed, as well as the sources and mechanisms of resistance. The breeding methodology used at CIAT and major accomplishments are presented. Determinate bush beans, obligate climbers, and large-seeded beans should be treated separately since resistance in them is currently much lower than in indeterminate bush beans. [CIAT]

0780

25367 SILBERNAGEL, M.J. 1982. Release of snap bean cv. Blue Mountain. Bean Improvement Cooperative. Annual Report 25:31-32. Engl. [United States Dept. of Agriculture, Agricultural Research Service, P.O. Box 30, Prosser, WA 99350, USA]

Phaseolus vulgaris. Snap beans. Cultivars. Bean common mosaic virus. Curly top virus. Selection. Yields. USA.

The main characteristics of the snap bean cv. Blue Mountain, to be released soon for commercial production, are briefly described. Characteristics of its parents are also given. Blue Mountain is resistant to BCMV (dominant "I" gene) and curly top virus. Data on plant architecture, yields (9.9-14.8 t/ha), cropping cycle, and others are provided. The cv. is suitable for canning and freezing. [CIAT]

0781

25881 STAVELY, J.R.; STEINKE, J. 1985. BARC-rust resistant-2, -3, -4, and -5 snap bean germplasm. HortScience 20(4):779-780. Engl., Sum. Engl., 7 Refs., Illus. [Plant Pathology Laboratory, Beltsville Agricultural Research Center-West, Agricultural Research Service, United States Dept. of Agriculture, Beltsville, MD 20705, USA]

Phaseolus vulgaris. Snap beans. Uromyces phaseoli. Cultivars. Races. Resistance. Selection. USA.

The white-seeded, green-podded bush snap bean germplasm lines, BARC-rust resistant (Rk) -2, -3, -4, and -5, that are the 1st snap beans homozygous for resistance to all available USA races of the pathogen, were approved for joint release by Agricultural Research Service-United States Department of Agriculture and the New Jersey Agricultural Expt. Station in Feb. 1984. [AS (extract)]

0782

25368 STAVELY, J.R. 1982. The 1981 bean rust nurseries. Bean Improvement Cooperative. Annual Report 25:34-35. Engl., 2 Refs. [United States Dept. of Agriculture, Agricultural Research Service, Beltsville Agricultural Research Centre, Beltsville, MD 20705, USA]

Phaseolus vulgaris. Uromyces phaseoli. Cultivars. Resistance. Selection. Snap beans. USA.

Results of the International Bean Rust Nursery (IBRN) with 100 entries and the Uniform Snap Bean Rust Nursery (UBRN) with 107 entries, field-tested in 1981 in USA, are reported. Fifteen IBRN lines were resistant to rust at all locations: Redlands Greenleaf B, Redlands Greenleaf C, CCGB 44, Negro Jalpatagua, Compuesto Chirualtenango 3, Carioca, V3249-13-1C, G1089-1C-1C, Olathe, BAT 41, BAT 1155, BAC 58, A-62, A-140, and Parana. Several IBRN entries showed differential reactions among the 3 locations (North Dakota, Beltsville, and Saginaw). The most resistant UBRN entries over all locations were G700, Nep-2, and B-190. [CIAT]

0783

22575 SULLIVAN, J.G.; FREYTAG, G.F. 1983. Potencial de hibridización interespecífica con fríjoles silvestres. (Interspecific hybridization potential with wild beans). In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 29a., Panamá, 1983. Memoria. Panamá. v.2. 5p. Span., 8 Refs., Illus.

Phaseolus vulgaris. Germplasm. Proteins. Phaseolus coccineus. Crossbreeding. Hybridizing. Puerto Rico.

In Mayaguez, Puerto Rico, a no. of wild bean germplasm accessions collected in Latin America were submitted to electrophoretical analysis in order to predict the probability of successful interspecific crossing. The protein patterns of Phaseolus filiformis and P. esperanzae were similar; the possibility of this interspecific cross is predicted. P. filiformis can be crossed with P. vulgaris but with great difficulty. P. angustissimus and P. anisotrichos are 2 morphologically distinct species; however, they showed similar protein patterns. The possible sources of error are mentioned and the protein patterns of 13 Phaseolus species are included. [CIAT]

0784

25614 THOMAS, C.V.; WAINES, J.G. 1982. Interspecific crosses between Phaseolus vulgaris and P. acutifolius: field trials. Bean Improvement Cooperative. Annual Report 25:58-59. Engl.

Phaseolus vulgaris. Phaseolus acutifolius. Crossbreeding. Backcrossing. Irrigation. Yields. Hybrids. USA.

Drought resistance of progenies derived from crosses between *Phaseolus acutifolius* and *P. vulgaris* was tested. In 1 expt, seed yields of bean var. that had been used as recurrent parents were compared with the backcross F_1 lines. The seed yield of the backcross line in the irrigated treatment (677 kg/ha) was not significantly different from that of the yield of the parental lines (675 kg/ha). The yield of the backcross lines in the dry treatment (27 kg/ha) was higher but not statistically different from the *P. vulgaris* parents (12 kg/ha). In another expt., 149 different lines (beans and *P. acutifolius* parental types, F_1 lines, and various backcross generations) were tested. The best results were obtained when the hybrids were backcrossed with *P. acutifolius*. [CIAT]

0785

23630 VANDERBOUGHT, I. 1986. L'etude de la variabilité chez le haricot commun (*Phaseolus vulgaris* L.) par l'utilisation de methodes statistiques multivariées appliquees a une banque de données. (Study of common bean variability through the utilization of multivariate statistical methods applied to a data bank). These Doctorat Sc.Agr. Gembloux, Belgique, Faculte des Sciences Agronomiques de l'Etat. 269p. Fr., 104 Refs., Illus.

Phaseolus vulgaris. Statistical analysis. Plant breeding. Plant introductions. South America. Central America. Mexico.

The variability of *Phaseolus vulgaris* was studied, based on a data bank, by applying different multivariate statistical methods to propose an analysis procedure capable of providing the breeder with the most useful and complete information, in addition to allow the selection of introductions in breeding programs. For the development of the analysis procedure (an organizational chart is included), 2 aspects are considered: (1) quantification of similarities and (2) classification of groups of individuals on the basis of the knowledge of associations of specific characteristics. The following methods are compared: methods of cluster hierarchical classification, method of transference, analysis of the main components, and methods of univariate and bivariate statistical analysis. [CIAT]

0786

26023 VERMEULEN, J. 1987. Screening ten bean cultivars (*Phaseolus vulgaris* L.) to halo blight (*Pseudomonas phaseolicola*) under six different planting systems. Msc.Agr. Thesis. Netherlands, Agricultural University Wageningen. 63p. Engl., Sum. Engl., 47 Refs., Illus.

Phaseolus vulgaris. Cultivars. *Pseudomonas phaseolicola*. Selection. Resistance. Intercropping. Planting. Spacing. Yields. Plant breeding. Colombia.

A trial was designed as a split plot model with 4 replications, using 2 cropping systems (association and monoculture) as main plots, 3 plant densities between beans (10, 20, and 50 cm) as subplots, and 10 different bean cv. as sub-subplots to (1) identify sources of bean germplasm tolerant to *Pseudomonas phaseolicola* and (2) obtain an effective field-screening system useful for selecting in breeding populations in the future. The trial was grown in Palmira, Colombia, and inoculated 4 days after planting by a simple spraying method with a mix of isolates of *P. phaseolicola*. Disease development and yield components were recorded. For comparison, 6 of the 10 bean cv. used were also tested in the greenhouse. In general, the growing season was unfavorable to observe the development of the disease due to high natural infection and with a (out of 8) mo. of dryness. Although Great Northern Nebraska no. 11 to. 27 and 9 bush bean

var. were resistant to halo blight, they showed no adaptation, but could be useful as resistant male parent lines. Boy 117A and Diacol Andino could be promising var. if halo blight resistance is incorporated in the future. F 1056 and ICA-Tundama will be very useful resistant germplasm for climbing and bush bean improvement. Monocropped beans and a plant density of 10 cm between plants gave the highest yield, which was coupled with the highest disease incidence. This cropping system is advisable in breeding program screening for resistance because of the high disease pressure for selecting resistant bean plants. However, an associated system with maize and a plant density of 10 cm between plants is advisable for small farmers. [AS]

0787

24630 VILLAGIS, V. 1985. Producción de variedades mejoradas. (Production of improved varieties). In Curso sobre el cultivo de frejol usando la metodología Aprender Haciendo, 1v., Pizampiro, Ecuador, 1985. Conferencias. Quito, Instituto Nacional de Investigaciones Agropecuarias. Programa de Leguminosas de la Estación Experimental Santa Catalina. pp.85-91. Span. [Programa de Leguminosas, Estación Experimental Santa Catalina, Inst. Nacional de Investigaciones Agropecuarias, Apartado 340, Quito, Ecuador]

Phaseolus vulgaris. Plant breeding. Seed production. Ecuador.

The terms var., local var., improved var., and promising line are defined and the methods used to obtain improved bean var. (introduction, selection, and hybridization) are briefly described. The process required to produce good quality seed is given, with a brief definition of the concepts var. purity, physical purity, seed germination, and disease-free. The steps involved in the production of good quality seed by artisans are listed. [CIAT]

0788

25324 ROSHILL, F. 1985. Estrategias de mejoramiento del frijol por tolerancia al mosaico dorado. (Strategies of bean breeding for tolerance to BGMV). In Fucha P., M.A.; González G., R., eds. Temas en virología. México, Sociedad Mexicana de Fitopatología. pp.43-55. Span., 17 Refs., Illus. [Inst. Nacional de Investigaciones Agrícolas, Centro de Investigaciones Agrícolas Golfo Centro, Campo Agrícola Experimental Cotaxtla, Apartado Postal 429, Veracruz 91700, México]

Phaseolus vulgaris. Plant breeding. cultivars. Bean golden mosaic virus. Resistance. Selection. Mexico.

Advances in breeding beans for tolerance to BGMV are reviewed and the breeding strategies used by the bean program of the Cotaxtla exptl. field (Instituto de Investigaciones Agrícolas, Mexico) are briefly described. The procedure to obtain improved bean cv. tolerant to BGMV consists of 6 steps: introduction, screening, hybridization, selection, preliminary yield trials, and uniform yield trials. Each of these steps is briefly described. The level of tolerance found in commercial var. in Guatemala and Mexico is discussed. BGMV-tolerant black beans basically have Porrillo as a source of tolerance; it is necessary to incorporate another source to increase the level of tolerance. [CIAT]

0789

21708 ZIMMERMANN, M.J.O.; ROSHILL, A.A.; WAINES, J.G.; FOSTER, K.W. 1984. A heritability and correlation study of grain yield, yield components, and harvest index of common bean in sole crop and intercrop. Field

Crops Research 9:109-118. Engl., Sum. Engl., 21 Refs., Illus. [Centro Nacional de Pesquisa de Arroz e Feijao, Caixa Postal 179, 74.000 Goiania-GO, Brasil]

Phaseolus vulgaris. Zea mays. Intercropping. Yields. Yield components. Inheritance. Cultivars. Plant breeding. Brazil.

The effect of intercropping common bean with maize, compared with bean in sole crop, on grain yield, no. of pods, seeds/pod, 100-seed wt., and HI were studied in 16 families of common bean. These families were grown in replicated trials at Irvine and Davis (California, USA) in a split plot exptl. design with intercrop and sole crop as main plots and families as subplots. Families interacted with cropping systems for grain yield, no. of pods, and seed wt. Heritabilities were slightly larger in sole crop than in intercrop for all traits except seeds/pod. The no. of pods and HI showed the largest difference in heritabilities between intercrop and sole crop. Genotypic and phenotypic correlations among traits involving grain yield and HI were variable in magnitude and sign for the 2 cropping systems. Path analysis showed that seed wt. had the largest positive direct effect on grain yield in both systems. Seed wt. had large negative indirect effects on grain yield in both systems via its correlations with the other yield components. Genotypic correlations for the same trait measured across cropping systems were greater than 0.80 for all traits except grain yield. For grain yield, the genotypic correlation was 0.52. The ratio of genetic variances in intercrop to sole crop, and the high positive genotypic correlations between cropping systems indicated that selection based on the mean of both systems would result in improved performance in both environments. [AS]

See also 0447 0471 0481 0492 0498 0499 0520 0527 0557 0578 0612 0617 0632 0645 0646 0648 0653 0677 0724 0809

H00 NUTRITION

0790

25666 GRANT, G.; GREER, F.; McKENZIE, N.H.; PUSZTAI, A. 1985. Nutritional response of mature rats to kidney bean (Phaseolus vulgaris) lectins. Journal of the Science of Food and Agriculture 36(5):409-414. Engl., Sum. Engl., 14 Refs., Illus. [Rowett Research Inst., Bucksburn, Aberdeen AB2 9SB, England]

Phaseolus vulgaris. Nutritive value. Animal nutrition. Animal physiology. Diets. Proteins. United Kingdom.

In a series of 10-day pair feeding expt. it was found that the nutritional value of diets containing beans was essentially the same for rats aged between 30-120 days. Thus, NPU values of 25-39 on diets containing Processor bean (35 g protein/kg) + egg albumin (65 g protein/kg) were obtained. As food intakes were considerably reduced when rats were fed diets containing more than 45 g protein/kg Processor bean, the measurement of protein utilization became increasingly more difficult. The severe disruption of the brush borders of duodenal and jejunal enterocytes, originally observed when bean-containing diets were fed to young (30-day-old) rats, was also found with rats up to the age of 120 days on similar diets. Similarly, the development of circulating antilectin antibodies in the animals showed no age dependence within the age limits investigated.

It was also shown that oral immunization did not protect the rats from the effects of toxicity and that the immune response was a result of continuous absorption of lectin throughout the feeding period. Thus, the extent and the mechanism of toxicity of Phaseolus vulgaris bean lectins were found not to be dependent on the age or maturity of the animal. [AS]

0791

24041 LIMA, A.I.; MANCINI FILHO, J.; DOMINGUES, J.B.; LAJOLO, F.M. 1980. Propriedades hemaglutinantes, mitogenica e tóxica de variedades brasileiras de feijões (Phaseolus vulgaris L.). (Hemagglutinating, mitogenic, and toxic properties of Brazilian French bean varieties). Revista de Farmácia e Bioquímica 16(1-2):145-154. Port., Sum. Port., Engl., 12 Refs.

Phaseolus vulgaris. Cultivars. Nutritive value. Brazil.

Seed extracts of all the 16 bean var. investigated were capable of agglutinating trypsinized red cells in ox or rabbit blood, and also untrypsinized rabbit blood. Most var. also induced mitosis in human lymphocyte cells. Var. Moruna and Pirata 1 were among the most active in all these respects. None was effective with untrypsinized ox blood. Toxicity, after intraperitoneal injection in mice, was strongest in Moruna and Pirata 1, but several var. with high mitogenic capacity were nontoxic. In general, toxicity was associated with capacities for ox and rabbit blood agglutination. [Field Crop Abstracts]

0792

25291 PACHICO, D.H. 1984. Nutritional objectives in agricultural research. The case of CIAT. In Pinstrup-Andersen, P.; Berg, A.; Forman, M., eds. International agricultural research and human nutrition. Washington, D.C., International Food Policy Research Institute. pp.25-40. Engl., Sum. Engl., 62 Refs. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Development. Technology. Human nutrition. Colombia.

Nutritional factors have been important considerations both in the setting of commodity priorities at CIAT and in the determination of research strategies for individual programs. Just as collaboration with national research and extension organizations is critical to the development of new technology for CIAT commodities, so is the collaboration with other institutes necessary in nutrition research. The CIAT bean program might benefit from advances in biochemical studies of protein digestibility that have led to more practical screening techniques. Collaboration with other institutions in the gathering of food-consumption data to estimate price and income elasticities of demand is essential for sound analysis of the nutritional effects of new technology. [AS (extract)]

See also 0479

H01 Foods and Nutritive Value

0793

26009 BEAN/COWPEA COLLABORATIVE RESEARCH SUPPORT PROGRAM. U.S.A. 1984. Improved biological utilization and availability of dry beans. In _____. 1984 Annual Report. 1. Technical summary. East Lansing, Michigan State University. pp.135-153. Engl.

Phaseolus vulgaris. Nutritive value. Cooking. Mineral content. S. Storage. Timing. Agricultural projects. Transfer of technology. Amino acids. Guatemala.

The results of project activities in 1984 to improve the availability, utilization, and nutritional quality of beans for human consumption in developing countries are presented. General aspects of the project are discussed. Research outputs in 1984 indicated that culinary and nutritional traits of beans are inherited qualitatively and can be improved through plant breeding. Lectin assays may be an accurate indication of S amino acid conen. A method was developed for determination of soluble and bound procyanidins in beans. Soaking beans in 1% NaCl for 5 h and sun drying prior to storage inhibited the hard-to-cook phenomenon. A modified Morris-Matson penetrometer is available to assess cooking time of beans as well as a method to assess hemagglutinin conen. and activity. Extrusion of hard-to-cook black beans is a good alternative process to produce animal feed. Training objectives and outputs and expected short-term research outcomes are summarized. Research plans for 1985 are included. [CIAT]

0794

25893 HAYTOWITZ, D.B.; MATTHEWS, R.H. 1984. Effect of cooking on nutrient retention of legumes. Cereal Foods World 29(6):362-364. Engl., 7 Refs. [United States Dept. of Agriculture, Human Nutrition Information Service, Hyattsville, MD, USA]

Phaseolus vulgaris. Cooking. Timing. Nutritive value. Composition. USA.

Three types of beans, broad beans, chickpeas, cowpeas, and lentils were cooked and analyzed for nutrient retention. The results allowed a degree of prediction of nutrient content of cooked legumes. Ultimate retention was affected not only by duration of cooking times but also by legume size, degree of binding of e.g. vitamins, and permeability of the seed coat to leached vitamins. [Food Science and Technology Abstracts]

0795

23618 MERINO, G.; LAREO, I.; BRESSANI, R. 1983. Evaluación del potencial nutricional del pescado en dietas a base de frijol (Phaseolus vulgaris) y un cereal [maíz (Zea mays) y/o arroz (Oriza sativa)]. [Nutritional potential of fish in diets based on beans and a cereal (maize and/or rice)]. Archivos Latinoamericanos de Nutrición 33(3):588-605. Span., Sum. Span., Engl., 15 Refs., Illus.

Phaseolus vulgaris. Diets. Human nutrition. Nutritive value. Central America.

The complementation between maize and fish and between rice and fish was evaluated to establish the required levels of each in order to obtain an optimum biological response. The optimum levels of fish were around 2 and 8% for the maize and rice diets, resp. Complementary levels of fish in the bean:maize and bean:rice diets, basic staples of Central American diets, were evaluated in the same manner; levels as low as 2% fish were sufficient to obtain a significantly high biological response. The cost analysis of these exptl. mixtures revealed that the nutritional value of the Central American rural diets can be increased with the introduction of fish in small quantities, without increasing the family food expenses. [AS]

See also 0482 0809 0830

101 Rhizobium spp., Nitrogen Fixation and Nodulation

0796

26002 BEAN/COWPEA COLLABORATIVE RESEARCH SUPPORT PROGRAM. U.S.A. 1984. Identification of superior bean-rhizobia combinations for utilization in cropping systems suitable to small farms in Brazil. In _____. 1984 Annual Report. 1. Technical summary. East Lansing, Michigan State University. pp.45-54. Engl.

Phaseolus vulgaris. Cultivars. Nitrogen fixation. Rhizobium phaseoli. Strains. Transfer of technology. Agricultural projects. Brazil.

The results of project activities in 1984 to identify superior bean-rhizobia combinations for utilization in small farmer cropping systems in brazil are presented. General aspects of the project are discussed. Black bean lines 22-3, 22-8, 22-24, 22-34, and 22-50, with genetic potential to fix high N_2 levels, were developed. Breeding and selection methods exist that are suitable for use in bean improvement programs that include enhancement of N_2 fixation. Rhizobium phaseoli strains kim-5, CIAT 632, CIAT 640, 127E81-3, MG 336, 1033, 1035, and CNPAF 150 were identified as having high N_2-fixing ability under controlled conditions. Training objectives and outputs and expected short-term research outcomes are summarized. Research plans for 1985 are included. [CIAT]

0797

26012 BEAN/COWPEA COLLABORATIVE RESEARCH SUPPORT PROGRAM. U.S.A. 1984. Improving resistance to environmental stress in beans through genetic selection for carbohydrate partitioning and efficiency of biological nitrogen fixation. In _____. 1984 Annual Report. 1. Technical summary. East Lansing, Michigan State University. pp.178-190. Engl.

Phaseolus vulgaris. Cultivars. Water stress. Rhizobium phaseoli. Strains. Inoculation. Agricultural projects. Transfer of technology. Mexico.

The results of project activities in 1984 to improve resistance to environmental stress in beans in Mexico, through genetic selection for carbohydrate partitioning and efficiency of biological N fixation, are presented. General aspects of the project are discussed. No research outputs for immediate use were available in 1984; however, progress towards project objectives are summarized regarding evaluations of cv. under water stress, Rhizobium strains, and cv. response to Rhizobium inoculations. Training objectives and outputs and expected short-term research outcomes are summarized. Research plans for 1985 are included. [CIAT]

0798

24646 CAMERMAN, A.; HAKIZIMANA, A. 1975. La symbiose Rhizobium-legumineuses au Rwanda. (Rhizobium-legume symbiosis in Rwanda). Rubona, Institut des Sciences Agronomiques du Rwanda. Note Technique no.6. 48p. Fr., 28 Refs.

Phaseolus vulgaris. Rhizobium. Symbiosis. Inoculation. Fertilizers. N. Nodulation. Rwanda.

The importance of inoculation for the traditional Rwandan farmer and the research situation and means at the Institut des Sciences Agronomiques du Rwanda are discussed as well as results obtained with inoculation in the country before 1968. In orientation trials carried out between 1968-70 with beans, soybeans, peanuts, and peas, a clear difference was observed between the effects of bean inoculation in Karama and in Rubona, initially attributed to the sources of Rhizobium already existing in Rubona (colluvial soils of Lake Ellimbi) which competed with the evaluated sources 9.6 and 9.35.1. Between 1970-72 the symbiotic value of diverse inoculum sources was investigated, and inoculation was compared with the application of N fertilizer. Between 1972-74 the influence of K on inoculation was investigated. Overall, the use of a solid inoculum was preferred since it is easier to manufacture, has a lower cost, and can be preserved for a longer period of time (3-5 mo.). Results with beans were discouraging; a degeneration process of the inoculum sources due to the difficulty in maintaining these sources in a gel media was assumed. In controlled rural environments (Catovu hill), source 9.6 produced a yield of 1042 kg/ha; source 9.35.1, 1139 kg/ha, and the uninoculated control, 981 kg/ha. Furthermore, the inoculation of fallow ground and pastures is discussed and research recommendations are presented. [CIAT]

0799

25646 DUQUE, F.F.; NIVES, M.C.P.; FRANCO, A.A.; VICTORIA, R.L.; BODDEY, R.M. 1985. The response of field grown Phaseolus vulgaris to Rhizobium inoculation and the quantification of N_2 fixation using ^{15}N. Plant and Soil 88(3):333-343. Engl., Sum. Engl., 23 Refs. [Centro de Energia Nuclear na Agricultura, Avenida Centénario, Caixa Postal 96, 13.400 Piracicaba-SP, Brasil]

Phaseolus vulgaris. Inoculation. Rhizobium. Fertilizers. N. Cultivars. Nodulation. Nitrogen fixation. Yields. Brazil.

A field expt. was conducted near Rio de Janeiro (Brazil) to assess the effects of Rhizobium inoculation and N fertilizer (100 kg/ha) on 4 bean cv. (Carioca, Negro Argel, Venezuela 350, and Rio Tibagi). In the inoculated treatment 2.5 kg ^{15}N-labelled fertilizer/ha was added in order to apply the isotope dilution technique to quantify the contribution of N_2 fixation to the nutrition of these cv. Nodulation of all cv. in the uninoculated treatments was poor, but the cv. Carioca and Negro Argel were well nodulated when inoculated. Even when inoculated, nodulation of the cv. Venezuela 350 and Rio Tibagi was poor and both cv. showed little response to inoculation in terms of N accumulation or grain yield. The estimates of the contribution of N_2 fixation estimated using the isotope dilution technique for the cv. Carioca and Negro Argel amounted to 31.7 and 18.4 kg N/ha, resp. These 2 cv. produced 991 and 883 kg grain/ha, resp., when inoculated, and 663 and 620 kg/ha with the addition of 100 kg N fertilizer/ha. The response to N was particularly poor due to high leaching losses in the very sandy soil at the exptl. site. Cv. Venezuela 350 and Rio Tibagi only responded to N fertilizer and not to inoculation with Rhizobium, which stresses the importance of selecting plant cv. for N fixation in the field. [AS]

0800

24844 IDIE, O.T. 1984. Response of Phaseolus beans to seed inoculation and nitrogen fertilizer. Lilongwe, Malawi, Bunda College of Agriculture. 22p. Engl., Sum. Engl., 22 Refs., Illus. [Bunda College of Agriculture, P.O. Box 219, Lilongwe, Malawi]

Paper presented at MIRCEN Coordinating Board Meeting, Lilongwe, Malawi, 1983.

Phaseolus vulgaris. Inoculation. Fertilizers. N. Rhizobium phaseoli. Dry matter. Leaf area. Nodulation. Yields. Yield components. Malawi.

The response of 3 bean cv. (Masaka, Sapelekedwa, and 1308) to seed inoculation with Rhizobium phaseoli strain no. 3644 and to N fertilizer was investigated under irrigation at Bunda College of Agriculture (Malawi). Seed inoculation and N treatments were control, seed inoculation, N + seed inoculation, and N alone. Nodule no. and mass were highest with seed inoculation and least with N + seed inoculation. Bean growth and development, as determined by EM, LAI, specific leaf area, specific leaf wt., canopy height and width, showed that nodulation and N fixation were inadequate to meet nutrient requirements of beans. Plants not receiving N had low vigor and poor growth, and were chlorotic for about 45 days after planting. Seed yields of the control, seed inoculation, N + seed inoculation, and N treatments were 1263, 1467, 1969, and 2086 kg/ha, resp. [AS]

0801

22171 GALOMO R., T. 1978. Respuesta de la inoculación y fertilización en 4 variedades de fríjol Phaseolus vulgaris L. en la región de la Chontalpa, Tabasco. (Response to inoculation and fertilizer application in four bean cultivars in the Chontalpa region, Tabasco). Tesis Ing.Agr. Chapingo, México, Universidad Autónoma. 103p. Span., Sum. Span., 70 Refs., Illus.

Phaseolus vulgaris. Inoculation. Rhizobium phaseoli. Fertilizers. Cultivars. Yields. Mexico.

Two trials were carried out in Tabasco, Mexico, to try to increase bean yields through inoculation and fertilization. Four bean var. (3 meses, 2 meses, Mantequilla Tropical, and Jamapa), 2 Rhizobium phaseoli sources (C.S.A.T.-74 and Nitragin), and 2 doses of fertilizers (40-40-00 and 0) were used in 2 production systems (mechanized and traditional). Var. Jamapa and Mantequilla Tropical gave the highest yields in the mechanized system. Significant differences were found in the interactions var. x fertilizers and var. x fertilizers x inoculant. In the traditional system, the inoculant factor was highly significant. There was significant interaction in var. x inoculant and var. x fertilizers. The greatest no. of nodules was obtained with unfertilized treatments. [AS (extract)-CIAT]

0802

25653 PLADYS, D.; EIGAUD, J. 1985. Senescence in French-bean nodules: occurrence of different proteolytic activities. Physiologia Plantarum 63(1):43-48. Engl., Sum. Engl., 23 Refs., Illus. [Laboratoire de Biologie Végétale, Faculté des Sciences et des Techniques, Parc Valrose, F-06034, Nice Cedex, France]

Phaseolus vulgaris. Snap beans. Nodulation. Nitrogen fixation. Enzymes. Acetylene reduction. France.

A decline in nitrogenase activity (acetylene reduction) of nodules of Phaseolus vulgaris cv. Contander was correlated with a decrease in their soluble protein content including leghemoglobin. At the same time, 2 distinct proteolytic activities against leghemoglobin with acidic and alkaline pH optima were detected. The corresponding proteases were purified approx. 80-fold by ammonium sulphate precipitation, gel filtration, and hydroxyapatite chromatography. Both the acidic (pH optimum 3.5) and the alkaline (pH optimum 8.0) proteases were thiol enzymes. They were characteristic of senescing nodules, whereas only an acidic serine protease was present in functional nodules. [AS]

0803

24946 SEMU, E.; MSUMALI, G.P.; CHOWDHURY, M.S. 1982. Nodulation and yields of beans as affected by seed inoculation and nitrogen application. In Qureshi, J.N., ed. Soil management under intensive cultivation. Nairobi, Kenya, Soil Science Society of East Africa. pp.56-64. Engl., Sum. Engl., 13 Refs. [Dept. of Soil Science, Univ. of Dar es Salaam, c/o Sub Post Office Chuo Kikuu, Morogoro, Tanzania]

Phaseolus vulgaris. Inoculation. Fertilizers. N. Nodulation. Rhizobium phaseoli. Yields. Dry matter. Tanzania.

A field expt. was conducted at the Faculty Farm (Morogoro, Tanzania) to study the effects of seed inoculation and N fertilizer on the nodulation and yields of beans. A split plot design was used, with 2 var. (Canadian Wonder and Selian Wonder) as main plots. The subplots included 3 levels of N (0, 20, and 80 kg/ha) without inoculation, and inoculation with 2 bean inoculants but without N application. N application had no significant effect on nodulation. DM and grain yields were increased at the higher level of N, indicating the need for inoculation. Inoculation increased the nodulation of both var. The standard inoculant increased significantly the DM yields, but not the grain yields. The DM increase due to the local inoculant was not significant. The lack of grain yield response due to N or inoculation is thought to be due to some physiological barrier in the utilization of N by plants or due to some limiting soil factors. [AS]

0804

25220 SMITH, D.L. 1984. Effects of irrigation and fertilizer nitrogen on N_2 fixation and yield in Phaseolus vulgaris L. and Glycine max (L.) Merrill. Ph.D. Thesis. Ontario, Canada, University of Guelph. 243p. Engl., Sum. Engl., 192 Refs., Illus.

Phaseolus vulgaris. Irrigation. Fertilizers. N. Nitrogen fixation. Yields. Nodulation. Canada.

The effects of 2 environmental factors, water and soil N, on Phaseolus vulgaris N_2 fixation and yield were investigated. As effects unique to P. vulgaris were sought, Glycine max was included as a control. Under controlled environment conditions, given no N and ample water, P. vulgaris nodulated and fixed N_2 (C_2H_2) at rates equivalent to or higher than those of G. max. Under field conditions P. vulgaris always fixed substantially less N_2 than did G. max. Irrigation increased N_2 (C_2H_2) fixation in both P. vulgaris and G. max, but proportionally more in the case of P. vulgaris. Additional measurements indicated that P. vulgaris was much more water conservative than G. max, and this may have produced the more extreme effect of water regime on N_2 fixation by P. vulgaris. Application of N fertilizer inhibited the N fixation activities of P. vulgaris and G. max equivalently. Fertilizer N either did not increase the yield of both species or increased it equivalently in both, indicating that P. vulgaris is no more N limited than G. max, a species normally considered quite competent with regard to N_2 fixation. Data from soil sterilization and N dilution expt. indicated that P. vulgaris may be involved in a relationship with a soil organism(s) that allows it to make greater use of soil organic N than G. max. [Dissertation Abstracts International]

See also 0472 0509 0511 0517

0805

25835 AMARILES E., F.; QUINTERO M., A.M. 1985. Análisis econométrico de la producción y el consumo de frijol en Colombia; proyecciones hacia el año 2,000. (Econometric analysis of bean production and consumption in Colombia; projections for the year 2000). Tesis Economista. Cali, Colombia, Corporación Universitaria Autónoma de Occidente. 141p. Span., Sum. Span., 72 Refs., Illus.

Phaseolus vulgaris. Production. Consumption. Economics. Prices. Colombia.

An intent to measure the future evolution of bean production and consumption in Colombia is made, and the possible impact of a technological change in production is explored in order to offer alternatives for planning and designing economic policies. The historical production behavior is analyzed and projected for the 1987-2000 period depending on 2 circumstances: (a) continuation of past trends, and (b) increase in production levels as a result of the technological change. Consumption is projected using an equation that allows estimates to made over time, based on per capita consumption of the base year and by using population and income growth tendencies as well as the income elasticity of demand. Production/consumption balances and deficits/surpluses are established for the suggested situations. It is concluded that changes in bean production have been directly related to area planted and not to yield increases: if bean production continues along the same trend, the country would face a growing deficit, even if a slight increase in consumption derived from low rates of income growth occurred. If bean production goals are established that imply yield increases as a result of technological change, it is possible to simultaneously achieve the self-sufficiency and export objectives. [AS (extract)-CIAT]

0806

26606 BEAN/COWPEA COLLABORATIVE RESEARCH SUPPORT PROGRAM. U.S.A. 1984. Agronomic, sociological and genetic aspects of bean yield and adaptation. In _____. 1984 Annual Report. 1. Technical summary. East Lansing, Michigan State University. pp.98-110. Engl.

Phaseolus vulgaris. Agricultural projects. Developmental research. Socio-economic aspects. Ecuador.

The results of project activities in 1984 on agronomic, sociological, and genetic aspects of bean yield and adaptation in Ecuador are presented. General aspects of the project are discussed. During this 1st stage efforts are being made to adapt microcomputers to farming systems research. The need to 1st analyze inequality prior to initiating field research is stressed. Socioeconomic data on bean prodution in the Pimamparo area are given. Training objectives and outputs and expected short-term research outcomes are summarized. Research plans for 1985 are included. [CIAT]

0807

26607 BEAN/COWPEA COLLABORATIVE RESEARCH SUPPORT PROGRAM. U.S.A. 1984. Agronomic, sociological and genetic aspects of bean yield and adaptation. In _____. 1984 Annual Report. 1. Technical summary. East Lansing, Michigan State University. pp.111-122. Engl.

Phaseolus vulgaris. Agricultural projects. Transfer of technology. Developmental research. Guatemala.

The results of project activities in 1984 on agronomic, sociological, and genetic aspects of bean yield and adaptation in Guatemala are presented. General aspects of the project are discussed. The main steps that were taken to interface the socioeconomic, agronomic, and genetic variables in the research agenda are summarized. A literature review indicated that the photoperiod x temp. x genotype interactions shown to control maturity, adaptation, and yields in beans, also function for most crops. Training objectives and outputs and expected short-term research outcomes are summarized. Research plans for 1985 are included. [CIAT]

0808

26008 BEAN/COWPEA COLLABORATIVE RESEARCH SUPPORT PROGRAM. U.S.A. 1984. Improvement of bean production in Honduras through breeding for multiple disease resistance. In _____. 1984 Annual Report. 1. Technical summary. East Lansing, Michigan State University. pp.123-134. Engl.

Phaseolus vulgaris. Germplasm. Adaptation. Irrigation. Agricultural projects. Transfer of technology. Honduras. Puerto Rico.

The results of project activities in 1984 to improve bean production in Honduras and Puerto Rico, through breeding for multiple disease resistance, are presented. General aspects of the project are discussed. Advanced lines have yielded well and have shown good disease resistance under local conditions. Techniques for conducting a field crossing block were refined. The use of drip irrigation to maintain adequate moisture during the growing season increased the % of successful crosses. A field crossing block using drip irrigation appears to be a viable low-cost option for bean breeding programs in the tropics. Research plans for 1985 are included. Training objectives and outputs and expected short-term research outcomes are summarized. [CIAT]

0809

26001 BEAN/COWPEA COLLABORATIVE RESEARCH SUPPORT PROGRAM. U.S.A. 1984. 1984 Annual Report. 1. Technical summary. East Lansing, Michigan State University. 240p. Engl.

Phaseolus vulgaris. Agricultural projects. Developmental research. Plant breeding. Entomology. Nutritive value. Economics. Socioeconomic aspects. Botswana. Brazil. Cameroon. Dominican Republic. Ecuador. Guatemala. Honduras. Kenya. Malawi. Mexico. Nigeria. Senegal. Tanzania.

A technical summary of research findings on beans and cowpeas during 1984 in the different host countries of the Bean/Cowpea Collaborative Research Support Program is presented. Future plans are also mentioned. Research projects are concerned with bean genetics and plant breeding, entomology, pathology, agronomy, economics, nutrition, and sociocultural factors. The major findings are reported for 18 collaborative projects in Botswana, Brazil, Cameroon, Dominican Republic, Ecuador, Guatemala, Honduras, Kenya, Malawi, Mexico, Nigeria, Senegal, and Tanzania. The objectives, structure, and advances in research and training are summarized. Individual papers are recorded in this publication under the following consecutive no.: 0637, 0651, 0742, 0793, 0796, 0797, 0806, 0807, and 0808. [CIAT]

0810

24437 CORTEZ, C. 1984. Costos de producción de frejol arbustivo. (Bush bean production costs). In Curso sobre el cultivo de frejol usando la metodología Aprender Haciendo, 1o., Pimampiro, Ecuador, 1984. Conferencias. Quito, Instituto Nacional de Investigaciones Agropecuarias. Programa de Leguminosas de la Estación Experimental Santa Catalina.

pp.99-109. Span. [Depto. de Planificación, Inst. Nacional de Investigaciones Agropecuarias, Apartado 2600, Quito, Ecuador]

Phaseolus vulgaris. Costs. Ecuador.

Short farmer-oriented guidelines on bean production costs are given. Bush bean production costs in Pimampiro, Ecuador, up to July 1984, using the technology recommended by Instituto Nacional de Investigaciones Agropecuarias, are given; a sample format of production costs to be filled out by farmers is included. [CIAT]

0811

23210 COVARRUBIAS Z., C. 1983. Análisis económico del rubro poroto. (Economic analysis of bean production). In Curso Nacional de Frejoles, 1o., Talca, Chile, 1983. Trabajos presentados. Santiago, Organización de las Naciones Unidas para la Agricultura y la Alimentación. pp.129-156. Span.

Phaseolus vulgaris. Production. Economics. Marketing. Costs. Income. Trade. Chile.

The basic concept of profitability of an agricultural enterprise is discussed, and the calculations of production costs and incomes from beans are given. An example of a bean crop profitability analysis is also given. [CIAT]

0812

22612 GOEPFERT, C.F.; PONS, A.L.; SUTILI, V.R. 1976. Situacao do feijao no Rio Grande do Sul. (Bean situation in Rio Grande do Sul). In Reuniao Técnica Anual do Feijao, 3a., Porto Alegre-RS, Brasil, 1976. Ata. Porto Alegre, Brasil, Instituto de Pesquisas Agronomicas. pp.128-140. Port., Illus.

Phaseolus vulgaris. Socioeconomic aspects. Cultivation. Storage. Trade. Brazil.

In 1975 a survey was conducted in 7 microregions of Rio Grande do Sul, Brazil, to characterize the situation of beans in the region. Socioeconomic aspects, cultural practices, yields, storage, and marketing were covered. It was found that to meet the demand, beans require an adequate production infrastructure (zoning based on soils and climate, technical assistance, credit, selected seed, soil amendments, and fertilizers) and marketing (a min. stable price, and storage and conditioning facilities). Data are given in table form. [CIAT]

0813

24984 ISLA C., S.I. 1983. Actualización del cultivo de poroto seco en la República Argentina. (Update on dry bean cultivation in Argentina). Tesis Ing.Agr. Argentina, Universidad de Buenos Aires. 217p. Span., Illus.

Phaseolus vulgaris. Production. Land preparation. Cultivars. Planting. Spacing. Diseases and pathogens. Resistance. Selection. Injurious insects. Disease control. Colletotrichum lindemuthianum. Isariopsis griseola. Insect control. Whetzelinia sclerotiorum. Weeds. Marketing. Yields. Argentina.

A review on bean cultivation in Argentina is presented to update information on the following aspects: cropping zones and production, soil preparation and rotations, var. and new promising lines, seed quality and

treatment, planting date, density, and system, cultural practices, weeds and their control, pests (Empoasca kraemeri and Bemisia sp.) and diseases (bean chlorotic mottle virus, Rhizoctonia microsclerotia, and Ascochyta sp.), harvesting and yields, and commercialization (foreign markets). Specific information is given on bean production aspects based on a personal communication with an agronomist. An index to the reviewed literature and photocopies of the resp. articles are provided. [CIAT]

0814

25317 LEIVA R., O.R. 1982. Demanda real y potencial de semilla de fríjoles (Phaseolus vulgaris L.) en Guatemala. (Actual and potential demand of beans in Guatemala). In Pinchinat, A.M.; Poey, F., comp. Reunión Regional de Semillas, 3a., en la Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 28a., San José, Costa Rica, 1982. Trabajos presentados. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.155-159. Span. Sum., Span., 3 Refs.

Phaseolus vulgaris. Production. Consumption. Guatemala.

The current and potential demand of bean seeds in Guatemala is analyzed for the period 1980-85, with emphasis on projections for 1982. Among the strategies recommended to increase bean seed demand are the promotion of bean production in good soils through extension agents, promotion of the advantages of planting improved seeds by the bean program of the Instituto de Ciencia y Tecnología Agrícolas and seed enterprises, production of seed beans at the same time as beans for consumption, and maintenance of the prices of both at similar levels. [CIAT]

0815

25736 LIBONATI, V.F.; ANDRADE, J.C. DE; GUERREIRO, P.M. DA S. 1979. Producao dos principais alimentos de origem vegetal: feijao. (Production of the main foods of vegetal origin: beans). In _____. Alguns aspectos da producao de alimentos no Estado do Pará. Belem-PA, Brasil, Faculdade de Ciencias Agrarias do Pará. Servico de Documentacao e Informacao. Informe Técnico no.1. pp.13-15,57-76. Port.

Phaseolus vulgaris. Production. Cultivation. Cultivation systems. Trade. Brazil.

The main foodstuffs of the state of Pará (Brazil), among them beans, are presented. Production data for the 1970-76 period, importance of the crop in the state, cropping systems, and commercialization are indicated. [CIAT]

0816

22649 PACHICO, D. 1984. Bean technology for small farmers: biological, economic and policy issues. Agricultural Administration 15(2):71-86. Engl., Sum. Engl., 19 Refs., Illus. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Transfer of technology. Plant architecture. Socio-economic aspects. Development. Colombia.

The feasibility of developing new bean technology for small farmers in Latin America is assessed. Adaptation to associated cropping system, plant architecture, and adaptation to stress and low inputs are discussed as means of biasing technology towards small farmers. The economic impact of new technology biased towards small farmers who are competing with large

farmers is analyzed and the costs of developing small farm technology are noted. Some policy influences conditioning the decision whether to bias technology towards small farmers are considered. [AS]

0817

25633 SCHMIDT, G. 1979. Maize and beans in Kenya: the interaction and effectiveness of the informal and formal marketing systems. Nairobi, Kenya, Institute for Development Studies, University of Nairobi. Occasional Papers no.31. 166p. Engl., Sum. Engl., 44 Refs., Illus.

Phaseolus vulgaris. Marketing. Zea mays. Production. Consumption. Prices. Kenya.

The functioning of the Kenyan domestic maize and beans marketing system is analyzed with special regard to the interaction of the formal (controlled) and informal (uncontrolled) subsystems. Initially the determinants of the marketing system's performance framework for maize and beans marketing operations, structure, and conduct of the marketing systems are described and analyzed. This is followed by an evaluation of the performance guided by the stated objectives of the controls: to benefit producers and consumers. In summary, the analysis suggests that the objectives of the controls are not being achieved and, in fact, that the present system of controls contributes to marketing inefficiencies. [AS (extract)]

0818

24418 SUPERINTENDENCIA DO DESENVOLVIMENTO DA AMAZONIA. BRASIL. 1983. Avaliacao da safra de feijao. (Evaluation of the bean harvest). In _____. Avaliacao da safra 1981/1982 arroz, milho, feijao, mandioca; regiao norte. Belem-PA, Brasil, Departamento de Setores Produtivos. pp.39-50. Port., Illus.

Phaseolus vulgaris. Production. Marketing. Cultivars. Economics. Prices. Brazil.

An overall description of bean production systems (i.e., Vigna and Phaseolus) and an analysis of the 1981-82 bean crops in northern Brazil are presented. Area planted, production increase, production problems, producing municipalities, labor and fertilizer use, and credit performance were analyzed for both harvests in the states of Rondônia, Acre, Pará, Amazonas, Amapá, and Roraima. Perspectives for the 1982-83 crop in each of these states are analyzed. [CIAT]

0819

24417 SUPERINTENDENCIA DO DESENVOLVIMENTO DA AMAZONIA. BRASIL. 1982. Avaliacao da safra de feijao. (Evaluation of the bean harvest). In _____. Avaliacac da safra 1980/1981 de arroz, feijao, mandioca e milho, cultivados na regiao norte. Belem-PA, Brasil, Departamento de Setores Produtivos. pp.25-55. Port., Illus.

Phaseolus vulgaris. Production. Marketing. Cultivars. Economics. Prices. Brazil.

An overall description of bean production systems (i.e., Vigna and Phaseolus) and an analysis of the 1979-80 and 1980-81 bean crops in northern Brazil are presented. Area planted, production increase, production problems, producing municipalities, labor and fertilizer use, and credit performance were analyzed for both harvests in the states of

Rondônia, Acre, Pará, Amazonas, Amapá, and Roraima. Perspectives for the 1981-82 crop in each of these states are analyzed. [CIAT]

See also 0490 0491 0505 0574 0597 0599 0604 0606 0633 0792 0793 0797

L00 GRAIN STORAGE

0820

22608 ALTMAYER, M.B.; PELTEZOLLI, F.C.; BRUSAMOLIN, E.P.; RODRIGUES, A.C.; PETZHOLD, P.B. 1976. Efeito do teor de umidade e da embalagem na conservacao do feijao. (Effect of moisture content and packing on bean seed conservation). In Reuniao Técnica Anual do Feijao, 13a., Porto Alegre-RS, Brasil, 1976. Ata. Porto Alegre, Brasil, Instituto de Pesquisas Agronomicas. pp.88-97. Port.

Phaseolus vulgaris. Seed. Water content. Storage. Packaging. Germination. Brazil.

To study the effect of bean seed MC prior to storage and different packing types (thick, intermediate, and thin transparent polyethylene bags, and cotton sacks), an expt. was conducted with initial bean seed MC of 7, 9, 11, 13, 15, and 17% using 1 kg samples, with or without 2 g malathion/kg beans. Germination % and MC were measured 6 and 12 mo. after storage. There were no differences between insecticide-treated and untreated samples. The best packing media were the intermediate and thick polyethylene bags at 9-11% MC. At 6 mo. after storage all storage media gave similar results, but germination % tended to decrease at 17% MC in the thick polyethylene bags. Germination tended to decrease significantly at higher MC, especially in cotton sacks. Water absorption was higher in samples from cotton sacks at both 6 or 12 mo. storage; however, it was always high at any sampling date when seeds were kept at higher MC. [CIAT]

0821

26077 MOSCOSO, W.; BOURNE, M.C.; HOOD, L.F. 1984. Relationships between the hard-to-cook phenomenon in red kidney beans and water absorption, puncture force, pectin, phytic acid, and minerals. Journal of Food Science 49(6):1577-1583. Engl., Sum. Engl., 27 Refs., Illus. [Inst. Superior de Agricultura, Apartado No. 166, Santiago, República Dominicana]

Phaseolus vulgaris. Seed characters. Cooking. Mineral content. Timing. Storage. Water content. Dominican Republic.

The effect of high temp.-high humidity storage on cooking quality and physicochemical properties of dry, mature red kidney beans was evaluated over a storage period of 9 mo. The rate of softening of beans during cooking and the rate of dissolution of pectin during cooking followed apparent 1st-order kinetics, and their apparent rate constants correlated highly with each other. The apparent softening rate constants decreased with increasing time of storage. The loss of cookability in mature bean seeds stored under high temp.-high humidity conditions probably results from a decrease in phytic acid P and alterations in the ratio of monovalent:divalent cations in the tissue. [AS]

See also 0827

L01 Stored Grain Pests

0822

24689 DAVIES, J.C. 1959. A note on the control of bean pests in Uganda. East African Agricultural Journal 24(3):174-178. Engl., 5 Refs.

Phaseolus vulgaris. Acanthoscelides obtectus. Callosobruchus. Stored grain pests. Insect control. Uganda.

The biological cycles of the stored bean insect pests Acanthoscelides obtectus and Callosobruchus spp. in Uganda are briefly described. A 2-trial expt. to control A. obtectus (227 g of 0.05% gamma B.C.H. dust applied to 90.8 kg beans) showed that the tops of bins were more heavily infested than the bottoms at any time of the storage period (up to 6 mo.) in untreated beans, while the % damage remained low in either case in treated beans. In trials 1 and 2, the % damage by A. obtectus in untreated beans was 38.4 and 69.4% after 5 and 6 mo. storage, resp., compared with 1.5 and 0.3% for the treated beans. The av. wt. loss between bored and unbored beans was 12.8%. In Uganda all beans that are to be stored for more than 4 mo. should be treated. [CIAT]

0823

25648 SERRANO, M.S.; SCHOONHOVEN, A. VAN; VALOR, J.F.; CARDONA, C. 1983. Fuentes de resistencia en materiales silvestres de fríjol al ataque del gorgojo común del fríjol, Acanthoscelides obtectus (Say). (Sources of resistance to Acanthoscelides obtectus attack in wild bean materials). Revista Colombiana de Entomología 9(1-4):13-18. Span., Sum. Span., Engl., 20 Refs., Illus. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Acanthoscelides obtectus. Germplasm. Resistance. Cultivars. Stored grain pests. Colombia.

Over 200 Mexican wild bean accessions were tested for their resistance to Acanthoscelides obtectus; 65.5% were resistant, 19.5% showed intermediate resistance, and only 15.0% were susceptible. The rearing of A. obtectus for 4 generations on resistant lines reduced the reproductive capacity of the insect by up to 100%. In free-choice and no-choice tests, adult oviposition preference and larvae seed-penetration preference were tested; an av. of 49.8 eggs were laid per pod in resistant var. vs. 136.4 eggs/pod in susceptible var. When an age-specific life table was developed, the net reproductive rate calculated was lower in the resistant var. than in the susceptible check Diacol-Calima. The characteristics of the seed coat had some effect on the insect life cycle but the main resistance factor in wild beans was in the cotyledons. [AS]

See also 0706

M00 USES, INDUSTRIALIZATION AND PROCESSING

0824

25340 ARAUJO, E.F.; SILVA, F.F. DA; SILVA, J. DE S.F.; SEDIYAMA, C.S. 1984. Influencia da secagem das vagens na germinacao e no vigor de sementes de feijao. (Influence of pod drying on the germination and vigor of bean seeds). Revista Brasileira de Sementes 6(2):97-110. Port., Sum. Port., Engl., 15 Refs., Illus. [Univ. Federal de Vicosa, Depto. de Fitotecnia, 36.570 Vicosa-MG, Brasil]

Phaseolus vulgaris. Seed. Drying. Germination. Seed vigor. Harvesting. Timing. Water content.

In studies with Phaseolus vulgaris cv. Costa Rica, whole pods, harvested when the seed MC was 54 or 45%, were dried naturally or artificially in hot air at 40, 50, or 60°C. The control pods were left on the plants and were harvested (conventionally) when the seed MC was about 29%. In all cases the seeds were hand-shelled. The seeds were assessed for quality immediately after shelling and after 12 mo. of storage. Drying at 50 or 60°C decreased seed quality, especially in seeds with high initial MC, but 40°C had no adverse effect. After 12 mo. of storage, germination was highest in naturally dried control seeds (96.8%) and next highest (95.5%) in those harvested at 45% MC and dried at 40°C. [AS]

0825

21044 BEATTIE, R.L. 1982. The U.K. canned bean industry. Michigan Dry Bean Digest 6(4):24-25. Engl., Illus.

Phaseolus vulgaris. Canned beans. Marketing. United Kingdom.

The canned bean industry in the United Kingdom is discussed, with emphasis on the position held by the Heinz Company. The current vulnerability of this market in the United Kingdom due to the increase in the price of beans is analyzed along with some of its causes. A solution could be the improvement of productivity and consistency in bean production and handling and shipping techniques in order to remain competitive. [CIAT]

0826

26022 CAMPDEN FOOD PRESERVATION RESEARCH ASSOCIATION. ENGLAND. 1982. Campden standard for dry pea beans for canning. Gloucestershire. 22p. Engl.

Phaseolus vulgaris. Canned beans. Processing. Water content. Seed characters.

Standards for dry Phaseolus vulgaris used for canning are discussed under headings of: general quality, grades of P. vulgaris, ascertaining the grade, sampling (point and method of sampling, size of sample), MC, definition of defects, tolerances for defects, size-grading, color, flavor, bag material (as affecting P. vulgaris), and container inspection. Five appendices are included, namely, method for moisture determination, staining method of determination of cracked seed coats, reference method for color measurement of P. vulgaris, container inspection prior to loading and at unloading. [Food Science and Technology Abstracts]

0827

24431 CEVALLOS, F. 1984. Cosecha, trilla, limpieza y almacenamiento. (Harvesting, threshing, cleaning, and storage). In Curso sobre el cultivo de frejol usando la metodología Aprender Haciendo, 1o., Pimampiro, Ecuador, 1984. Conferencias. Quito, Instituto Nacional de Investigaciones Agropecuarias. Programa de Leguminosas de la Estación Experimental Santa Catalina. pp.93-98. Span. [Programa de Leguminosas, Estación Experimental Santa Catalina, Inst. Nacional de Investigaciones Agropecuarias, Apartado 340, Quito, Ecuador]

Phaseolus vulgaris. Harvesting. Threshing. Storage. Processing. Ecuador.

Simple recommendations are given on bean harvesting, threshing, cleaning, processing, and storage. Bean seed should be processed to eliminate contaminants and poor quality seed, improve the physical properties and appearance, provide protection against diseases and pests, create uniformity, and facilitate marketing. [CIAT]

0828

25888 CRIVELLI, G. 1984. La surgelazione del fagiolo borlotto e possibile e con buoni risultati. (Freezing of Borlotto-type beans is possible, and with good results). Informatore Agrario 40(48):43-44. Ital., Sum. Ital., 1 Ref., Illus. [Istituto Sperimentale per la Valorizzazione Tecnologica dei Prodotti Agricoli, Milan, Italy]

Phaseolus vulgaris. Cultivars. Processing. Italy.

In studies over 3 yr on a no. of Phaseolus vulgaris var. and lines of different seed type, the best for freezing were cv. Ania, Iena, Giulia, and Minia, and the line P262. The taste of round to ovoid, light-colored seeds (Ania, Iena, P262) was preferred to that of long, dark-colored seeds (Giulia, Minia). [Plant Breeding Abstracts]

0829

26029 DESHPANDE, S.S.; CHERYAN, M. 1984. Preparation and antinutritional characteristics of dry bean (Phaseolus vulgaris L.) protein concentrates. Qualitas Plantarum Plant Foods for Human Nutrition 34(3):185-196. Engl., Sum. Engl., 21 Refs., Illus. [Dept. of Food Science, 382-D, Ag.Eng.Sci.Bldg., Univ. of Illinois, Urbana, IL 61801, USA]

Phaseolus vulgaris. Cultivars. Proteins. Bean starch. Protein content. Tannin content. Bean flour. Uses. USA.

Protein concentrates and starches were prepared by a wet extraction process from 5 dry bean cv. The protein contents ranged from 69.7 to 76.4%. Concentrates prepared from dehulled beans under similar conditions had higher protein contents (80.6-87.9%). Each additional washing of the concentrates with distilled water increased their protein content. The protein recovery progressively decreased. The yield of starch ranged from 48.0 to 51.1% of the starting material. The solubility of bean proteins was minimal at pH 4.0, and under alkaline conditions, it was influenced by the tannin contents of the concn. Protein concentrates had lower trypsin, chymotrypsin, and amylase inhibitory activities as well as lower phytic acid and tannin contents compared with whole bean flours. [AS]

0830

26027 DRAKE, S.R.; KISMAN, B.F. 1984. Canned dry bean quality as influenced by high temperature short time (HTST) steam blanching. Journal of Food Science 49(5):1318-1320. Engl., Sum. Engl., 15 Refs. [United States Dept. of Agriculture, Agricultural Research Service, Irrigated Agriculture Research & Extension Center, Washington State Univ., Prosser, WA 99350, USA]

Phaseolus vulgaris. Canned beans. Processing. Cultivars. Water content. Seed color. Seed characters. USA.

High temp. short time (HTST) steam-blanched dry beans had greater drained weights and shear values than water-blanched dry beans. The MC of dry beans was greater after water blanching. Subjective grade was closely

related to drained weights and shear values, and HTST steam-blanched dry beans. Water-blanched dry beans were lighter in color than HTST steam-blanched dry beans. As length of HTST steam blanch was increased, Agtron color of the beans darkened. High quality canned dry beans can be produced with HTST steam blanching with energy and time savings, but differences between water and HTST steam blanching and canning quality is highly dependent on cv. and length of HTST steam blanch. [AS]

0831

24849 FOJE, O.T.; AYOJOADE, F.W.F. 1972. Effects of seed size on the yield of canning beans. Malawi Journal of Science 1:37-40. Engl., Sum. Engl., 7 Refs.

Phaseolus vulgaris. Canned beans. Seed characters. Yields. Yield components. Malawi.

Seeds of canning bean cv. No. 1196 were screened into 3 sizes (1, 6.58; 2, 10.84; 3, 19.24 g/100 seeds) and planted under irrigation in a randomized block design replicated 5 times. Sizes 1, 2, and 3 yielded 2478.5, 2694.4, and 2504.1 kg/ha, resp. However, these differences were not significant. The low heritability of seed size was probably due to its polygenic character. [AS]

0832

26066 FARROW, I.J. 1982. Blanching dried vegetables. United Kingdom Patent Application GB 2 088 695 A. 3p. Engl., Sum. Engl. [Cleary & Co. Limited, Main Road, Clenchwarton, Kings Lynn, Norfolk PE30 4BQ, England]

Phaseolus vulgaris. Processing. Canned beans. United Kingdom.

A method of preparing dried vegetables for canning is described which involves an extended blanch period (e.g. 8-90 min) at a controlled, elevated temp. (e.g. 150-195°F) and which does not require a preliminary extended cold water soak previously required in the preparation of such vegetables for canning. Treatment of beans or peas is exemplified. [AS]

0833

22516 LOLLATO, M.A.; SILVA, W.R. DA 1984. Efeitos da utilizacao da mesa gravitacional na qualidade de sementes de feijoeiro. (Effects of gravity table utilization on bean seed quality). Pesquisa Agropecuária Brasileira 19(12):1483-1496. Port., Sum. Port., Engl., 18 Refs., Illus. [Inst. Agronomico do Paraná, Area Técnica de Sementes, Caixa Postal 1331, 86.100 Londrina-PR, Brasil]

Phaseolus vulgaris. Seed. Processing. Seed characters. Germination. Brazil.

Considering the importance of using, and the difficulty of getting high quality bean seed, the effects of using gravity tables in seed lots were assessed. After cleaning, the seed lots passed through the gravity table originating 4 treatments the 1st time, which in turn were each submitted to the gravity table, each one generating 4 more treatments. The following analyses were carried out after sampling: seed MC, purity, 1000 grain wt., volumetric wt., seed density, germination, accelerated aging, seed health, and stained, defective, or germinated seed no. The gravity table was efficient in separating the seed lots as a function of the following parameters: seed density, unitary and volumetric wt., germination power, vigor, seed health, and purity. These parameters were higher in the upper

unloading beaks. A tendency of stained, defective, germinated, Rhizoctonia solani- and Fusarium spp.-contaminated seeds to go to the lower unloading beak was also observed. The use of gravity tables in bean seed classification is justified in order to improve the quality of seed lots. [AS]

0834

22156 PALA, M.; DEELEN, W. VAN; STEINBUCH, F. 1983. Effect of different pretreatments on the quality of deep frozen green beans and carrots. Wageningen, Sprenger Institut. Report no.2227. 24p. Engl., Sum. Germ., Engl., 17 Refs., Illus.

Phaseolus vulgaris. Snap beans. Processing. Germany Federal Republic.

Since pretreatment methods for frozen vegetables are of considerable importance with respect to quality retention, conventional water- and steam-blanching methods were compared with vacuum packaging, evacuation, and heat shock treatments, as well as combinations of various methods. Green beans and carrots were used as the raw materials. The difference in quality of the frozen vegetables was determined by chemical and physical parameters: pH, DM content, total acid content, ascorbic acid content, peroxidase activity, color, and texture. Results indicate that the max. quality retention of frozen green beans was achieved by the evacuation and heat shock treatments. [AS]

0835

22517 PEREIRA, F.C.; NORWIG, J.; THOMPSON, D.R. 1984. Green bean and asparagus blanching data. Transactions of the American Society of Agricultural Engineers 27(2):624-628. Engl., Sum. Engl., 26 Refs., Illus.

Phaseolus vulgaris. Snap beans. Processing. Canned beans. USA.

Effects of blanching on asparagus and cut green beans were determined by measuring gas removal and recovery after blanch. Canned beans were also examined for changes after storage. All changes in green beans were nearly complete in a 3-min blanch at 89°C. Organoleptic evaluation of taste and texture yielded no significant differences between beans blanched at different temp. (82-92°C), and stored at room temp. or 30°C for different times (0-63 days), though instrumental tests showed loss of texture at higher blanch and storage temp., and significant loss of color during storage at both temp. Since no variations in sediment were observed, blanching green beans at 92°C for 3 min or more may be sufficient. [Food Science and Technology Abstracts]

0836

26089 TONINI, G.; MINNITI, A.M.; MAINI, F.; RANALLI, P. 1984. Scelta varietale, epoca di semina e raccolta dei fagiolini per un buon prodotto trasformato. (Choice of variety, sowing and harvest dates for a good processed product in dwarf beans). Informatore Agrario 40(48):67-76. Ital., 15 Refs., Illus.

Phaseolus vulgaris. Seed characters. Cultivars. Planting. Harvesting. Timing. Snap beans. Storage. Processing. Italy.

Tabulated data are presented on characters including size, shape, and seeds:pod ratio at harvest, and color and consistency of the frozen product at 6 and 12 mo. storage and -25°C of 6, 9, and 8 French bean cv. in 1981, 1982, and 1983, resp., with different sowing and harvest dates. Similar

data are also presented on 15 and 11 cv. in 1982 and 1983, resp., and on 10 cv. in a 2nd study in 1983. Brief summaries of the processing suitability of each cv. are provided: Euronor, Brelan, Autan, Mirage, and PV124 were suitable for canning only; Bel Ami, Pros Gitana, and Ingo were suitable for both canning and freezing. [Horticultural Abstracts]

0837

25883 VAN BUREN, J.P. 1983. Two effects of sodium chloride causing softening of the texture of canned snap beans. Journal of Food Science 48(4):1362-1363. Engl., Sum. Engl., 10 Refs. [Dept. of Food Science & Technology, Cornell Univ., Geneva, NY 14456, USA]

Phaseolus vulgaris. Snap beans. Processing. Canned beans. Cooking. USA.

The effect of NaCl on the texture of canned snap beans was studied with leached and nonleached pods. Pectin and Ca solubilization were also measured. NaCl promoted softening both during cooking and apart from cooking. The cooking effect was accompanied by increased pectin solubility. The noncooking effect was accompanied by increased Ca solubility. [AS]

ABBREVIATIONS AND ACRONYMS

A	Angstrom(s)
ABA	Abscisic acid
ac	Acre(s)
Afr.	Afrikaans
a.i.	Active ingredient
alt.	Altitude
AMV	Alfalfa mosaic virus
approx.	Approximate(ly)
atm.	Atmosphere
ATP	Adenosine 5'-triphosphate
av.	Average
BAP	6-Benzylaminopurine
BBMV	Broad bean mosaic virus
BCMV	Bean common mosaic virus
BGMV	Bean golden mosaic virus
BGYMV	Bean golden yellow mosaic virus
BOD	Biochemical oxigen demand
BPMV	Bean pod mottle virus
BRMV	Bean rugose mosaic virus
BSMV	Bean southern mosaic virus
BV	Biological value
BYMV	Bean yellow mosaic virus
°C	Degrees Celsius (centigrade)
ca.	About (circa)
CAMD	Cassava African mosaic disease
CMV	Cassava African mosaic virus
CBB	Cassava bacterial blight
CBSD	Cassava brown streak disease
CEC	Cation exchange capacity
CER	CO_2 exchange rate
CF	Cassava flour
CGR	Crop growth rate
CLM	Cassava leaf meal
CLV	Cassava latent virus
CM	Cassava meal
cm	Centimeter(s)
COD	Chemical oxigen demand
concn.	Concentration
CP	Crude protein
CSL	Calcium stearyl lactylate
CSW	Cassava starch wastes
C.V.	Coefficient of variation
cv.	Cultivar(s)
2,4-D	2,4-dichlorophenoxyacetic acid
DM	Dry matter
DNA	Deoxyribonucleic acid
EC	Emulsifiable concentrate
EDTA	Ethylenediaminetetraacetic acid
EEC	European Economic Community
e.g.	For example
ELISA	Enzyme-linked immunosorbent assays
EMS	Ethyl methane sulfonate
Engl.	English
EP	Preliminary Trials, CIAT
expt.	Experiment(s)
exptl.	Experimental
°F	Degrees Fahrenheit
Fr.	French
ft-ca	Foot candles (10.76 lux)
FYM	Farmyard manure
g	Gram(s)
G	Giga (10^9)
GA	Gibberellic acid
gal	Gallon(s)
GE	Gross energy
Germ.	German
GERs	Glucose entry rates
GLC	Gas-liquid chromatography
h	Hour(s)
ha	Hectare(s)
HCN	Hydrocyanic acid
HDP	Hydroxypropyl distarch phosphate (modified cassava starch)
HI	Harvest index
hp	Horsepower
IAA	Indoleacetic acid
IBA	Indolebutyric acid
IBYAN	International Bean Yield and Adaptation Nursery, CIAT
Illus.	Illustrated
in.	Inches
Ital.	Italian
IU	International unit
J	Joule
Jap.	Japanese
kat	Katal(amount of enzymatic activity that converts 1 mole of substrate/s)
kcal	Kilocalorie(s)
kg	Kilogram(s)
kJ	Kilojoule
km	Kilometer(s)
KNap	Potassium naphthenate
kR	Kiloroentgen(s)
l	Liter(s)
LAD	Leaf area duration
LAI	Leaf area index
lat.	Latitude
lb	Pound(s)
LD_{50}	Mean lethal dose
LER	Land efficiency ratio

LPC	Leaf protein concentrate
lx	Lux
M	Mega
M	Molar
m	Meter(s)
Mal.	Malay
max.	Maximum
MC	Moisture content
ME	Metabolizable energy
meq	Milliequivalent(s)
met.	Methionine
mg	Milligram(s)
mho	Reciprocal ohm
min.	Minimum
min	Minute(s)
ml	Milliliter(s)
mm	Millimeter(s)
mo.	Month
mol. wt.	Molecular weight
m.p.	Melting point
NAA	Alpha-naphthalene acetic acid
NAD	Nicotinamide adenine dinucleotide
NADH	Nicotinamide adenine dinucleotide, reduced form
NAR	Net assimilation rate
NCE	Net CO_2 exchange
NE	Northeast
NER	Net energy ratio
nm	Nanometer(s) (10^{-9} m)
no.	Number(s)
NPFs	Negative production factors
NPR	Net protein ratio
NPU	Net protein utilization
NW	Northwest
OM	Organic matter
oz	Ounce(s)
p.	Page
P	Probability
Pa	Pascal(s)
PAN	Peroxyacetic nitrate
PCNB	Pentachloronitrobenzene
PDA	Potato dextrose agar
PER	Protein efficiency ratio
pH	Hydrogen ion concentration
pp.	Pages
pphm	Parts per hundred million
PPI	Pre planting incorporation
ppm	Parts per million
PSA	Potato sucrose agar
pv.	Pathovar
Ref(s).	Reference(s)
resp.	Respective(ly)
Rf	Retardation factor-chromatography
RGR	Relative growth rate
RH	Relative humidity
RNA	Ribonucleic acid
Rom.	Romanian
rpm	Revolutions per minute
Russ.	Russian
s	Second
SBM	Soybean meal
SCN	Thiocyanate
SCP	Single cell protein
SDS	Sodium dodecyl sulfate
Sk.	Slovak
sp.	Species
Span.	Spanish
spp.	Species
SSL	Sodium stearyl-2-lactylate
Sum.	Summary
t	Ton(s)
TDN	Total digestible nutrients
temp.	Temperature
TIA	Trypsin inhibitor activity
TIBA	2,3,5-Triiodobenzoic acid compound with N-methylmethanamine
TLC	Thin-layer chromatography
TMV	Tobacco mosaic virus
TSH	Thyroid-stimulating hormone
UDPG	Uridine diphosphate glucose
UMS	Unmodified cassava starch
UV	Ultraviolet
var.	Variety(ies), varietal
VEF	Bean Team Nursery, CIAT
VFA	Volatile fatty acids
vol.	Volume
VPD	Vapor pressure deficit
vpm	Volume per million
vs.	Versus
W	West, watt
wk.	Week
WP	Wettable powder
wt.	Weight
yr	Year(s)
/	Per
%	Percent(age)
>	More than, greater than
<	Less than
≤	Equal to or less than
≥	Equal to or greater than
±	Plus or minus

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0502 0612 0618 0619 0629 0634 0722
0740 0742 0751 0808

CLIMATIC REQUIREMENTS
0477 0504 0526 0556
TEMPERATURE
0461 0494 0502

CLIMBING BEANS
0546 0594 0595 0604 0617 0625

COLEOPTERA
0576 0706 0712 0714 0716 0721 0773
0774 0776 0827

COLLETOTRICHUM LINDEMUTHIANUM
0547 0760

DISEASE CONTROL
0504 0526 0636 0638 0642 0680 0740
0813
CHEMICAL CONTROL
0663 0668 0676 0681
DISEASE TRANSMISSION
0676
ETIOLOGY
0638
INOCULATION
0651
RESISTANCE
0504 0578 0594 0632 0651 0752 0773
0813
SYMPTOMATOLOGY
0526 0636 0638 0642 0680

COLOMBIA
0442 0494 0502 0530 0568 0569 0570
0571 0572 0573 0574 0575 0582 0583
0584 0585 0586 0593 0595 0596 0598
0604 0605 0606 0607 0608 0609 0627
0633 0736 0755 0757 0767 0792 0816
DISEASES AND PATHOGENS
0594 0676 0696 0766
GERMPLASM
0731 0777 0823
INJURIOUS INSECTS
0779 0823
PRODUCTION
0597 0805

COMPOSITION
0478 0479 0482 0483 0484 0486 0794
DRY MATTER
0462 0464 0472 0499 0800
MINERAL CONTENT
0451 0456 0457 0475 0481 0488 0495
0516 0793 0821
PROTEIN CONTENT
0485 0488 0745 0768 0829
WATER CONTENT
0527 0820 0821 0824 0826 0830

CONODERUS
0712

CONSUMPTION
0805 0814 0817

COOKING
0479 0821 0837
NUTRITIVE VALUE
0793 0794

COPPER
0455

LEAVES
0456
MINERAL DEFICIENCIES
0452
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0456

CORYNEBACTERIUM FLACCUMFACIENS
DISEASE CONTROL
0638 0642
ETIOLOGY
0638
SYMPTOMATOLOGY
0638 0642

COSTA RICA
0496 0523 0524 0530 0549 0562 0587
0588 0602 0612
DISEASES AND PATHOGENS
0529 0613 0672 0673 0679
GERMPLASM
0777

COSTS
0492 0555 0587 0597 0604 0606 0810
0811

COTYLEDONS
0449 0467 0476 0487

COWPEA MOSAIC VIRUS
0692

CROP LOSSES
0697 0703 0713 0715 0726 0779

CROSS-POLLINATION
0447
PLANT BREEDING
0728 0734

CUBA
0497 0545 0555
DISEASES AND PATHOGENS
0692 0764
INJURIOUS INSECTS
0714 0719 0720 0721 0722
SEED PRODUCTION
0611

CUCUMBER MOSAIC VIRUS
RESISTANCE
0745 0775

CULTIVARS
0438 0447 0450 0454 0459 0467 0463
0464 0468 0469 0471 0478 0483 0485
0486 0488 0490 0491 0498 0499 0502
0504 0507 0509 0518 0520 0524 0525
0526 0527 0530 0540 0544 0545 0546
0547 0548 0552 0559 0561 0562 0563
0567 0573 0576 0582 0584 0586 0587
0588 0593 0596 0605 0606 0622 0632
0633 0634 0639 0646 0647 0649 0653
0671 0672 0677 0679 0681 0684 0686
0690 0692 0694 0697 0699 0702 0713
0721 0728 0732 0733 0734 0736 0737
0738 0739 0741 0743 0744 0746 0747
0754 0755 0757 0758 0760 0761 0762
0763 0764 0768 0770 0772 0773 0774
0775 0778 0780 0781 0782 0786 0788
0789 0791 0796 0797 0799 0801 0813
0818 0819 0828 0829 0830 0836
ADAPTATION
0566 0594 0612 0613 0614 0615 0616
0618 0619 0620 0621 0623 0624 0625
0626 0627 0628 0630 0631 0635 0724
0742 0752
GERMPLASM
0528 0616 0617 0631 0635 0637 0645
0648 0683 0742 0745 0748 0751 0765
0823
PLANT INTRODUCTIONS
0557 0626 0635 0748 0776

CULTIVATION SYSTEMS
0547 0548 0549 0567 0568 0569 0570
0571 0572 0573 0574 0575 0576 0577
0578 0579 0580 0581 0582 0583 0584
0585 0586 0587 0588 0589 0590 0591
0592 0593 0594 0595 0596 0597 0598
0599 0600 0601 0602 0603 0604 0605
0606 0607 0608 0609 0610 0633 0672
0673 0737 0752 0755 0765 0786 0769
0815

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0476

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0700
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0728

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0467 0474

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0437 0439 0440 0477

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0448 0540
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0765

DELIA PLATURA
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0526
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0715

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0469 0502 0563
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0471 0473 0635
GERMINATION
0466 0820
PODDING
0471 0473

DIABROTICA BALTEATA
0714
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0721

DIABROTICA SPECIOSA
PLANT INJURIES
0712

DIPTERA
0705 0715 0716 0726
INSECT CONTROL
0526 0711 0717 0718 0723

DISEASE CONTROL
0565 0582 0633
BACTERIOSES
0504 0636 0638 0642 0646 0680 0740
MYCOSES
0504 0526 0529 0636 0638 0642 0650
0656 0658 0662 0663 0668 0669 0672
0674 0675 0676 0680 0681 0682 0683
0727 0740 0761 0813
VIRUSES
0504 0636 0638 0642 0694 0740

DISEASE PHYSIOLOGY AND BIOCHEMISTRY
0652 0659

DISEASE TRANSMISSION
0646 0676

VIRUSES
0694 0696

ENV
0693

DOMINICAN REPUBLIC
0689 0821
DISEASES AND PATHOGENS
0676 0677 0742
[illegible]
0677 0742 0777

DRAINAGE
0671

[illegible]
0498 0498 0499 0509 0520 0527

DRY WEIGHT
0419 0462 0464 0472 0499 0514 0544
0600 0801

DRY BEANS
0571 0585 0598 0617 0675
GRAZING
0514 0539 0568 0569 0593

ECOLOGY
0472 0509 0511 0517 0798 0799 0802
0804

ECONOMICS
0492 0505 0569 0574 0586 0587 0597
0599 0604 0606 0613 0805 0809 0810
0811 0814 0817 0818 0819

ECUADOR
0462 0563 0510 0519 0536 0636 0806
0809 0810 0827
INJURIOUS INSECTS
0776
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0492 0565
SEED PRODUCTION
0787

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0472 0478

EL SALVADOR
0812
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0812

ELASMOPALPUS LIGNOSELLUS
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0721
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0712

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0647
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0674

EMPOASCA FABAE
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0720

EMPOASCA KRAEMERI
0722

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0779

ENZYMES
0453 0460 0461 0480 0487 0644 0669
0736 0802

ERYSIPHE POLYGONI
DISEASE CONTROL
0676 0680
SYMPTOMATOLOGY
0636 0680

ETIELLA ZINCKENELLA
0712

EVAPOTRANSPIRATION
0494

FAT CONTENT
LEAVES
0467

FERTILIZERS
0451 0459 0473 0492 0493 0496 0497
0500 0503 0504 0505 0507 0511 0512
0517 0518 0517 0518 0519 0521 0522
0523 0529 0526 0537 0548 0557 0572
0576 0585 0591 0595 0609 0610 0677
0752 0765 0798 0799 0800 0801 0802
0804

FLOWERING
0471 0475 0675

FOLIAGE
0445 0470 0498

FUSARIUM OXYSPORUM
DISEASE CONTROL
0676
RESISTANCE
0677
SYMPTOMATOLOGY
0676

FUSARIUM SOLANI PHASEOLI
0657 0670 0684
DISEASE CONTROL
0680
RESISTANCE
0666 0671
SYMPTOMATOLOGY
0680

GENES
0728 0735 0736 0737 0743 0767 0
0773

GENOTYPES
0482 0498 0499 0509 0566 0629 0733
0744 0759 0771 0774

GERMINATION
SEED
0463 0466 0532 0820 0824 0833

GERMPLASM
0578 0616 0617 0619 0631 0635 0637
0645 0668 0683 0731 0742 0745 0748
0751 0756 0765 0777 0783 0808 0823

GREEN MANURES
0500

GROWTH
0420 0426 0455 0660
LIGHT
0445 0477
MINERALS AND NUTRIENTS
0451 0461 0495 0514 0513 0657 0671
0761
NUTRIENT SOLUTION
0657
PLANTING
0501 0514
SALINITY
0475
SPACING
0501 0514
TEMPERATURE
0465 0468 0474 0671

GUATEMALA
0485 0592 0612 0793 0807 0809
DISEASES AND PATHOGENS
0612 0779
GERMPLASM
0777
PRODUCTION
0814

HAITI
0454

HARVESTING
0492 0504 0505 0526 0530 0531 0537
0555 0564 0824 0827 0836

HEAT TREATMENT
0658

HELIOTHIS ARMIGERA
0716

HELIOTHIS ZEA
INSECT CONTROL
CHEMICAL CONTROL
0710

HEMIPTERA
0712

HERBICIDES
0496 0528 0534 0541 0542 0543 0544
0549 0550 0553 0554 0558
DISEASES AND PATHOGENS
0529 0556
PLANT INJURIES
0763

HETEROSIS
0757

HOMOPTERA
0691 0698 0716 0721 0722 0726 0779
INSECT CONTROL
0526 0540 0708 0719 0720 0723

HONDURAS
0612 0809
DISEASES AND PATHOGENS
0612
GERMPLASM
0777 0808
INJURIOUS INSECTS
0713 0724

HUMAN NUTRITION
0479 0792 0793 0794 0795 0805

HYBRIDIZING
0647 0728 0732 0734 0736 0758 0769
0774 0777 0783

HYBRIDS
0440 0736 0758 0766 0774 0784

INCOME
0507 0569 0574 0586 0587 0597 0599
0604 0606 0811

INDIA
0453 0455 0456 0461 0466 0467 0472
0476 0759

INDOLEACETIC ACID
0474

INHIBITORS
0480 0482

INJURIOUS INSECTS
0490 0491 0505 0577 0713 0725 0765
0812
COLEOPTERA
0526 0706 0712 0714 0716 0721 0722
0724 0726 0823
DIPTERA
0526 0765 0711 0715 0716 0717 0719
0723 0726
HEMIPTERA
0712
HOMOPTERA
0526 0691 0698 0708 0716 0717 0720
0721 0722 0723 0723 0726 0779
LEPIDOPTERA
0710 0712 0716 0723 0726
THYSANOPTERA
0526 0716

INJURIOUS MITES
0723 0726
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0526 0709

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0705 0708 0714 0718 0725 0779

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DISEASES AND PATHOGENS
0682
INJURIOUS INSECTS
0716

INTERCROPPING
0540 0568 0572 0573 0576 0583 0585
0592 0603 0755 0786
ZEA MAYS
0567 0569 0571 0574 0575 0577 0578
0579 0580 0581 0582 0584 0586 0587
0588 0589 0590 0591 0593 0594 0596
0597 0598 0599 0600 0601 0602 0604
0605 0606 0607 0609 0610 0673 0737
0752 0789

IRON
0657
MINERAL DEFICIENCIES
0452

[illegible]
0447 0465

IRRIGATION
0450 0492 0502 0504 0506 0510 0515
0524 0526 0617 0784 0804 0808

ISARIOPSIS GRISEOLA
0547
DISEASE CONTROL
0676 0678 0642 0740 0813
CHEMICAL CONTROL
0668
ETIOLOGY
0678
INCIDENCE
0651
RESISTANCE
0617 0632 0751 0817
SYMPTOMATOLOGY
0676 0678 0642

[illegible]
0575 0582 0579 0580 0609
DISEASES AND PATHOGENS
0654 0678 0680
FUNGICIDE
0617

LEAF PRESERVATION
0504 0506 0526 0529 0532 0565
0[illegible]

LEAFHOPPERS
DISEASES AND PATHOGENS
0657
GERMPLASM
0655

LEAF AREA
0445 0800

LEAVES
0442 0447 0444 0449 0450 0465 0467
0475 0476 0477 0487 0489 0509 0541
0703
DISEASES AND PATHOGENS
0644 0647 0650 0684 0689
MINERALS AND NUTRIENTS
0451 0456 0461 0495 0516

LEPIDOPTERA
0712 0716 0726
INSECT CONTROL
0710 0725

LIGHT
0466
GROWTH
0445 0477

MACROPHOMINA PHASEOLI
DISEASE CONTROL
0638

ETIOLOGY
0638
SYMPTOMATOLOGY
0638 0654

MAGNESIUM
0452 0495 0516

MALAWI
0448 0508 0538 0539 0540 0800 0809
0811
DISEASES AND PATHOGENS
0678 0752 0765
GERMPLASM
0678 0765

MANGANESE
0451 0452

MANURES
0492 0500 0508 0519 0570 0608 0609
0610

MARKETING
0490 0491 0504 0526 0811 0812 0813
0815 0817 0818 0819 0825

MARUCA TESTULALIS
0716

MECHANIZATION
0521 0537 0555 0577

MELOIDOGYNE INCOGNITA
0791
RESISTANCE
0742

METHIONINE
0481

MEXICO
0450 0474 0495 0509 0534 0550 0552
0554 0559 0562 0589 0590 0599 0602
0610 0620 0621 0623 0624 0628 0629
0704 0743 0785 0797 0801 0809
DISEASES AND PATHOGENS
0654 0678 0780

MICRONUTRIENTS
0451 0452 0455 0456 0459 0513 0516
0657

MINERAL CONTENT
0457 0488 0793
LEAVES
0451 0456 0475 0495 0516
SEED
0481 0821
STEMS
0456

MINERAL DEFICIENCIES
0452

MINERALS AND NUTRIENTS
0525 0671 0701
ALUMINIUM
0452
BORON
0452 0657
CALCIUM
0446 0451 0452 0453 0473 0495 0516
COPPER
0452 0455 0456
IRON
0452 0657
MAGNESIUM
0452 0495 0516
MANGANESE
0451 0452

MOLYBDENUM
0516
NITROGEN
0451 0452 0454 0457 0461 0462 0472
0473 0481 0488 0493 0495 0496 0497
0500 0503 0507 0511 0514 0516 0517
0518 0521 0522 0523 0533 0591 0765
0798 0799 0800 0803 0804
POTASSIUM
0451 0452 0453 0495 0497 0500 0503
0507 0516 0521
SULFUR
0452 0453
ZINC
0451 0452 0456 0459 0513

MOLYBDENUM
0516

MUTATION
0485 0768

MYCOSES
0504 0526 0529 0547 0578 0594 0613
0626 0632 0636 0637 0645 0642 0643
0649 0650 0652 0653 0654 0655 0656
0659 0660 0661 0662 0663 0664 0665
0666 0667 0668 0669 0672 0675 0676
0677 0678 0679 0680 0681 0682 0683
0685 0686 0688 0727 0740 0741 0742
0746 0748 0749 0751 0752 0761 0762
0764 0770 0773 0778 0781 0782 0813
EPIDEMIOLOGY
0673 0674
INOCULATION
0651
ISOLATION
0657 0687
LEAVES
0658
SEED
0760
SEEDLINGS
0670
TEMPERATURE
0670 0671 0684

MYLABRIS OCULATA
0526

NEMATODES
0526 0678 0701 0702 0742
NEMATODE CONTROL
0700

NICARAGUA
0618
DISEASES AND PATHOGENS
0613
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0619 0777

NIGERIA
0809

NITROGEN
0454 0457 0461 0472 0481 0495 0514
FERTILIZERS
0451 0473 0493 0496 0497 0500 0503
0507 0511 0516 0517 0518 0521 0522
0523 0533 0591 0765 0798 0799 0800
0803 0804

NITROGEN FIXATION
0452
NITROGEN METABOLISM
0451 0452
PLANT ASSIMILATION
0451
PROTEIN CONTENT
0488

NITROGEN FIXATION
0454 0798 0799 0802 0804

NODULATION
0509 0802
MINERALS AND NUTRIENTS
0472 0511 0798 0799 0800 0803 0804

NUCLEIC ACIDS
0489 0693

NUTRIENT SOLUTION
0457 0460 0657

NUTRIENT TRANSPORT
0446 0476 0458

NUTRIENT UPTAKE
0451 0455 0455 0456 0462 0519

NUTRITIONAL REQUIREMENTS
0451 0459 0473 0491 0493 0496 0497
0500 0503 0504 0505 0507 0508 0511
0512 0513 0516 0517 0518 0521 0522
0523 0525 0526 0533 0548 0557 0570
0572 0578 0586 0591 0595 0608 0609
0609 0610 0633 0752 0765 0798 0799
0800 0801 0803 0804

NUTRITIVE VALUE
0790 0791 0793 0794 0795 0809

OPHIOMYIA PHASEOLI
0705 0716 0717 0718

OSCINIS PHASEOLI
0725

OSMOTIC POTENTIAL
0477

OZONE
AIR POLLUTION
0703
PLANT INJURIES
0703

PACKAGING
0820

PANAMA
0493 0528
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0751
GERMPLASM
0751 0777

PH
0457 0460
AGRICULTURAL LIME
0522

PHASEOLLIN
0436 0438 0481 0486 0666

PHASEOLUS ACUTIFOLIUS
0520 0560 0645 0647 0758 0766 0774
0784

PHASEOLUS COCCINEUS
0440 0447 0474 0647 0648 0699 0732
0769 0773 0783

PHASEOLUS LUNATUS
0474 0476 0744

PHOSPHORUS
0451 0452 0459 0473 0493 0495 0496
0497 0500 0503 0507 0516 0521 0523
0525 0705

PHOTOSYNTHESIS
0442 0448 0475

PHYTOALEXINS
0436 0438 0441 0481 0486 0666 0703

PHYTOHEMAGGLUTININS
0436

PLANT ANATOMY
0437 0439 0462 0469 0495

PLANT ARCHITECTURE
0816

PLANT ASSIMILATION
0451 0453 0455 0456 0460 0462 0519
0527 0541

PLANT BREEDING
0471 0492 0556 0557 0690 0729 0735
0740 0742 0771 0775 0776 0778 0779
0785 0787 0789 0809
BACKCROSSING
0753 0774 0784
CROSSBREEDING
0736 0737 0745 0746 0754 0757 0758
0762 0769 0774 0783 0784
HYBRIDIZING
0647 0728 0734 0736 0758 0769 0774
0777 0783
MUTATION
0485 0768
SELECTION
0578 0744 0745 0750 0754 0762 0764
0786 0788

PLANT DEVELOPMENT
0445 0461 0462 0465 0468 0470 0474
0475 0476 0477 0499 0501 0514 0523
0657 0667 0671 0701 0721

PLANT FERTILITY
0440 0753 0774

PLANT HABIT
0538 0540 0546 0594 0617 0625 0629
0731 0736 0743 0765 0767

PLANT INJURIES
0692 0712 0713 0715 0724 0726 0779
AIR POLLUTION
0703
HERBICIDES
0703

PLANT NUTRITION
0460 0657

PLANT PHYSIOLOGICAL PROCESSES
0443 0450 0495 0509
ABSCISSION
0444 0473
NUTRIENT TRANSPORT
0446 0456 0458
PHOTOSYNTHESIS
0442 0448 0475
PLANT ASSIMILATION
0451 0453 0455 0456 0460 0462 0519
0527 0541

PLANT REPRODUCTION
0447 0728 0734

PLANT TISSUES
0474

PLANT TOXINS
0686

PLANT VASCULAR SYSTEM
0437

PLANTING
0505 0526 0545 0547 0548 0559 0561
0566 0571 0583 0[illegible]6 0765 0836
SPACING
0501 0502 0506 0514 0532 0533 0535
0539 0551 0552 0557 0562 0565 0568
0569 0573 0574 0579 0580 0586 0587
0590 0593 0596 0601 0602 0603 0604
0609 0633 0752 0755 0786 0813

PODDING
0471 0473

PODS
DISEASES AND PATHOGENS
0648
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0713

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0440

POLLINATION
0447 0728 0734 0766

POTASSIUM
0495 0497 0500 0503 0507 0516 0521
MINERAL DEFICIENCIES
0452
NUTRIENT UPTAKE
0451 0453
PLANT ASSIMILATION
0451 0453

PREDATORS AND PARASITES
0709 0711 0712 0722

PRICES
0805 0817 0818 0819

PROCESSING
0492 0824 0826 0827 0828 0830 0832
0833 0834 0835 0836 0837

PRODUCTION
0490 0491 0492 0505 0526 0532 0548
0557 0565 0597 0733 0775 0805 0811
0813 0814 0815 0817 0818 0819

PROTEINS
0456 0459 0480 0481 0486 0710 0783
0789
0801
0849

PSEUDOMONAS PHASEOLICOLA
0644
DISEASE CONTROL
0599 0636 0638 0642 0646 0740
DISEASE TRANSMISSION
0646
ETIOLOGY
0638
RESISTANCE
0594 0578 0646 0729 0759 0751 0769
0775 0786
SYMPTOMATOLOGY
0636 0638 0642 0647 0646

PSEUDOMONAS SYRINGAE
EPIDEMIOLOGY
0640 0641
SYMPTOMATOLOGY
0643

PUERTO RICO
0597
DISEASES AND PATHOGENS
0647 0648 0699 0742 0756
GERMPLASM
0648 0742 0756 0777 0783 0808

PYTHIUM ULTIMUM
0684
RESISTANCE
0749

RAINFALL DATA
0494

REUNION
0512 0672

RHIZOBIUM
0509 0517
INOCULATION
0511 0797 0798 0799 0800 0801 0803
STRAINS
0755 0796 0797

RHIZOBIUM PHASEOLI
INOCULATION
0511 0797 0800 0801 0803
NODULATION
0509 0511 0800 0803
STRAIN
0796 0797

RHIZOCTONIA SOLANI
0678 0684
DISEASE CONTROL
0676 0680
BIOLOGICAL CONTROL
0679 0677 0682 0687
INTEGRATED CONTROL
0681

RESISTANCE
0613 0677 0679 0687
SYMPTOMATOLOGY
0676 0680

RICE
0489

ROOTING
0563

ROOTS
0439 0446 0456 0458 0469 0483 0489

ROTATIONAL CROPS
0547

RWANDA
0555 0546 0551 0625 0768 0798
GERMPLASM
0617

SALINITY
GROWTH
0475
PLANT DEVELOPMENT
0475
TEMPERATURE
0502

SCLEROTIUM ROLFSII
DISEASE CONTROL
0636 0638
ETIOLOGY
0638
RESISTANCE
0578
SYMPTOMATOLOGY
0636 0638

SEED
0436 0480 0486 0612 0731 0747 0826
0830
AMINO ACIDS
0478 0481
DISEASES AND PATHOGENS
0491 0760 0776
GENETICS
0736 0771
GERMINATION
0467 0468 0532 0870 0824 0833
INTERNODUS INSECTS
0491 0712
MARKETING
0491
PRODUCTION
0491 0512
PROTEIN CONTENT
0665 0768
STORAGE
0610 0811 0836
YIELDS
0472 0545 0635 0767 0768 0831

SEED CHARACTERS
0463 0471 0506 0507 0545 0612 0635
0771 0736 0738 0747 0760 0767 0768
0771 0776 0811 0826 0830 0831 0833
0876

SEED COLOR
0480 0506 0612 0635 0731 0738 0768
0776 0830

SEED PRODUCTION
0491 0547 0611 0668 0787

SEED TREATMENT
0472

SEEDS
0732

SELECTION
0498 0499 0520 0527 0594 0605 0611
0612 0613 0617 0622 0631 0632 0634
0646 0679 0738 0741 0747 0749 0751
0756 0761 0763 0780 0781 0782 0813
PLANT BREEDING
0578 0744 0745 0750 0754 0762 0764
0786 0788

SENEGAL
0809

SHOOTS
0474 0476

SNAP BEANS
0445 0451 0467 0470 0472 0489 0506
0516 0526 0555 0626 0627 0640 0641
0658 0662 0683 0701 0702 0715 0718
0727 0730 0747 0759 0763 0780 0781
0782 0802 0834 0835 0836 0837

SOIL FERTILITY
0452 0492 0507 0511 0556 0678

SOIL REQUIREMENTS
0452 0492 0504 0507 0511 0526 0556
0670 0671 0678

SOIL TEMPERATURE
0670 0671

SOLAR RADIATION
0494

SOLUBLE CARBOHYDRATES
0437

SOUTH AFRICA
0526 0541 0645 0675 0688

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CIAT is a nonprofit organization devoted to the agricultural and economic development of the lowland tropics. The government of Colombia provides support as a host country for CIAT and furnishes a 522-hectare site near Cali for CIAT's headquarters. In addition, the Colombian Foundation for Higher Education (FES) makes available to CIAT a 184-hectare substation in Quilichao and a 73-hectare substation near Popayán, the Colombian Rice Federation (FEDEARROZ) also makes available to CIAT a 30-hectare farm—Santa Rosa substation—near Villavicencio. CIAT co-manages with the Colombian Agricultural Institute (ICA) the 22,000-hectare Carimagua Research Center on the Colombian eastern plains and carries out collaborative work on several other ICA experimental stations in Colombia; similar work is done with national agricultural agencies in other Latin American countries.

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Information and conclusions reported herein do not necessarily reflect the position of any of the aforementioned entities.

Abstracts on Field Beans
(*Phaseolus vulgaris* L.)

Vol. XI No. 3 December, 1986

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INTRODUCTION

This journal of analytical abstracts is designed to provide a specialized guide to the world's literature on field beans (*Phaseolus vulgaris* L.), disseminating research results and ongoing activities related to the crop.

The abstracts present condensed information from journal articles, booklets, reports, theses, manuals, and other conventional and nonconventional material, categorized into broad disciplinary fields. These are complemented with author and subject indexes to enable more comprehensive consultation.

When information is required on a specific topic, CIAT's Bean Information Center can carry out bibliographic searches of its entire document collection. As part of this service, users receive a set of abstracts of the articles related to the topic of their interest. The full text of these articles is available through the Photocopy Service of the Communication and Information Support Unit.

The Specialized Information Centers on cassava (*Manihot esculenta* Crantz) and on tropical pastures also publish abstract journals in their respective areas.

COMPONENTS OF AN ABSTRACT

Accession number (for photocpy requests)

Authors

Year of publication

Sequential number in the journal (for use of indices)

[19421 ABATE, T.; NEGASI, A. 1981. 0118 Chemical control of American bollworm (Heliothis armigera) (Hubner) with ultra-low-volume sprays. Ethiopian Journal of Agricultural Science 3(1):49-55. Engl., Sum. Engl., 11 Refs. [Inst. of Agricultural Research, P.O. Box 2003, Addis Ababa, Ethiopia]

Original title

Additional notes

Author address

Source

Pages

Language of paper

Language of summary

Phaseolus vulgaris. Injurious insects. Lepidoptera. Heliothis armigera. Insect control. Chemical control. Ethiopia.

Descriptors

Expt. consisting of ultralow vol. formulations of endosulfan (500 and 750 g a.i./ha), cypermethrin (150 g a.i./ha), fenitrothion (960 g a.i./ha), profenofos (750 g a.i./ha), and an untreated check were conducted for 2 consecutive yr against Heliothis armigera on haricot beans at the Awassa and Nazareth Expt. Stations of the Institute of Agricultural Research (IAR), Ethiopia. The treatments were replicated 5 times in a randomized complete block design on 20 x 20 m plots. Of the insecticides used, single application of cypermethrin gave a more consistent and significant control than the check in both seasons at both stations. A new product, cypermethrin/profenofos 166[R], substituted for fenitrothion at Nazareth in the 1980 season, gave promising results to warrant further testing. Endosulfan, a recommended insecticide against the American bollworm in the past, was not as satisfactory as cypermethrin in its control of H. armigera on haricot beans. [AS]

Abstract

Abstractor and/or translator

HOW TO USE THE INDEXES

The numbers listed under each entry in the author and subject indexes correspond to the abstract's sequential number, found above each abstract within the journal.

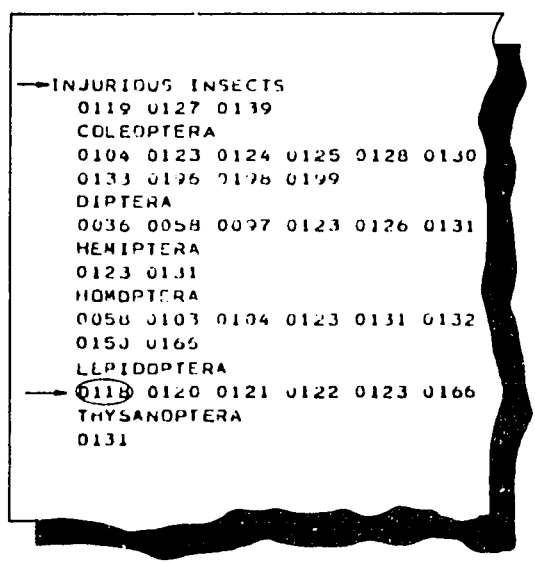
The last issue of the year contains cumulative author and subject indexes for the year.

Author Index

The Author Index can be used to find abstracts when the personal or corporate authors are known. The Author Index, which is alphabetically arranged, lists *all* author and co-author names cited in the publication.

Subject Index

The Subject Index presents an alphabetical list of descriptors used in beans research, many of which are combined with other descriptors, allowing the identification of more specific topics.


INJURIOUS INSECTS
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0839

26202 DEBOUCK, D.G.; HIDALGO, R. 1985. Morfología de la planta de fríjol común. (Morphology of the common bean plant). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.7-41. Span., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Plant anatomy; Roots; Stems; Leaves; Buds; Flowers; Inflorescences; Seeds; Plant habit; Cultivars; Plant development; Colombia.

The morphology of the different parts of the bean plant (roots, stems, branches and axillary complexes, leaves, inflorescences, flowers, fruits, and seeds) is described. The growth habits and floral and vegetative development of beans are described and illustrated. (CIAT)

0840

26291 MORRIS, D.A.; ARTHUR, E.D. 1985. Invertase activity, carbohydrate metabolism and cell expansion in the stem of Phaseolus vulgaris L. Journal of Experimental Botany 36(165):623-633. Engl., Sum. Engl., 16 Refs., Illus. (Dept. of Biology, Building 44, T Univ. Southampton S09 5NH, England)

Phaseolus vulgaris; Stems; Cytology; Growth; Plant growth substances; United Kingdom.

In stems of Phaseolus vulgaris cv. Masterpiece the specific activity of acid invertase was highest in the most rapidly elongating internode and was low in internodes which had completed their elongation, in young internodes before the onset of rapid elongation, and in the apical bud. From shortly after its emergence from the apical bud, the elongation of internode 3 was attributable mainly to cell expansion. Transfer of plants to complete darkness or treatment with GA increased the rate of internode elongation and final internode length by stimulating cell expansion. (AS (extract))

0841

26563 STEINMULLER, D.; TEVINI, M. 1985. Action of ultraviolet radiation (UV-B) upon cuticular waxes in some crop plants. Planta 164(4):557-564. Engl., Sum. Engl., 48 Refs., Illus. (Botanical Inst. II, Univ. of Karlsruhe, Kaiserstrasse 12, D-7500 Karlsruhe, Federal Republic of Germany)

Phaseolus vulgaris; Irradiation; Leaves; German Federal Republic.

The surface structure and composition of surface lipids were examined in leaves of barley, bean, and cucumber seedlings grown in a growth chamber under white light and low levels of UV (UV-B; 280-320 nm) radiation. The cuticular wax of cucumber cotyledons and bean leaves appeared as a thin homogeneous layer, whereas on barley leaves crystal-like structures could be observed under there irradiation conditions. Principally, the amount of cuticular wax found in barley leaves was 5 times greater than in bean or cucumber leaves. The predominant wax components in bean were primary alcohols and monoesters. Irradiation with enhanced UV-B levels caused an increase of total wax by about 25 percent in all plant species investigated. Distribution patterns of the homologs within some wax classes were different at low and enhanced UV-B levels. In general, the distribution of the homologs was shifted to shorter acyl chain lengths in wax of leaves exposed to enhanced UV-B levels. This was most apparent in cucumber wax, less in bean or barley wax. (AS (extract))

0838

23013 ORMROD, D.P.; WOOLLEY, C.J.; EATON, G.W.; STOBBE, E.H. 1967. Effect of temperature on embryo sac development in Phaseolus vulgaris L. Canadian Journal of Botany 45:948-950. Engl., 5 Refs., Illus.

Phaseolus vulgaris; Temperature; Anthesis; Flowers; Canada.

An expt. was carried out under controlled lab. conditions to determine the effect of temp. changes on embryo sac development in beans. Bush bean var. Stringless Green Pod was grown in controlled environment cabinets with day/night temp. of 35.0/26.5, 29.5/21.0, and 24.0/15.5 degrees Celsius. Ten flowers were collected at random from the 8 plants at each temp. at approx. 24 h prior to anthesis, at anthesis, and at 24 and 48 h after anthesis. A large proportion (up to 51/51) of embryo sacs contained an egg and 2 visible polar nuclei at 24 h prior to anthesis at all temp. The highest temp. ratio (35.0/26.5 degrees Celsius) resulted in a lower proportion of normal embryo sacs; almost none developed endosperm. Within 48 h after anthesis, embryo sacs had degenerated their contents, showing the marked effect of high temp. on embryo sac development. Blossom drop at lower temp. may be related to the later availability of nutrients for the developing embryos or other effects independent of temp. (CIAT)

20559 VERBELEN, J.P.; SPRUYT, E.; DE GREEF, J.A. 1985. A microscopical study of the statocyte system in stems of etiolated Phaseolus seedlings. American Journal of Botany 72(7):1054-1060. Engl., Sum. Engl., 32 Refs., Illus. (Univ. of Antwerpen, U.I.A., Dept. of Biology, Universiteitsplein 1, B-2610 Wilrijk, Belgium)

Phaseolus vulgaris; Seedlings; Stems; Cytology; Belgium.

In etiolated bean seedlings there is a starch sheath around the vascular stem tissue. This cell layer shows a gradient of amyloplast no. and cell dimensions. A max. relative amyloplast pressure in the stem hook was shown. Cytological as well as physiological arguments indicate that the stem hook may play an important role in graviperception through this starch sheath. (AS) See also 1104 1152

0843

26906 AMIRO, B.D.; GILLESPIE, T.J. 1985. Leaf conductance response of Phaseolus vulgaris to ozone flux density. Atmospheric Environment 19(5):807-810. Engl., Sum. Engl., 20 Refs., Illus. (Environmental Research Branch, Whiteshell Nuclear Research Establishment, Pinawa, Manitoba, R0E 1L0, Canada)

Phaseolus vulgaris; Ozone; Air pollution; Cultivars; Canada.

The effect of O3 flux density on leaf conductance to O3 in Phaseolus vulgaris was examined. The change in conductance was measured within the 1st 2 h of fumigation for mature, fruiting 5-wk. old plants of an O3-sensitive cv. (Seafarer), for young, 14-day-old plants of the same cv., and for an O3-resistant cv. (Gold Crop). Young Seafarer plants showed no change in conductance to O3 over a wide range of O3 flux densities. Gold Crop showed a decrease in conductance of -3.1 percent/(mg O3/square meter/h) whereas mature Seafarer plants exhibited a stronger decrease of -7.7 percent/(mg O3/square meter/h). Diffusion porometer measurements taken on fruiting Seafarer plants in the field illustrated that a decrease in leaf diffusive conductance to water is related to visual O3 injury. (AS)

0844

26950 BOLLINI, R.; CERIOTTI, A.; BARMATI, M.G.; VITALE, A. 1985. Glycosylation is not needed for the intracellular transport of phytohemagglutinin in developing Phaseolus vulgaris cotyledons and for the maintenance of its biological activities. Physiologia Plantarum 65(1):15-22. Engl., Sum. Engl., 31 Refs., Illus. (Istituto Biosintesi Vegetali, Consiglio Nazionale delle Ricerche, Via Bassini 15, I-20133, Milano, Italy)

Phaseolus vulgaris; Proteins; Cotyledons; Phytohaemagglutinins; Italy.

Approx. 10 percent of the total protein contained in Phaseolus vulgaris cv. Greensleeves seeds is composed of the glycoprotein lectin, phytohemagglutinin. Whether the presence of N-linked oligosaccharide side chains is a prerequisite for the correct intracellular transport of this protein and whether unglycosylated phytohemagglutinin maintains its biological activities were investigated. Excised developing cotyledons were incubated in the presence of tunicamycin to prevent glycosylation in vivo, and the fate of the unglycosylated protein synthesized in such cotyledons determined. It was found that unglycosylated phytohemagglutinin reaches its normal site of accumulation, the protein bodies, and maintains erythroagglutinating and mitogenic activities. (AS)

0845

26904 FHRET, P.L.; JOLLIFFE, P.A. 1985. Photosynthetic carbon dioxide exchange of bean plants grown at elevated carbon dioxide concentrations. Canadian Journal of Botany 63(11):2026-2030. Engl., Sum. Engl., Fr., 42 Refs., Illus. (Dept. of Plant Science, Univ. of British Columbia, Vancouver, B.C., Canada V6T 2A2)

Phaseolus vulgaris; CO2; Growth; Light; Photosynthesis; Canada.

Leaves of bean plants (cv. Pure Gold Wax) grown in atmospheres enriched with CO2 (1400 microliters/liter) showed a decrease in CO2 exchange capacity when compared with unenriched plants (340 microliters/liter) measured at the same CO2 concn. The decrease was not associated with changes in chlorophyll concn. or photorespiratory activity. The decrease was less evident in older leaves, in leaves maintained at low light intensity, and in those with reduced chlorophyll contents. Respiration rates in leaves of CO2-enriched plants increased only under conditions that caused a concurrent decrease in

photosynthetic capacity. Enriched leaves had higher starch contents than unenriched leaves. The results were consistent with the idea that CO2 enrichment decreases photosynthetic capacity when photoassimilate supply exceeds sink demand. (AS)

0846

25592 EL-SHARKAWY, M.A.; COCK, J.H.; HERNANDEZ, A. DEL P. 1985. Stomatal response to air humidity and its relation to stomatal density in a wide range of warm climate species. Photosynthesis Research 7:137-149. Engl., Sum. Engl., 41 Refs., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Relative humidity; Transpiration; Stomata; Photosynthesis; Colombia.

The gas exchange of 19 very different warm climate species (including bean var. Diacol Calima, G-4446, and G-64) was observed at different leaf to air VPD. In all species stomata tended to close as VPD increased, resulting in a decrease in net photosynthesis. The absolute reduction in leaf conductance/unit increase in VPD was greatest in those species which had a large leaf conductance at low VPDs. This would be expected even if stomata of all species were equally sensitive. However, the percentage reduction in net photosynthesis, used as a measure of the relative sensitivity of stomata of the different species, was also closely related to the max. conductance at low VPD. Similarily, the relative sensitivity of stomata to changes in VPD was closely related to the weighted stomatal density or crowding index. The results and the hypothesis are discussed in the light of selection for optimal productivity under differing conditions of RH and soil water availability, by observation of stomatal density and distribution on the 2 sides of the leaf. (AS (extract))

0847

26078 ESCALANTE E., L.E. 1986. Efecto de la eliminación manual de órganos reproductivos sobre el período de floración en Phaseolus vulgaris L. (Effect of manual elimination of reproductive organs on the flowering period of Phaseolus vulgaris). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 157p. Span., Sum. Span., 86 Refs., Illus.

Phaseolus vulgaris; Flowering; Cultivars; Abscission; Flowers; Yields; Yield components; Mexico.

To prolong the flowering period, the reproductive organs (flowers and pods) were manually eliminated during flowering of the bean var. Cacahuate 72 (determinate habit) and Michoacán 12-A-3 (indeterminate habit and short-vined), planted at 3 different dates under greenhouse conditions in Chapingo, Mexico. The periods for elimination of reproductive organs for var. Cacahuate 72 and Michoacán 12-A-3 were at 0, 4, 8, 12, and 16, and 0, 5, 10, 15, and 20 days after initiation of flowering, resp. The flowering period and development cycle of the bean plants of the 2 var. were extended (1) when the pods and flowers formed throughout the entire period of elimination of reproductive organs were eliminated and (2) when flowers formed were eliminated daily from the initiation of flowering until a certain date of this period. The longer the flowering period and development cycle of the plant, the greater the no. of formed structures and their dry wt. were. Var. Cacahuate 72 flowered earlier and showed a lower no. and higher dry wt. of formed structures. Yield and yield components of the 2 var. were not modified by the elimination of reproductive organs, but rather by planting dates, the highest values occurring on the 1st date. (AS (extract)-CIAT)

0848

25679 HEATH, R.L.; FURBANK, R.T.; WALKER, D.A. 1985. Effects of polyethylene-glycol-induced osmotic stress on transpiration and

photosynthesis in pinto bean leaf discs. Plant Physiology 78(3):627-629. Engl., Sum. Engl., 11 Refs., Illus. (Dept. of Botany & Plant Sciences, Univ. of California, Riverside, CA 92521, USA)

Phaseolus vulgaris; Leaves; Transpiration; Photosynthesis; Chlorophyll; Stomata; USA.

Transpiration, photosynthesis, and chlorophyll fluorescence were measured in a new bean leaf disc chamber which simultaneously measured CO2 and H2O vapor exchanges during infusion of solution into the cut edge of the disc. Polyethylene glycol (mol. wt., 6000) was used to apply a mild external osmotic stress to the leaf disc within the chamber. This stress rapidly caused a temporary increase in transpiration, which was reversed (5-6 min later) and after 20-25 min, the stomates nearly completely closed. Internal CO2 (calculated) and leaf temp. followed the transpiration measurements. However, chlorophyll fluorescence (small rise) followed internal CO2 (small rise). This complete sequence of events resembles those caused by exposure of leaves to certain air pollutants, which have been seen to cause such a transient increase followed by a decrease in stomatal closure. (AS)

0849

26269 HOLMES, M.G.; KLEIN, W.H. 1985. Evidence for phytochrome involvement in light-mediated stomatal movement in Phaseolus vulgaris L. Planta 166(3):348-353. Engl., Sum. Engl., 26 Refs., Illus. (Dept. of Botany, Plant Science Laboratories, Univ. of Reading, Whiteknights, Reading RG6 2AS, England)

Phaseolus vulgaris; Stomata; Light; United Kingdom.

Observations made with primary leaves of Phaseolus vulgaris demonstrated that phytochrome modulates light-induced stomatal movement. Removal of the far-red-absorbing form of the pigment (Pfr) with far-red radiation decreased the time required by the stomata to reach max. opening following a dark-to-light transition; this effect of far-red radiation was fully reversible with red. Removal of Pfr with far-red radiation also decreased the time required to reach max. closure following a light-to-dark transition, and the rate of closure was dependent on the final irradiation treatment before darkness. No evidence was found for phytochrome involvement in determining stomatal aperture under constant conditions of either darkness or light. (AS)

0850

26272 JAFFE, M.J.; HUBERMAN, M.; JOHNSON, J.; TELEWSKI, F.W. 1985. Thigmomorphogenesis: the induction of callose formation and ethylene evolution by mechanical perturbation in bean stems. Physiologia Plantarum 64(2):271-279. Engl., Sum. Engl., 22 Refs., Illus. (Biology Dept., Wake Forest Univ., Winston-Salem, NC 27109, USA)

Phaseolus vulgaris; Plant physiological processes; Inhibitors; USA.

Mechanical perturbation by rubbing of the 1st internode of 11 to 12-day-old plants of Phaseolus vulgaris cv. Cherokee Wax induces the rapid deposition of callose in the cells of phloem and other tissues. Callose deposition begins immediately after mechanical perturbation, and shows a minor transient peak at 1.5 h, and a major peak 6 h later. The callose gradually disappears and is gone after 3 days. The evolution of ethylene in response to mechanical perturbation begins after 1 h, peaks at 2-3 h, and is gone by 5-6 h. A spray of 0.01 molar 2-deoxy-D-glucose (DDG) completely blocks stem thickening, callose deposition, and ethylene evolution due to mechanical perturbation. It is concluded that mechanical perturbation of bean stem tissue induces deposition of callose more rapidly than it induces evolution of ethylene and that DDG can block both processes. (AS (extract))

0851

26092 LAJOLO, F.M.; FINARDI FILHO, F. 1985. Partial characterization of the amylase inhibitor of black beans (Phaseolus vulgaris), variety Rico 23. Journal of Agricultural and Food Chemistry 33(1):132-138. Engl., Sum. Engl., 49 Refs., Illus. (Depto. de Alimentos e Nutricao Experimental, Faculdade de Ciencias Farmaceuticas, Univ. de Sao Paulo, B. 14, Caixa Postal 30786, Sao Paulo-SP, Brasil)

Phaseolus vulgaris; Inhibitors; Enzymes; Brazil.

The amylase inhibitor of black (kidney) beans has an apparent mol. wt. of 53,000 by gel filtration, an isoelectric point of 4.35, and a sedimentation coefficient of 4.4 S. It contains mannose, xylose, galactose (5.4 percent), and glucosamine (3.0 percent), and is highly resistant to proteolysis. The N-terminal amino acids are alanine, glutamic acid, and threonine; the C terminals identified were leucine and tyrosine. The inhibitor can be dissociated into 3 different subunits that can reassociate with complete restoration of activity but its molecular structure is modified as shown by the fluorescence and circular dichroism spectra. The inhibitor is active against mammalian alpha-amylases and amyloglucosidase from Rhizopus genus and Aspergillus niger; it is not active against Bacillus subtilis or Aspergillus orizae alpha-amylases. The optimum pH for inhibitor is 4.5 for salivary and 5.5 for pancreatic alpha-amylase. Several anions, nitrate, chloride, bromide, iodide, and SCN (given in descending order of activation), increase the rate of salivary amylase inhibition. (AS)

0852

26591 MELAKEBERHAN, H.; WEBSTER, J.M.; BROOKE, R.C. 1984. Improved techniques for measuring the CO2 exchange rate of Meloidogyre infected bean plants. Nematologica 30(2):213-221. Engl., Sum. Engl., Fr., 13 Refs., Illus. (Centre for Pest Management, Dept. of Biological Sciences, Simon Fraser Univ., Burnaby, Vancouver, B.C. Canada V5A 1S6)

Phaseolus vulgaris; Inoculation; Meloidogyne incognita; Photosynthesis; CO2; Canada.

An improved open system that measures CO2 exchange rate of up to 20 plants/day is described. The CO2 exchange rate was determined in expt. using beans inoculated with 1 of 4 inoculum levels of Meloidogyne incognita juveniles. Measurements were taken at intervals up to 27 days after inoculation using either a destructive or a nondestructive assay. The normal pattern of photosynthetic rate was decreased in nematode-infected plants relative to the controls from 3 days after inoculation. Dark respiration rates significantly increased over controls only at 3 days after nematode inoculation. The change in photosynthetic and dark respiration pattern of beans after nematode inoculation is discussed in relation to the ontogenetic development of the host and nematode. The advantages of this improved open system in facilitating an understanding of the mechanisms by which nematodes affect CO2 exchange rate are identified. (AS)

0853

26075 METZGER, J.D.; KENG, J. 1984. Effects of dimethipin, a defoliant and desiccant, on stomatal behavior and protein synthesis. Journal of Plant Growth Regulation 3(3):141-156. Engl., Sum. Engl., 19 Refs., Illus. (United States Dept. of Agriculture, Agricultural Research Service, State Univ. Station, Fargo, ND 58105, USA)

Phaseolus vulgaris; Defoliation; Abscission; Proteins; Water stress; Transpiration; RNA; Chlorophyll; Stomata; Leaves; USA.

The 1st visible macroscopic effect of a foliar spray of dimethipin on Phaseolus vulgaris cv. Black Valentine was a severe loss of leaf turgor followed by desiccation and abscission. Dimethipin-treated leaves had higher

transpiration rates than control leaves when given treatments that caused stomatal closure (e.g. darkness, water stress, or exogenous ABA). The earliest detectable biochemical effect of dimethipin was inhibition of (14)C-leucine incorporation into protein. Dimethipin had a substantially smaller effect on incorporation of (3)H-uridine into RNA, suggesting that dimethipin acts primarily on the processes associated with translation rather than transcription. (AS (extract))

0854

26061 OBRADOR R., J. 1985. Deterioración fisiológica de la semilla de frejol. (Physiological deterioration of bean seeds). In Curso Internacional de Investigación sobre Producción de Frejol (Phaseolus vulgaris), Santiago, Chile, 1985. Trabajos presentados. Santiago, Instituto de Investigaciones Agropecuarias. Estación Experimental La Platina. 20p. Span., 21 Refs., Illus.

Phaseolus vulgaris; Seed; Germination; Seed vigour; Seed characters; Deterioration; Plant physiological disorders; Chile.

The factors contributing to the physiological deterioration of bean seeds are reviewed. The concepts of longevity, germination, and vigor are discussed in relation to seed physiological quality. The direct and indirect tests developed to measure seed vigor are indicated as well as the causes of seed vigor reduction. The factors that affect the bean seed physiological quality are briefly analyzed, among which are genetic and climatic factors, physical characteristics, maturity, deterioration under field conditions, mechanical damage, damage caused by heat during drying, storage and sanitary conditions. (CIAT)

0855

26270 PALMER, M.V.; WONG, O.C. 1985. Identification of cytokinins from xylem exudate of Phaseolus vulgaris L. Plant Physiology 79(1):296-298. Engl., Sum. Engl., 22 Refs., Illus. (State Chemistry Laboratory, Melbourne 3002, Australia)

Phaseolus vulgaris; Cytokinins; Analysis; Australia.

The principal biologically active cytokinins in xylem exudate of young Phaseolus vulgaris plants were identified by bioassay, high-performance liquid chromatography, enzymic degradation, and combined gas chromatography-mass spectrometry (selected ion monitoring): zeatin riboside, zeatin nucleotide, dihydrozeatin riboside, dihydrozeatin nucleotide, O-glucosyl zeatin, O-glycosyl dihydrozeatin, O-glucosyl dihydrozeatin riboside, and O-glucosyl dihydrozeatin nucleotide. Trace amounts of O-glucosyl zeatin riboside and O-glucosyl zeatin nucleotide were also detected. (AS)

0856

26985 SEBASIGARI, K.; ADAMS, M.W. 1980. Carbohydrate partitioning patterns in some grain legume cultivars. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. p.106. Engl.

Phaseolus vulgaris; Genotypes; Carbohydrate content; Starch content; Flowering; Maturation; Translocation; USA.

A study to identify the characteristic partitioning patterns of nonstructural carbohydrates (starch and sugars) among genotypes of dry beans, soybeans, cowpeas, and some Asian beans was conducted at Saginaw Valley Bean and Sugar Beet Research Farm and at Michigan State U., USA. Entries were sampled weekly from 50 percent flowering until physiological maturity. The preliminary analysis indicates that, in general, amounts of

nonstructural carbohydrates increased from 50 percent flowering until the pod-filling period. Bean cv. NEP-2 and BTS showed a moderate decline in nonstructural carbohydrates at least in one tissue throughout the seed development period (from mid-pod-filling period until physiological maturity). (CIAT)

0857

26203 WHITE, J.W. 1985. Conceptos básicos de fisiología del fríjol. (Basic concepts of bean physiology). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.43-59. Span., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Plant physiology; Plant physiological processes; Photosynthesis; Plant respiration; Dry matter; Temperature; Light; Water requirements; Growth; Yields; Yield components; Colombia.

The physiological processes that determine bean growth are reviewed, namely photosynthesis, respiration, DM distribution, HI, yield components, and environmental effects. Some concepts used in physiological work such as growth analysis, leaf area determination, data analysis, yield, yield components, and environmental data are discussed. (CIAT) See also 0935 0940 1072 1084 1104 1158

0858

26578 BARCELO, J.; POSCHENRIEDER, C.; GUNSE, B. 1985. Effect of chromium VI on mineral element composition of bush beans. Journal of Plant Nutrition 8(3):211-217. Engl., Sum. Engl., 10 Refs. (Univ. Autónoma de Barcelona, Depto. Fisiología Vegetal, Facultad de Ciencias, Bellaterra, España)

Phaseolus vulgaris; Nutrient solution; Cr; Growth; Chlorosis; Roots; Mineral content; K; Na; Mg; Fe; P; Mn; N; Ca; Nutrient transport; Spain.

Plants of bush bean cv. Contender were grown on perlite with nutrient solution and 0, 1.0, 2.5, and 5.0 ppm levels of Na2CrO4. Significant decrease of top growth and chlorosis in trifoliated leaves were observed for 2.5 and 5.0 ppm Cr, with Cr concn. (micrograms/g) in tops, greater than or equal to 12.1 and in roots, greater than or equal to 509.9. Cr decreased K, Na, Mg, and Fe concn., and increased P and Mn concn. in roots. In tops decreased N, K, Na, and Fe concn. and increased Mn and Ca concn. were observed. Translocation of P, Zn, Cu, and Fe was inhibited; Ca and Mn translocation was generally enhanced. P:Fe ratio was increased up to 60 percent in chlorotic plants, indicating a shift from Fe(2+) to Fe(3+). (AS)

0859

26074 BRETELER, H.; ARNOZIS, P.A. 1985. Effect of amino compounds on nitrate utilization by roots of dwarf bean. Phytochemistry 24(4):653-657. Engl., Sum. Engl., 36 Refs., Illus. (Research Inst. for Atomic Sciences in Agriculture, P.O. Box 48, 6700 AA Wageningen, The Netherlands)

Phaseolus vulgaris; Roots; Nutrient absorption; Amino acids; Nutrient solution; Netherlands.

Amino compounds (1 millimola., pH 5) were given prior to, together with, or after the addition of nitrate to study their effect on nitrate uptake and in vivo nitrate reductase activity (NRA) in roots of Phaseolus vulgaris. The effect of amino compounds varied with the amino species, the nitrate status of the plant (induced vs. uninduced), and the aspect of nitrate utilization. Cysteine inhibited the nitrate uptake rate and root NRA under all conditions tested. NRA in uninduced roots was stimulated by tryptophan, and arginine inhibited NRA under all conditions tested. Uptake was inhibited by aspartate and glutamate and stimulated by leucine when these amino compounds were given prior to or after completion of the apparent induction of nitrate uptake. In the presence of beta-alanine and tryptophan, induction of uptake was accelerated. (AS)

0860

26257 COSGROVE, D.C.; JONES JUNIOR, J.B.; MILLS, H.A. 1985. Influence of NO3 and NH4 on Kjeldahl N, NO3-N, and snapbean pod yield. HortScience 20(3):427-429. Engl., Sum. Engl., 9 Refs., Illus. (Dept. of Horticulture, Univ. of Georgia, Athens, GA 30602, USA)

Phaseolus vulgaris; Nutrient solution; N; Flowering; Yields; Leaves; Mineral content; Plant nutrition; USA.

A shift in the form of N in the nutrient solution to NH4 only after initial bloom significantly reduced snap bean pod yield as much as 50 percent, depending on the prebloom NO3:NH4 ratio. Pod yield was unaffected by prebloom NO3:NH4 ratio if at least half of the N in the nutrient solution was NO3, or if NO3 supplied all of the N during postbloom development. Therefore, for max. pod yield, NO3 should be the primary N form supplied to snap bean plants after bloom. The NO3 content in upper mature leaves at pod maturity was significantly correlated (r = 0.88) to NO3 level applied, with a value of

7000 ppm in the leaves associated with highest pod yield. Total N (Kjeldahl N + NO3) of at least 5.50 percent in upper mature leaves at pod maturity was associated with highest pod yield. (AS (extract))

0861

26913 FIRGANY, A.H.; HUSSEIN, M.M. 1984. Growth and chemical composition of Vicia faba and Phaseolus vulgaris seedlings as affected by different concentrations of manganese in water culture. Annals of Agricultural Science 29(1):19-28. Engl., Sum. Engl., 14 Refs. (National Research Centre, Dokki, Cairo, Egypt)

Phaseolus vulgaris; Seedlings; Mn; Growth; Composition; Egypt.

Pot-grown plants of Phaseolus vulgaris and Vicia faba were irrigated with nutrient solution containing 0, 0.01, 0.02, 0.05, 1.00, 5.00, or 10.00 ppm Mn. Shoot and root fresh wt. of P. vulgaris increased with 0.01 ppm Mn and decreased with further increase in Mn concn. Total shoot + root dry wt. was highest at 0.01 ppm Mn for V. faba (7.6 g) and at 0.05 ppm Mn for P. vulgaris (3.8 g). Leaf Mn concn. increased with increasing Mn supply to P. vulgaris, while V. faba was little affected. (Horticultural Abstracts)

0862

26934 HANKANGA, M.D.; TARIMO, A.J.P. 1985. Effect of grass mulch on nutrient uptake by beans (Phaseolus vulgaris L.). In Mijas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.4-7. Engl., Sum. Engl., 3 Refs. (Dept. of Crop Science, Faculty of Agriculture, Sokoine Univ. of Agriculture, P.O. Box 3005, Morogoro, Tanzania)

Phaseolus vulgaris; Cultivars; Mulching; Nutrient uptake; N; P; K; Mg; Ca; Seedlings; Flowering; Maturation; Mineral content; Tanzania.

Three bean var. (Kabanima, Selian Wonder, and Canadian Wonder) grown in field plots either mulched or unmulched (control) were analyzed for total N, P, K, Mg, and Ca at the seedling, blooming, and maturity stages of growth. For total percentages of N, K, and Mg, highest values were observed at the seedling stage, whereas total percentage values of P and Ca were highest at the blooming and maturity stages of growth, resp., in all var. The mulch treatment did not significantly affect the amount of nutrients taken by the plants. Var. did not show significant variations in their ability to take various nutrients from the soil. It is concluded that the stage of growth and the type of nutrient desired might be important considerations for nutrient analysis in beans. (AS)

0863

26295 POSCHENRIEDER, C.; CABOT, C.; BARCELO, J. 1983. Influencia de altas concentraciones de cadmio sobre el crecimiento, desarrollo y contenido de pigmentos fotosintéticos de Phaseolus vulgaris. (Influence of high cadmium concentrations on growth, development, and content of photosynthetic pigments in Phaseolus vulgaris). Anales de Edafología y Agrobiología 42(1-2):315-327. Span., Sum. Engl., Span., 19 Refs., Illus. (Depto. de Fisiología Vegetal, Facultad de Ciencias, Univ. Autónoma de Barcelona, Bellaterra, Barcelona, España)

Phaseolus vulgaris; Nutrient solution; Growth; Cd; Toxicity; Chlorophyll; Yield components; Protein content; Spain.

The effect of different Cd concn. (10, 80, and 160 ppm) on the growth and development of Phaseolus vulgaris was studied under greenhouse conditions. Results indicated that Cd not only adversely affects plant growth, but also decreases pigment content and seed no., size, and protein content. There was no effect on germination up to 80 ppm Cd. (CIAT)

0864

26085 SCHMITT, H.A.; WEAVER, C.M. 1984. Level of application and period of exposure affecting accumulation and distribution of chromium-51 and zinc-65 in hydroponically grown kale, bush beans, and soybeans. Journal of Agricultural and Food Chemistry 32(3):498-503. Engl., Sum. Engl., 19 Refs. (Dept. of Foods & Nutrition, Purdue Univ., West Lafayette, IN 47907, USA)

Phaseolus vulgaris; Nutrient solution; Cr; Zn; Harvesting; Timing; Nutrient absorption; Mineral content; Stems; Flowers; Leaves; USA.

Expt. were conducted to assess the efficiency of various conditions for intrinsic labeling of kale, soybeans, and bush beans with Cr-51 and Zn-65. Various harvest times, exposure levels and periods were employed and nuclide concn., percent of applied dose accumulated by various plant parts, and nuclide distribution were calculated. Cr-51 and Zn-65 concn. increased proportionally with increasing level of application. The efficiency of incorporation of Cr-51 or Zn-65 varied little within each plant species among various treatment levels. Exposure period and level of Cr-51 and Zn-65 affected the nuclide concn. significantly (P less than 0.05) but not the distribution of Cr-51 or Zn-65. Radionuclide concn. was generally greater when plants were exposed throughout the growth cycle than for shorter periods of time, but the greater efficiency of incorporation into soybean seeds occurred when plants were exposed during the reproductive period of growth. (AS)

0865

26508 SIJMONS, P.C.; VAN DEN BRIEL, W.; BIENFAIT, H.F. 1984. Cytosolic NADPH is the electron donor for extracellular Fe(III) reduction in iron-deficient bean roots. Plant Physiology 75(1):219-221. Engl., Sum. Engl., 17 Refs., Illus. (Dept. of Plant Physiology, Univ. of Amsterdam, Kruislaan 318, 1098 SM Amsterdam, The Netherlands)

Phaseolus vulgaris; Roots; Fe; Nutrient uptake; Netherlands.

In Fe-deficient Phaseolus vulgaris plants, the total NADP (nicotinamide adenine dinucleotide phosphate)/g fresh wt. and the NADPH (NADP, reduced form):NADP ratio were twice those of Fe-sufficient plants. The NADPH:NADP ratio was considerably lowered after a 2-min. incubation with 1 millimolar ferricyanide. Total NAD was not influenced by the growth conditions and was mainly present in the oxidized form. The results indicated that NADPH was the electron donor for the high ferric ion reduction activity found in Fe-deficient roots. (Horticultural Abstracts)

0866

26068 SOSA C., C.E. 1984. Efecto de niveles de sodio y calcio en la solución nutritiva sobre el desarrollo de sorgo (Sorghum vulgare L.), fríjol (Phaseolus vulgaris L.) y tomate (Lycopersicon esculentum M.) (Effect of levels of sodium and calcium in nutrient solution on the development of sorghum, beans, and tomato). Tesis Ing.Agr. Guatemala, Universidad de San Carlos. 71p. Span., Sum. Span., 14 Refs., Illus.

Phaseolus vulgaris; Nutrient solution; Na; Ca; Germination; Biomass production; Mineral content; Growth; Guatemala.

The tolerance of sorghum, beans, and tomato to different Na and Ca levels in the nutrient solution was evaluated under greenhouse conditions at the U. de San Carlos, Guatemala. The parameters measured were germination time, biomass, analysis of plant nutrient concn., plant height, and root length. When 10 meq Na/100 ml were added to the nutrient solution in the absence of Ca, plants of the 3 crops germinated but did not complete their vegetative cycle. Plants developed poorly in the presence of 8 meq Ca and 10 meq Na/100

ml in the solution. The highest biomass av. in the 3 crops were obtained with levels containing 0-3 meq Na/100 ml in nutrient solution, with or without Ca. The nutrient concn. of the plant had a similar performance with respect to K, Ca, and Mg for 3 crops: in the presence of Ca it increased for the different levels of Na evaluated; however, Na analysis in the 3 crops indicated that Ca affects Na concn. reduction in the leaf tissue. (AS (extract)-CIAT)

0867

26239 VEIGA, C.L. 1980. Potencial de utilizacao de nitrogenio na forma ionica e molecular, de cultivares de feijoeiro (Phaseolus vulgaris, L.). (Potential of nitrogen utilization, in ionic and molecular forms, of bean cultivars). Tese Doutor Agr. Piracicaba-SP, Brasil, Escola Superior de Agricultura Luiz de Queiroz da Universidade de Sao Paulo. 129p. Port., Sum. Port., Engl., 85 Refs., Illus.

Phaseolus vulgaris; Nutrient solution; Nutrient uptake; Nitrogen fixation; Cultivars; Brazil.

The capacity for N utilization when supplied in mineral and molecular forms as well as the effect of different N sources on N uptake and symbiotic N fixation of 38 bean cv. were evaluated at the Centro de Energia Nuclear na Agricultura (Piracicaba, Brazil). Two cv. with higher potential for ionic and molecular N uptake were selected. Plants grew better in complete nutrient solution (42 ppm N) than when inoculated. The best cv. for ionic N uptake and symbiotic N fixation were Rosinha Bico de Ouro, Carioca, and Brasil 343; for N fixation, cv. Tayhú, Charque 2, Paulista Branco, Mexico 262, Venezuela 350, Aroana, Moruna, and Porrillo Sintético were the best. A better plant growth was observed when N was applied in the form of ammonium nitrate and urea. (AS (extract)) See also 0902 0918 0925 1155

0868

25313 CHOWDHURY, I.R.; PAUL, K.B.; SASSEVILLE, D. 1981. The emergence and yields of beans, okra and squash as influenced by Cytex, Triacontanol and Ethrel. In Annual Meeting Plant Growth Regulator Working Group, 7th., Dallas, Texas, 1980. Proceedings. Colorado, USA, Great Western Sugar CO. pp.77-82. Engl., Sum. Engl., 8 Refs. (Dept. of Agriculture, Natural Resources & Home Economics, Lincoln Univ., Jefferson City, MO 65101, USA)

Phaseolus vulgaris; Plant growth substances; Growth; Yields; Dwarf beans; USA.

Seeds of bush beans, okra, and summer yellow squash were soaked overnight in Cytex, Triacontanol, and ethephon solutions, and planted in the field in 4 rows, each 6 m long, and replicated 4 times. At early bloom stage, one of the inner rows was sprayed with the same growth regulator solution. Seedling emergence, growth, and yields of these crops as affected by the above biostimulants were evaluated. The seedling emergence or the seedling growth were not significantly affected by any of the treatments. Although not significant, ethephon treatment slightly but consistently reduced the yields of beans and okra. All other treatments had very little effect on the yields of any of the test crops used. (AS)

0869

26033 DAGBA, E. 1985. Influence du milieu, en particulier de la température, sur l'édification du port chez le haricot (Phaseolus vulgaris L.). (Influence of environmental conditions, especially the temperature, on bean growth habit). These Docteur Sc. France, Universite de Clermont II. v.1.275p.,v.2.197p., Résumé de la these E. no.340,23p. Fr., Sum. Fr., Engl., 55 Refs., Illus.

Phaseolus vulgaris; Plant habit; Temperature; Dwarf beans; Climbing beans; France.

The relations between Phaseolus vulgaris growth habit and culture conditions (especially the effect of the temp.) are analyzed. A bean var. (dwarf or climbing) may be induced to develop an upright or a twining growth habit by changing the environmental conditions. Generally, a constant and low temp. (12 degrees Celsius), in continuous light, is favorable to the upright habit; a constant and warm temp. (27 degrees Celsius) is favorable to the twining habit. A hot temp. (30 degrees Celsius) until the outspreading of the 1st trifoliate leaf, followed by a lower temp. (20 degrees Celsius), induces the twining habit. Inversely, a cool temp. followed by a hot temp. induces the upright habit. (AS (extract))

0870

26204 FERNANDEZ, F.; GEPTS, P.; LOPEZ, M. 1985. Etapas de desarrollo en la planta de fríjol. (Developmental stages of the bean plant). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.61-78. Span., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Plant development; Growth; Developmental stages; Germination; Emergence; Flowering; Podding; Maturation; Colombia.

The developmental scale of the bean crop and the general characteristics of plant development are described on the basis of morphological and physiological changes in the plant. The factors influencing the duration of the developmental stages of beans are identified, namely growth habit, earliness, and climate. (CIAT)

0871

26552 HAYES, P.M.; PATRICK, J.W. 1985. Photosynthate transport in stems of Phaseolus vulgaris L. treated with gibberellic acid, indole-3-acetic acid or kinetin. Planta 166(3):371-379. Engl., Sum. Engl., 18 Refs., Illus. (Dept. of Biological Sciences, Univ. of Newcastle, N.S.W. 2308, Australia)

Phaseolus vulgaris; Gibberellins; Indoleacetic acid; Cytokinins; Auxins; Nutrient transport; Australia.

GA, IAA, or kinetin applied to the apical regions of decapitated stems of derooted Phaseolus vulgaris plants, promoted (14)C-photosynthate transport to the site of hormone application. Hormonal promotion of acropetal photosynthate transport was associated with significant increases in the pool size of free-space sugars at the hormone-treated region of the stem. The hormone-induced increases in the free-space pool size depended on continued phloem transport in the stem stumps while photosynthate leakage from the sink tissues of the stems was unaffected by the hormone treatments. On the basis of these observations, it is concluded that the increases in the pool size of sugars in the stem free space results from hormonal action on processes that determine rates of sugar unloading from the sieve element-companion cell complexes. (AS (extract))

0872

26917 JOLLIFFE, P.A.; EHRET, D.L. 1985. Growth of bean plants at elevated carbon dioxide concentrations. Canadian Journal of Botany 63(11):2021-2025. Engl., Sum. Engl., Fr., 26 Refs., Illus. (Dept. of Plant Science, Univ. of British Columbia, vancouver, B.C., Canada V6T 2A2)

Phaseolus vulgaris; CO2; Growth; Canada.

Plants of Phaseolus vulgaris cv. Pure Gold Wax were grown in controlled environment chambers at 6 CO2 concn. ranging from 340 to 3000 microliters/liter. Data for plant growth analysis were obtained from 5 harvests from 11 to 55 days after planting. Growth curves were fitted to the data using a cubic spline regression procedure. CO2 enrichment caused large and rapid increases in leaf dry wt., unit leaf rate, and specific leaf wt. Smaller responses included a decrease in LAR and an increase in leaf wt. ratio. Root dry wt. and leaf area were not significantly affected by CO2 treatments. RGR was initially higher in CO2-enriched plants and later declined; it may be a suitable index for the evaluation of CO2 effects during long periods of growth. Results indicate that leaf formation and expansion were not limited by assimilate supply. Max. growth and pod yield were obtained in plants grown at 1200 microliters/liter CO2. (AS)

0873

26537 LAMBERT, W.D.; WHELESS, T.G.; BASLER, E. 1985. Effects of acifluorfen on auxin translocation in bean seedlings. Plant Growth Regulation 3(2):119-123. Engl., Sum. Engl., 13 Refs. (Dept. of Botany & Microbiology, Oklahoma State Univ., Stillwater, OK 74078, USA)

Phaseolus vulgaris; Seedlings; Herbicides; Plant growth substances; Auxins; USA.

The effect of sodium salt of acifluorfen on the translocation of the (14)C-labeled auxins 2,4,5-trichlorophenoxyacetic acid (2,4,5-T-(14)C) and IAA-1-(14)C and was determined. The auxins and acifluorfen were injected into the stem at the cotyledonary node of 9-day-old bean cv. Tenderpod seedlings. The plants were harvested 4 h after treatment and analyses of (14)C were made of various plant parts. Acifluorfen increased 2,4,5-T-1-(14)C translocation out of the treated area and especially into the large primary leaves. This translocation pattern is indicative of apoplastic translocation and suggests that acifluorfen inhibited vein loading of the auxins. Acifluorfen affected auxin translocation in the dark as effectively as in the light even through

the herbicidal effects of acifluorfen are known to be expressed only after light treatment. (AS)

0874

26288 MISRA, S.H.; BEWLEY, J.D. 1985. The messenger RNA population in the embryonic axes of Phaseolus vulgaris during development and following germination. Journal of Experimental Botany 36(171):1644-1652. Engl., Sum. Engl., 22 Refs., Illus. (Plant Physiology Research Group, Dept. of Biology, Univ. of Calgary, Alberta T2N 1N4, Canada)

Phaseolus vulgaris; Germination; Seed, RNA; Proteins; Genetics; Canada.

Messenger RNAs were extracted from young, mid-maturation, late-maturation, mature-dry, and 20-h-germinated embryonic axes of Phaseolus vulgaris cv. Taylor's Horticultural. They were translated in vitro in a rabbit reticulocyte lysate protein synthesizing system. Analysis of the translation products using 2-dimensional polyacrylamide gel electrophoresis indicated that there were substantial changes in the messenger RNA populations of developing and germinating axes. The no. of polypeptides synthesized increased sharply at 20-22 days after pollination and then declined. There was a parallel increase and decrease in the Poly(A+) content of the seed axis. The analysis showed that certain messages were present throughout development and were stored in mature dry seed. These messages were degraded upon subsequent rehydration. Some messages appeared during mid-maturation but declined during later stages of development and were absent from the mature seed. In the germinating seed a set of messages unique to germination appeared. (AS)

0875

26290 MORRIS, D.A.; ARTHUR, E.D. 1985. Effects of gibberellic acid on patterns of carbohydrate distribution and acid invertase activity in Phaseolus vulgaris. Physiologia Plantarum 65(3):257-262. Engl., Sum. Engl., 23 Refs. (Dept. of Biology, Building 44, The Univ., Southampton SO9 5NH, England)

Phaseolus vulgaris; Plant growth substances; Gibberellins; Growth; United Kingdom.

The application of GA (10 micromolar) as a root drench to 16-day-old plants of Phaseolus vulgaris cv. Masterpiece stimulated growth of the stem internodes and reduced root growth. GA treatment did not affect the export of (14)C from a primary leaf to which ((14)C)-sucrose was applied, but greatly increased upward translocation to the elongation region of the stem at the expense of transport to the hypocotyl and root system. The observed changes in the patterns of growth and ((14)C)-labelled assimilate distribution were correlated with an increase in the specific activity of acid invertase in the elongating stem internodes and a decrease in invertase activity in the hypocotyl and root. Sucrose concn. in the elongating internodes fell substantially after treatment with GA while the concn. of hexose sugars increased. It is suggested that by stimulating acid invertase synthesis in the elongating internodes, GA acts to establish a more favorable sucrose gradient between these sinks and source leaves. Under source-limiting conditions this, in turn, will lead to a reduced rate of assimilate translocation to competing sinks in the root system. (AS)

0876

26296 PREVOST, I.; LE PAGE-DEGIVRY, M.T. 1985. Changes in abscisic acid content in axis and cotyledons of developing Phaseolus vulgaris embryos and their physiological consequences. Journal of Experimental Botany 36(173):1900-1905. Engl., Sum. Engl., 16 Refs., Illus. (Laboratoire de Physiologie Végétale, 28, Avenue Valrose, 06034 Nice Cedex, France)

Phaseolus vulgaris; Embryo; Cotyledons; Plant growth substances; Growth;

France.

Changes in ABA content with time were measured in embryonic axes and in cotyledons of Phaseolus vulgaris embryos using a radioimmunoassay. During embryogenesis, a similar pattern was observed in both tissues. ABA increased to a max. 29 days after anthesis, followed by a decrease as the seed matured. The level of ABA in the cotyledons was always much higher than that in the axes. In in vitro cultures, the duration of the lag phase before germination of isolated embryonic axes increased with ABA content. The presence of cotyledons always lengthened the lag phase; longer lag phases were associated with greater concn. of ABA in the cotyledons. Moreover, the presence of cotyledons stimulated the growth of seedlings. (AS)

0877

26297 PREVOST, 1.; LE PAGE-DEGIVRY, M.T. 1985. Inverse correlation between ABA content and germinability throughout the maturation and the in vitro culture of the embryo of Phaseolus vulgaris. Journal of Experimental Botany 36(170):1457-1464. Engl., Sum. Engl., 21 Refs., Illus. (Laboratoire de Physiologie Végétale, 28, Avenue Valrose, 06034 Nice Cedex, France)

Phaseolus vulgaris; Seeds; Embryo; Germination; Plant growth substances; France.

Changes in embryo ABA content during the maturation of the seed of Phaseolus vulgaris cv. Contender were followed, using a radioimmunoassay. The pattern of change is similar to that already described in several species: a rapid increase (from day 18 to 29 after anthesis) was followed by a decrease, the ABA level being 10 times lower on day 48 than on day 29. Embryos isolated from day 18 to 48 after anthesis were able to germinate when cultivated on a mineral medium supplemented with sucrose and agar. The development pattern varied throughout the embryogenesis and could be correlated with the differentiation of the embryo at the time of isolation. Before germination could take place, a lag phase was observed, the duration of which could be correlated with embryo ABA content. As ABA content increased in the youngest embryos the duration of the lag phase increased. In the same way, the no. of days to germination was shown to diminish as ABA content decreased. Inverse correlation between ABA content and germinability was thus demonstrated throughout the development of the embryo. During in vitro culture, free ABA content decreased in the embryo and reached low values a few days before germination occurred. The beginning of root elongation in culture was again well correlated with the disappearance of free endogenous ABA. A transfer expt. inducing an earlier germination associated with a more limited development suggests that the lag phase is associated with an active continuation of embryonic development. (AS)

0878

26298 RANSOM, J.S.; MOORE, R. 1985. Geoperception in primary and lateral roots of Phaseolus vulgaris (Fabaceae). 3. A model to explain the differential georesponsiveness of primary and lateral roots. Canadian Journal of Botany 63(1):21-24. Engl., Sum. Engl., Fr., 29 Refs., Illus. (Dept. of Biology, Baylor Univ., Waco, TX 76798, USA)

Phaseolus vulgaris; Roots; Plant growth substances; Growth; USA.

The bending response of microsurgically treated roots of Phaseolus vulgaris seedlings was studied in lab. trials. Half-tipped primary and lateral roots bent towards the side of the root on which the intact half tip remained. Asymmetrical placement of a tip of a lateral root onto a detipped primary root caused the root to bend to the side on which the tip was placed. The more pronounced gravity response of primary roots, compared with lateral roots, was positively correlated with the greater vol., width, and length of columella in the primary roots. It was concluded that lateral roots produced

less growth inhibitor and were unable to redistribute the inhibitor to create a concn. gradient sufficient to induce a pronounced gravitropic response. (Horticultural Abstracts)

0879

26595 SCHRAVENDIJK, H.W. VANANDEL, O.M. VAN 1985. Interdependence of growth, water relations and abscisic acid level in Phaseolus vulgaris during waterlogging. Physiologia Plantarum 63(2):215-220. Engl., Sum. Engl., 33 Refs., Illus. (Botanical Laboratory, State Univ. of Utrecht, Lange Nieuwstraat 106, NL-3512 PN Utrecht, The Netherlands)

Phaseolus vulgaris; Growth; Irrigation; Water requirements; Transpiration; Netherlands.

The interdependence between changes in growth and water relations after waterlogging was investigated by recording simultaneously growth, transpiration, water potential, turgor, leaf diffusion resistance, and ABA content in Phaseolus vulgaris cv. bruine Noord-Hollandse. Growth was inhibited immediately after flooding, whereas transpiration decreased gradually to a low level in about 3 days. The 1st 2 days after flooding a small increase in ABA content in the leaves was observed which was accompanied by an increase in diffusion resistance. The increase in ABA content could result from an inhibited export from the leaves. After the 1st 2 days a decrease in water potential and turgor was accompanied by a drastic increase in both ABA content and diffusion resistance. This large increase in ABA content occurred before the turgor had reached its min. value. The change in diffusion resistance kept showing a lag of about 1 day with the change in ABA content. The possibility is discussed that besides ABA its metabolite phaseic acid is also involved in stomatal closure. After the formation of adventitious roots on the hypocotyl, ABA level, diffusion resistance, water potential, and turgor returned to the control values. Transpiration showed a slow recovery from the 6th day after flooding, whereas growth was inhibited for at least 9 days. A remarkable similarity exists between current observations on the responses of bean plants to flooding and the well-known responses to drought. (AS)

0880

26507 SEMU, E.; SINGH, B.R.; SELMER-OLSEN, A.R.; STEENBERG, K. 1985. Uptake of Hg from (203)Hg-labeled mercury compounds by wheat and beans grown on an Oxisol. Plant and Soil 87(3):347-355. Engl., Sum. Engl., 27 Refs., Illus. (Dept. of Soil Science, Sokoine Univ. of Agriculture, P.O. Box 3008, Morogoro, Tanzania)

Phaseolus vulgaris; Germination; Translocation; Hg; Norway; Tanzania.

Studies were conducted to evaluate the uptake of Hg by wheat and beans grown on an Oxisol with different levels of MEMC and HgCl2. Germination of beans grown with both compounds at 50 mg Hg/kg soil failed completely, even after repeated sowing. Yields were decreased, though not significantly, by HgCl2 up to 5 mg Hg/kg soil. The concn. of Hg in bean straw, but not grain, increased significantly with increasing levels of MEMC and HgCl2 application, and was greater in plants grown with HgCl2. Translocation to grain was low, with little difference between plants grown with MEMC or HgCl2. (AS (extract))

0881

26553 SILVA, E.A.M. DA; ANDERSON, C.E. 1985. Influencia da luz no desenvolvimento foliar do feijoeiro (Phaseolus vulgaris L.). (Influence of light on leaf development of beans). Revista Ceres 32(179):1-11. Port., Sum. Port., Engl., 17 Refs., Illus. (Univ. Federal de Vicosa, Dept. de Biologia Vegetal, 36.570 Vicosa-MG, Brasil)

Phaseolus vulgaris; Light; Leaves; Stomata; Plant development; Brazil.

Bean leaf anatomy variation, in plants grown at 9.8, 18.0, 27.0, and 36.0 Klux, is characterized by increased leaf thickness with increase in light. Leaves grown at lower light intensities have larger intercellular spaces than leaves grown at higher light treatments. Hooked trichomes were more frequent at highest light levels. Stomata frequency increased at the highest light intensity but the highest frequency was observed at 27 Klux. Stomatal diffusion resistance was greater on the upper surface of the leaf while stomatal diffusion resistance increased with a decrease in light intensity on both sides of the leaves. (AS)

0882

26230 SUBRAMANIAN, D. 1981. Effect of gamma radiation on the germination and seedling growth in French bean and lima bean. Science and Culture 47(3):107-108. Engl., Illus. (Dept. of Botany, Annamalai Univ., Annamalainagar 608 101, India)

Phaseolus vulgaris; Seed; Irradiation; Co; Germination; Mutation; Growth; India.

One hundred seeds (10 percent MC) each of Phaseolus vulgaris var. Accelamatised Bountiful and P. limensis var. Red Speckled were irradiated using Co(60) as the gamma ray source at 5, 10, 20, 30, and 40 Kr. Germination as well as seedling survival were more affected in P. limensis than in P. vulgaris. The lethal dose for these 2 were 20 and 40 Kr, resp. The critical levels in which max. mutagenic effectiveness and efficiency were found were 5 and 20 Kr, resp. (CIAT) See also 0840 0858 0861 0863 0897 0905 0907 0920 0923 0930 0955 0964 1085 1135

0883

26249 BALDINI, V.L.S.; DRAETTA, I.S.; PARK, Y.K. 1985. Purification and characterization of alpha-galactosidase from feijao bean Phaseolus vulgaris. Journal of Food Science 50(6):1766-1767. Engl., Sum. Engl., 10 Refs., Illus. (Inst. de Tecnologia de Alimentos, Fazenda Sta. Elisa, Caixa Postal 139, 13.100 Campinas-SP, Brasil)

Phaseolus vulgaris; Enzymes; Proteins; Analysis; Brazil.

Alpha-galactosidase from Phaseolus vulgaris var. Carioca-80 was purified and its characteristics established. The purified enzyme exhibits multiple forms--enzymes I and II with mol. wt. of 140,000 and 49,000 daltons, resp. Optimum pH was 5.5 for enzyme I and 6.0 for enzyme II. Optimum temp. for both was 55 degrees Celsius. Kinetically, enzyme I is more reactive. Heavy metal ions completely inhibited both enzymes. Galactose is a potential inhibitor for both enzymes. (AS)

0884

24687 BLISS, F.A. 1976. Annual report on improving yield and quality of bean seed protein and the development of superior populations for cooperative utilization in breeding programs; January 1-December 31, 1976. Washington, D.C., Agency for International Development. Department of State. 49p. Engl., Sum. Engl., 2 Refs., Illus.

Phaseolus vulgaris; Plant breeding; Yields; Protein content; Seed; Genotypes; Germplasm; Tannin content; USA; Colombia; Puerto Rico.

The research carried out in Wisconsin (USA), Colombia, and Puerto Rico on developing and evaluating high protein bean genotypes with wide adaptability and multiple trait superiority is discussed. The results of the studies are presented and illustrated with tables. There is great variability among bean genotypes to accumulate protein in the seed. There is now a sound basis for developing strains with improved met. content, and research is well underway in determining the effects of tannin. (AS (extract))

0885

26585 KUNWAR, R.; SINGH, R.; SINHA, M.M. 1984. Studies on mineral composition and protein content in French bean (Phaseolus vulgaris L.). Progressive Horticulture 16(1-2):116-119. Engl., Sum. Engl., 6 Refs. (Government Valley Fruit Research Station, Srinagar Garhwal, Uttar Pradesh Pin 246174, India)

Phaseolus vulgaris; Snap beans; Cultivars; Mineral content; Protein content; N; P; K; Ca; Mg; Climbing beans; Dwarf beans; India.

Fifteen French bean cv. commonly grown in the hills of Uttar Pradesh, India, were examined for grain mineral and protein contents. Mean values were 2.76, 0.11, 1.60, 0.22, 0.47, and 23.53 percent N, P, K, Ca, Mg, and CP, resp. Semidwarf cv. showed the highest protein content followed by dwarf beans, whereas tall beans had a low content. The same was true with respect to P and K contents. Ca and Mg concn. were highest in tall and dwarf beans, resp. Positive significant correlations were observed between protein and N (r = +0.92) and between N and Mg (r = +0.67); medium correlation was observed between protein and Mg (r = 0 + 0.55). (AS)

0886

26275 LARA, M.; PORTA, H.; PADILLA, J.; FOLCH, J.; SANCHEZ, F. 1984. Heterogeneity of glutamine synthetase polypeptides in Phaseolus vulgaris L. Plant Physiology 76(4):1019-1023. Engl., Sum. Engl., 22 Refs., Illus. (Centro de Investigación sobre Fijación de Nitrógeno, Univ. Nacional Autónoma de México, Cuernavaca, Morelos, Apartado Postal 565-A,

México)

Phaseolus vulgaris; Enzymes; Proteins; Mexico.

Glutamine synthetases from roots, nodules, and leaves of Phaseolus vulgaris were purified to homogeneity and their polypeptide composition determined. The leaf enzyme is composed of 6 polypeptides. The cytosolic fraction contains two 43,000 dalton polypeptides and the chloroplastic enzyme is formed by four 45,000 dalton polypeptides. Root glutamine synthetase consists only of the same 2 polypeptides of 43,000 daltons that are present in the leaf enzyme. The nodule enzyme is formed by 2 polypeptides of 43,000 daltons, one is common to the leaf and root enzyme but the other is specific for N2-fixing nodule tissue. The 2 glutamine synthetase forms of the nodule contain a different proportion of the 43,000 dalton polypeptides. (AS)

0887

26549 LE PAGE-DEMIVRY, M.T.; BULARD, C. 1984. A radioimmunoassay for abscisic acid: properties or cross-reacting polar metabolites. Physiologie Végétale 22(2):215-222. Engl., Sum. Engl., Fr., 16 Refs., Illus. (Laboratoire de Physiologie Végétale, Faculté des Sciences et des Techniques, Parc Valrose, 06034 Nice Cedex, France)

Phaseolus vulgaris; Plant growth substances; Analysis; France.

Estimates of ABA in an extract of Phaseolus vulgaris cv. Contender embryos appeared too high using a radioimmunoassay technique. Purification using TLC established that ABA in its free and alkali-hydrolyzable forms constituted only a small part of the immunoreactive material. The major source of the cross reactivity was a group of polar metabolites poorly soluble in ether but well recovered by ethyl acetate and butanol. The metabolites were compared with recently identified glucosides of ABA and dihydrophaseic acid, but major differences were detected. (Seed Abstracts)

0888

26979 LESTER, G.; HOSFIELD, G.L.; IZQUIERDO, J.A.; UEBERSAX, M.A. 1980. An HPLC method for the quantitative determination of nonstructural carbohydrates in tissues of common bean. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. pp.80-84. Engl.

Phaseolus vulgaris; Carbohydrate content; Sugar content; Seed; Analysis; Pods; Stems; Roots; Dry matter; Leaves; Petioles; USA.

An accurate analytic procedure for rapid separation and quantitative determination of free sugars and water-soluble starch in tissues of common bean was developed, using high performance liquid chromatography. The data obtained are presented in table form. (CIAT)

0889

26283 MANEN, D.; MANEN, J.F.; MORGAN, M.R. 1984. Phaseolus vulgaris lectin heterogeneity related to their metal content. Plant Science Letters 37(1-2):105-110. Engl., Sum. Engl., 19 Refs., Illus. (Inst. de Botanique, Université de Geneve, 1 Chemin de l'Imperatrice, 1292 Chambésy/Geneve, Switzerland)

Phaseolus vulgaris; Lectins; Mineral content; Mn; Ca.

The seed lectins of Phaseolus vulgaris cv. Contender typically consist of 5 tetrameric isolectins E4, E3L, E2L2, EL3, and L4. However, electrophoretic and isoelectric focusing analysis of each purified protometer show a great heterogeneity. It was demonstrated that each tetrameric isolectin exists in 5 different electrophoretic forms depending on the amount of Mn(2+) cation

bound to each isolectin. The effects of Mn(2+) binding on charge and/or molecular properties of the protomers are discussed. Under the same exptl. conditions, if Ca(2+) ions are used instead of Mn(2+), the above modifications are not observed. (AS)

0890

26299 RATHERT, G. 1985. Sucrose and starch content of plant parts as a possible indicator for salt tolerance of crops. Australian Journal of Plant Physiology 11(6):491-495. Engl., Sum. Engl., 29 Refs. (Plant Nutrition, Berliner Str. 80, D-1000, Berlin 37, Federal Republic of Germany)

Phaseolus vulgaris; Sucrose; Salinity; Starch content; Leaves; Roots; Resistance; German Federal Republic.

The effects of NaCl on total root and leaf sucrose and on total foliar starch in crops of differing salt tolerance were investigated during the early stages of salinity stress. Leaf sucrose level increased most in bush bean (sensitive) but less in rice (moderately sensitive), whereas it decreased slightly in soybean (moderately tolerant) and more in cotton (tolerant). Initial root sucrose was lowest in bush beans, but this sensitive species showed the largest percentage increase after salination. Foliar starch increased in sensitive crops but decreased in tolerant crops. NaCl-induced carbohydrate change in roots and laminae was correlated with tolerance of the species independently of ion-regulation behavior. Sucrose and starch contents may assist in the selection for salt tolerance within species. (AS)

0891

26243 RODRIGUEZ DE MORA, D. 1982. Efecto de los polifenoles sobre la digestibilidad in vivo e in vitro de la proteína del fríjol. (Effect of polyphenols on in vivo and in vitro digestibility of bean protein). Tesis Mag.Sc. Guatemala, Universidad de San Carlos. 98p. Span., Sum. Span., 113 Refs., Illus.

Phaseolus vulgaris; Phenolic content; Digestibility; Seed color; Guatemala.

Two methods to quantify polyphenols in legumes and develop an in vitro methodology were evaluated to determine the digestibility of white, black, and red bean protein. Finally, the polyphenol content with both methods varied with the seed coat color and the heat treatment reduced its content. In the cooked or dried bean flours with broth, the percentage of total polyphenol loss determined by Folin-Denis reached 37 percent and a reduction of 94 percent was obtained for biologically active polyphenols determined by the Hagerman-Butler's method. The major reduction of polyphenols was observed in the cooked and dried beans without broth, reaching values of up to 51 and 96 percent for total and biologically active polyphenols, resp. In the trial with rats the digestibility of bean protein with broth was 73.21, 69.56, and 64.51 percent for white, red, and black beans, resp.; in beans without broth digestibility of bean protein was 71.97, 71.96, and 68.83 percent for white, red, and black beans, resp. (AS (extract)-CIAT)

0892

26502 ROSINGER, C.H.; WILSON, J.M.; KERR, M.W. 1984. Changes in the soluble protein and free amino acid content of chill-sensitive and chill-resistant plants during chilling and hardening treatments. Journal of Experimental Botany 35(159):1460-1471. Engl., Sum. Engl., 33 Refs., Illus. (School of Plant Biology, Univ. College of North Wales, Bangor, Gwynedd LL57 2UW, England)

Phaseolus vulgaris; Relative humidity; Drought, Leaves; Protein content; Amino acids; Snap beans; Temperature; United Kingdom.

The effects of low temp. (5 and 12 degrees Celsius) and drought treatments on

leaf soluble protein content and free amino acid content were investigated in 4 species, which were ranked according to chilling sensitivity: pea (chill-resistant), mung bean (highly chill-sensitive), and tomato and French bean (intermediate chilling sensitivity). Drought treatment caused a 30-40 percent decrease in protein levels, and in all but mung bean a 100-200 percent increase in free amino acid conen. Four days chilling at 5 degrees Celsius, 85 percent RH, caused leaf water content to decrease by almost 50 percent in mung bean, but by only approx. 6-7 percent in the other 3 species. During this treatment the leaf soluble protein content decreased in all 4 species, although the decrease was greatest and most rapid in mung bean. In the chill-sensitive species the decrease in protein content was accompanied by an increase in free amino acid content. When plants of each species were chilled at 5 degrees Celsius, 100 percent RH, water loss was greatly reduced or prevented and there was no significant decrease in leaf soluble protein. It is concluded that the protein decrease which occurred at 5 degrees Celsius, 85 percent RH, was a response to water loss and not the direct result of low temp. However, chilling at 100 percent RH did cause an increase in free amino acid content of the chill-sensitive species, suggesting that this was a direct response to low temp. Although drought treatment caused a 6-20 fold increase in free proline content in the leaves of the 4 species examined, chilling (5 degrees Celsius) and chill-hardening (12 degrees Celsius) caused little change in free proline content, indicating that the accumulation of this protective amino acid is unlikely to contribute to the effectiveness of the chill-hardening treatment. (AS)

0893

26287 SATHE, S.K.; DESHPANDE, S.S.; SALUNKHE, D.K. 1984. Dry beans of Phaseolus. A review. 2. Chemical composition: carbohydrates, fiber, minerals, vitamins, and lipids. Critical Review. in Food Science and Nutrition 21(1):41-93. Engl., 463 Refs., Illus. (Dept. of Nutrition & Food Science, Muscle Biology Group, Univ. of Arizona, Tucson, AZ, USA)

Phaseolus vulgaris; Carbohydrate content; Seed; Starch content; Digestibility; Proteins; Fibre content; Mineral content; Vitamin content; Cultivars; Fatty acids; USA.

An extensive bibliographic review on the current status of research on the chemical composition of dry bean carbohydrates is presented. Isolation techniques, size, shape, and appearance of starch granules, amylose content, granule crystalline characteristics, molecular structure analyzed by debranching enzymes, gelatinization temp. and pasting properties, and functional properties such as swelling and solubilization are indicated. Investigations on the oligosaccharides of the raffinose family, carbohydrates as crude fiber, and pectic substances that affect bean cooking quality are reviewed. The digestibility of carbohydrates, BV, NPU, and the influence of starch content on the digestibility of proteins are taken into account, as well as some aspects of the alpha-amylase inhibitors. The investigations on the bean fiber content show important nutritional implications in human nutrition such as its possible influence on the protection against atherosclerosis and certain venous diseases. Studies on mineral content of bean seed such as Ca, Fe, Cu, Zn, P, K, Na, Mn, and Mg, and the content of the other substances as phytic acid, oxalic acid, and polyphenols that form complex substances which prevent the mineral absorption by the organism are reviewed. The vitamin contents of beans such as Ayocote, Bayo Gordo, Red Kidney, Small White, Great Northern, Pinto, and even other species as Phaseolus lunatus, P. limensis, and P. aureus, are presented and compared. Lipids are included in this review. (CIAT)

0894

26037 SWANSON, B.G.; SEIB, P.; WOOD, D.; HOSFIELD, G.; UEBERSAX, M.A.; TELEK, L.; BRESSANI, R.; BRAHAM, E.; ELIAS, L.; MOLINA, M.; GOMEZ-BRENES, R. 1982. Improved biological utilization and availability of dry beans. In Bean/Cowpea Collaborative Research Support Program. U.S.A. 1982 Annual

Report. East Lansing, Michigan State University. pp.57-63. Engl.

Phaseolus vulgaris; Agricultural projects; Lectins; Phytohaemagglutinins; Seed coat; Proteins; Socioeconomic aspects; Digestibility; Phenolic content; USA; Guatemala.

Achievements of the project to improve the biological utilization and availability of dry beans in the USA and Guatemala are summarized and goals for 1983 are given. A method was developed to assess hemagglutinating lectins in dry and processed beans, as well as a method to determine procyanidins and other components in seed coats of dry beans. A strong binding capacity of procyanidins and some pigments was observed. Globular protein G-1 from dry beans was also isolated and purified. The results of a survey of rural Guatemalan bean producing areas are presented. Factors associated with the hard-to-cook phenomenon and low digestibility are discussed; if polyphenolic compounds are eliminated, digestibility values would increase 8-10 percent for colored beans. Two methods to determine total and biologically active polyphenol in colored beans are described as well as 2 methods to prevent the development of the hard-to-cook phenomenon. (CIAT) See also 0856 0860 0862 0863 0864 0866 0897 0899 0900 0904 0908 0910 0911 0920 0933 1016 1112 1171 1176 1178 1189 1190 1220 1224

0895

22551 CURSO INTENSIVO POSTGRADO DE INVESTIGACION PARA LA PRODUCCION DE FRIJOL EN EL PERU, 2o., CHINCHA, PERU, 1984. Trabajos presentados. (Papers presented). Lima, Instituto Nacional de Investigación y Promoción Agropecuaria. Programa Nacional de Leguminosas de Grano. Guía Didáctica no.6. 183p. Span., 41 Refs., Illus.

Phaseolus vulgaris; Cultivars; Diseases and pathogens; Injurious insects; Insect control; Irrigation; Weeding; Production; Peru.

A compendium is presented of the conferences given to the participants in the 2nd Intensive Postgraduate Course in Bean Production Research in Peru, carried out at Chincha exptl. station from May 14th to 26th, 1984. Topics of current bean research covered were new exptl. lines and var. developed by the grain legume program, diagnosis of bean cultivation problems, damage caused by the main pests attacking beans, pest control, water requirements and management, exptl. field techniques, and weed control. Individual papers are recorded in this publication under the following consecutive no.: 0903, 0906, 0942, 0954, 1053, 1074, 1078, 1079, 1092, 1114, 1115, 1200, and 1211. (CIAT)

0896

26293 PECHAN, P.M.; WEBSTER, B.D. 1985. Determination of pollen number of beans using an electrical particle-counting device. HortScience 20(3):444-445. Engl., Sum. Engl., 9 Refs. (Dept. of Agronomy & Range Science, Univ. of California, Davis, CA 95616, USA)

Phaseolus vulgaris; Anthers; Pollen; USA.

The no. of pollen grains in anthers of Phaseolus vulgaris was estimated using a Coulter Counter, an electrical particle-counting device. Nine green buds were collected randomly from 3 plants grown in a growth chamber. From each bud, one anther at a time was excised and placed in liquid N for 3 s. Pollen grains were transferred from the anthers into a drop of 0.3 molar NaCl on a glass slide. The saline-pollen grain mixture was cleaned of all debris, and pollen was washed into a beaker containing the same solution. This procedure was repeated for the remaining 9 anthers of each bud. The total no. of pollen grains/bud was determined using a Coulter Counter. (AS) See also 1104 1191

0897

26918 AGUIRRE B., G. 1976. Factibilidad económica de la aplicación de inoculante en la producción de fríjol (Phaseolus vulgaris L.) a diferentes niveles de nitrógeno en el suelo en Cadereyta Jimenez, N.L. (Economic feasibility of inoculant application in bean production at different soil nitrogen levels in Cadereyta Jiménez, N.L.). Tesis Ing.Agr. Administrador. Nuevo León, México, Instituto Tecnológico y de Estudios Superiores de Monterrey. 103p. Span., Sum. Span., 45 Refs., Illus.

Phaseolus vulgaris; Inoculation; Fertilizers; N; Yields; Yield components; Flowering; Protein content; Mexico.

The response of bean var. Delicias 71 to inoculation, the interaction between N fertilization and inoculation, and the economic feasibility of inoculant application were determined in a commercial agricultural field located in Cadereyta Jiménez (Nuevo León, México). Four N levels were used (0, 18, 36, and 54 kg/ha). The parameters measured were grain yield, days to flowering and to harvest, no. of pods/plant, no. of grains/pod, and CP analysis. A highly significative interaction was found between inoculation and N fertilization, the treatment of 36 kg N/ha with inoculation being the best. No difference was found in the relative CP content in the grain, although the absolute difference in CP production/ha was highly significative. (AS (extract)-CIAT)

0898

25316 BALDUCCI JUNIOR, J.J.; ROSOLEM, C.A.; MACHADO, J.R. 1984. Adubacao foliar do feijoeiro (Phaseolus vulgaris L.): 3. Efeitos de NP e NPK. (Foliar fertilization of beans: 3. Effects of NP and NPK). Revista de Agricultura (Brasil) 59(3):221-228. Port., Sum. Port., Engl., 2 Refs. (Faculdade de Ciencias Agronomicas, Univ. Estadual de Sao Paulo, 18.600 Botucatu-SP, Brasil)

Phaseolus vulgaris; Fertilizers; N; P; K; Yields; Brazil.

Four expt. were conducted in Sao Manuel (Sao Paulo, Brazil) in 1979-80, 2 in the wet season and 2 in the dry season, to study the effect of foliar applications with NPK fertilizer on the yield of bean cv. Carioca. Treatments had no significant effect on seed yields. (CIAT)

0899

26967 CHRISTENSON, D.R.; BRICKER, C.; REISEN, J. 1980. Effect of applied nitrogen on yield and tissue nutrient levels of several d bean varieties. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. pp.32-34. Engl.

Phaseolus vulgaris; Cultivars; Fertilizers; N; Yields; Mineral content; Ca; Mg; Mn; Fe; P; Zn; USA.

The response of 4 bean var. (61618, 61356, Black Turtle Soup, and Sanilac) to the application of 6 N rates (0, 22.5, 44.9, 67.3, 89.7, and 112.2 kg/ha) was evaluated as to yield and tissue nutrient levels at Saginaw Valley Research Farm (Michigan, USA). Yield of var. 61618 and 61356 was increased with applications up to 27.3 and 36.3 kg N, resp. Sanilac yield was increased with up to 18.2 kg applied N, while Black Turtle Soup yield was not significantly affected by N rate. N, Ca, Mg, and Mn levels were increased with the increasing N rates, while P and Fe levels were not affected. A significant interaction was observed between var. and N rate on Zn in plant tissue. There was little or no visual difference between N treatments during the growing season. (CIAT)

0900

26966 CHRISTENSON, D.R.; BRICKER, C.; REISEN, J. 1980. Effect of fertilizer sources and manganese rate on yield and tissue manganese levels of navy beans, soybeans and sugarbeets. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. pp.16-20. Engl.

Phaseolus vulgaris; Fertilizers; P; Mn; Yields; Mineral content; USA.

The effect of 2 fertilizer sources (monoammonium phosphate and diammonium phosphate) and 2 Mn rates (0 and 9 kg/ha) on yield and tissue Mn levels of navy beans, soybeans, and sugar beets was evaluated at the Saginaw Valley Research Farm (Michigan, USA). Navy bean yield was increased by applied Mn. A significant interaction between fertilizer source and Mn rate at 4 wk. was found. After that date the only significant effect was due to Mn rate. (CIAT)

0901

26256 CLERMONT, C.; MATHIEU, F.; LARAQUE, J.A. 1985. Etude de fractionnement d'un engrais complet sur le haricot de Juillet a Salagnac. (Trial on split application of a complete fertilizer in July-planted beans in Salagnac). Recherche et Developpement Rural 1(2):77-96. Fr., Sum. Fr., Engl., Span., 7 Refs., Illus.

Phaseolus vulgaris; Fertilizers; N; P; K; Yields; France.

The effect of using split applications of 20-10-20 NPK fertilizer for the cultivation of beans was studied. Results indicated that the highest dose of fertilizer should be applied at the end of the vegetative cycle of the crop. (AS)

0902

26219 FLOR M., C.A. 1985. Revisión de algunos criterios sobre la recomendación de fertilizantes en fríjol. (Review of some criteria for recommending fertilizers in beans). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.287-312. Span., 26 Refs., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Fertilizers; Nutrient uptake; Cultivars; Yields; Soil fertility; Colombia.

The problem of fertilizer recommendations is discussed and each criterion to be considered is analyzed: amount of nutrients in the soil, crop requirements, fertilizer efficiency, and economic aspect of fertilization. A list of some var. tolerant to adverse soil conditions (low P, high Al) is presented as well as curves of nutrient uptake and of efficiency of fertilizer applications, and estimation of nutritional requirements. (CIAT)

0903

22554 FLOR M., C.A. 1984. El diagnóstico de problemas en fríjol: su aplicación a los problemas de fertilidad de suelos. (Diagnosis of problems in beans: its application to soil fertility problems). In Curso Intensivo Postgrado de Investigación para la Producción de Fríjol en el Perú, 2o., Chincha, Perú, 1984. Trabajos presentados. Lima, Instituto Nacional de Investigación y Promoción Agropecuaria. Programa Nacional de Leguminosas de Grano. Guía Didáctica no.6. pp.21-36. Span., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Plant nutrition; Minerals and nutrients; Nutrient uptake; Micronutrients; Colombia.

A scheme of scientific research methodology is presented that includes

special diagnostic characteristics. Symptom categories (visual, cytological, chemical, and metabolic) and the diagnostic techniques most used by researchers (unifactorial and multifactorial experimentation) are described. Tables are included on critical levels of nutrients in the soil for bean cultivation, absorption rate and mobility of nutrients applied to the foliage, and factors affecting micronutrient availability. (CIAT)

0904

26983 GARCIA, S.; FEICOSEY, D.; ADAMS, M.W. 1980. Differential starch storage in two bean varieties in relation to their ability to withstand a shading stress. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research report. pp.100-102. Engl.

Phaseolus vulgaris; Cultivars; Shading; Starch content; Roots; Stems; Petioles; Pods; Seeds; Yield components; USA.

An expt. was conducted to obtain information on the value of starch storage in beans, and to determine whether breeding should be focussed on this characteristic. Many bean var. Sanilac (non-starch storer) and NEP-2 (starch storer) were grown with 2 treatments, with and without shade. The rates of seed fill in all plots were measured and sampled plants in each plot were analyzed for starch and soluble solids contents using the starch iodide staining test and the refractometer, resp. Samples of roots, stems, petioles, pods, and seeds were also taken, and frozen for later lab. analysis. The rate of seed fill of Sanilac was significantly reduced by shading, while that of NEP-2 was not. Sanilac yielded [illegible] percent less than NEP-2 without shade, but 23 percent less under shade. NEP-2, the high-level starch storer, was less adversely affected by the reduced availability of light. (CIAT)

0905

26909 GNUDI R., C. 1984. Efecto del sombreamiento sobre el crecimiento y la abscisión de elementos reproductivos del frejol (Phaseolus vulgaris L.) cv. Tuscola. (Effect of shading on growth and abscission of reproductive elements of bean cultivar Tuscola). Tesis Lic. Ciencias Agric. Santiago, Universidad de Chile, Facultad de Ciencias Agrarias, Veterinarias y Forestales. 84p. Span., Sum. Span., Engl., 60 Refs., Illus.

Phaseolus vulgaris; Solar radiation; Shading; Weeds; Abscission; Flowers; Growth; Leaf area; Dry matter; Chile.

The effect of 3 levels of light intensity (80, 40, and 20 percent incident radiation), produced by artificial shading and by weeds (weedy for 55 days), on the growth and abscission of reproductive elements in bean cv. Tuscola was studied at the U. of Chile. A decrease of the light intensity to 40 and 20 percent incident radiation produced a smaller no. of folioles, which although thinner were larger than those of the other treatments. Leaf area, therefore, increased with decreasing light intensity. The shade produced by this greater leaf area caused an early senescence of leaves in inferior strata. The yield in the treatments with 40 and 20 percent incident radiation was, on av., 58.6 percent less than that of the check. The yield of the treatment with 80 percent incident radiation was 1.8 percent less than that of the check; however, this difference was not significative. A decrease of the light intensity to 40 and 20 percent incident radiation reduced the production of reproductive elements by 22.4 percent and increased abscission by 22.0 percent. The weeds alone reduced the amount of incident radiation (max. value of approx. 1% percent). However, the weedy treatment had a DM production, a leaf area development, and a folicle no. and size significantly smaller than those of the treatment with 80 percent incident radiation and the check. (AS (extract))

0906

22559 GUERRA L., L. 1984. Requerimientos y manejo de agua en fríjol. (Water requirements and management in beans). In Curso Intensivo Postgrado de Investigación para la Producción de Fríjol en el Perú, 2o., Chincha, Perú, 1984. Trabajos presentados. Lima, Instituto Nacional de Investigación y Promoción Agropecuaria. Programa Nacional de Leguminosas de Grano. Guía Didáctica no.6. pp.59-82. Span., Sum. Span., 4 Refs., Illus.

Phaseolus vulgaris; Irrigation; Water requirements; Yields; Peru.

An expt. was conducted at Vista Florida exptl. station for irrigation (Peru) to determine the production functions of irrigation water (function of physical production, function of marginal production, and function of av. production) in beans. These functions provide good elements for determining the most productive water management system. Four treatments or water layers were applied, based on the percentage of available water consumption by the plant: 20.3, 29.0, 40.6, and 58.0 mm water for 35, 50, 70, and 100 percent available moisture. The results indicate that a relationship exists between the volumes of water used and crop yields; the max. yield (2503 kg/ha) required a vol. of 7120 cubic meters/ha. (CIAT)

0907

25331 BOSTALACIO, S.; VALIO, I.F.M. 1984. Desenvolvimento de plantas de feijao cv. Goiano Precoce, em diferentes regimes de irrigacao. (Development of bean cultivar Goiano Precoce under different irrigation regimes). Pesquisa Agropecuária Brasileira 19(2):211-218. Port., Sum. Port., Engl., 33 Refs., Illus. (Depto. de Biologia, Escola Superior de Agricultura de Lavras, Caixa Postal 37, 37.200 Lavras-MG, Brasil)

Phaseolus vulgaris; Irrigation; Water stress; Flowering; Growth; Abscission; Brazil.

In a controlled-environment expt., Phaseolus vulgaris cv.Goiano Precoce was irrigated daily or once or twice/wk. and subjected to water stress at preflowering, flowering, and fruiting. Irrigation twice/wk. gave fastest vegetative growth with daily RGR of 0.1 g/g and daily NAR of 0.24 mg/square centimeter. Imposition of water stress resulted in 11.7, 7.2, and 0 percent abscission of flower buds in plants which had been irrigated every day, and once and twice/wk., resp. Pod abscission was 36-50 percent under conditions of water stress. (AS)

0908

26582 KAHUYA, J.A.; BARENDSE, G.W.M.; LINSKENS, H.F. 1985. Water stress tolerance and proline accumulation in Phaseolus vulgaris L. Acta Botanica Neerlandica 34(5):293-300. Engl., Sum. Engl., 11 Refs., Illus. (Botany Dept., P.O. Box 35060, Dar es Salaam, Tanzania)

Phaseolus vulgaris; Cultivars; Resistance; Water stress; Stomata; Abscission; Flowers; Pods; Proline; Tanzania.

Water stress tolerance was determined in 5 bean var. (Burundi, Njano Fupi, Ulyankulu Mjanda Kitenge, Bukoba Goroli Kahawia, Kigoma Njano Ndefu, and Ulyankulu Kitenge Nyeusi) of diverse geographical origin within Tanzania, using as indicators: water saturation deficit, stomatal resistance, and degree of flower and pod abscission. Proline accumulation under stress was determined for 3 of the var. A positive correlation was detected between water stress tolerance and proline accumulation. Significant differences occurred between var. for the traits measured. Bukoba Goroli Kahawia was the most stress-tolerant var. It is concluded that determination of proline accumulation capacity under stress could be a useful index when selecting stress tolerant var. (AS)

0909

26273 KIRKHAM, M.B.; REDELFS, M.S.; STONE, L.R.; KANEMASU, E.T. 1985. Comparison of water status and evapotranspiration of six row crops. Field Crops Research 10(3):257-268. Engl., Sum. Engl., 14 Refs., Illus. (Evapotranspiration Laboratory, Kansas State Univ., Manhattan, KS 66506, USA)

Phaseolus vulgaris; Water requirements; Evapotranspiration; Soil moisture; Osmotic potential; USA.

During a 2-yr field study, the water status and evapotranspiration of 6 row crops were measured to determine if differences in water use could be identified from plant water measurements. The plants were maize, Pennisetum americanum, sorghum, Phaseolus vulgaris, soybean, and sunflower. Water potential, osmotic potential, canopy temp., and stomatal conductance were analyzed. Evapotranspiration was determined from soil water content measurements. Except for sunflowers, plants with the highest water potential had the lowest evapotranspiration (sorghum and P. vulgaris) and plants with the lowest water potential had the highest evapotranspiration (P. americanum, soybeans, and maize). The results showed that leaf water status did not predict crop water use. (AS)

0910

26546 LARQUE-SAAVEDRA, A.; RODRIGUEZ, M.T.; TREJO, C.; NAVA, T. 1985. Abscisic acid accumulation and water relations of four cultivars of Phaseolus vulgaris L. under drought. Journal of Experimental Botany 36(172):1787-1792. Engl., Sum. Engl., 20 Refs., Illus. (Centro de Botánica, Colegio de Postgraduados, Chapingo 56230, México)

Phaseolus vulgaris; Drought; Cultivars; Resistance; Water stress; Composition; Mexico.

Plants of 4 bean cv. differing in drought resistance were grown in pots under greenhouse conditions, and prior to flowering, water was withheld from the pots until the mid-day transpiration rate reached values below 1.0 micrograms H2O/square centimeter/s (designated the drought stage). At this point leaves were harvested on 3 or 4 occasions over 24 h to determine ABA concn., total water potential, solute potential, and turgor potential. ABA concn. at the drought stage differed between cv. at each sampling time, but overall differences in ABA level between cv. were not significant. ABA levels did not, therefore, correlate with the drought resistance properties reported for the cv. Total water potential, solute potential, and turgor potential differed between cv. when they reached the drought stage. Results are discussed in relation to total water potential and hour of the day when bean samples were taken for ABA analysis. (AS (extract))

0911

26277 LLUCH, C.; CAMPOS, J.A.; LIGERO, F. 1983. Efecto del azufre, nitrógeno y Rhizobium sobre la cosecha, nodulación y contenido de nutrientes en Phaseolus vulgaris. (Effects of sulfur, nitrogen, and Rhizobium on yield, nodulation, and nutrient content in Phaseolus vulgaris). Anales de Edafología y Agrobiología 42(5-6):769-781. Span., Sum. Engl., Span., 39 Refs., Illus.

Phaseolus vulgaris; Rhizobium phaseoli; N; S; Nodulation; Growth; Inoculation; Fertilizers; Yields; Spain.

The effect of N and S application as fertilizers and seed inoculation with Rhizobium phaseoli on the yield, nodulation, and nutrient content of beans was studied in soil/sand (3:1) culture. The results show a positive effect of S and N application on the development of reproductive and vegetative organs, resp. Nodule wt. and no. decreased when N was applied and increased when S was applied. Nutritional parameters and interactions among different

macronutrients were also determined. The values of nutritional and growth parameters are discussed. (AS)

0912

26964 MICHIGAN STATE UNIVERSITY. AGRICULTURAL EXPERIMENT STATION. 1980. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. 151p. Engl.

Phaseolus vulgaris; Soil fertility; Plant breeding; Nutritive value; Processing; Rotational crops; Yields; Soil compaction; Water stress; USA; Puerto Rico.

The advances of research carried out in 1980 on navy beans, sugar beets, maize, soybeans, and alfalfa at the Agricultural Expt. Station of Michigan State U., USA, are presented. These cover soil fertility, crop management, plant breeding, food value, processing quality, yield potential, crop rotation, compaction, and water stress. Individual papers are recorded in this publication under the following consecutive no.: 0856, 0888, 0899, 0900, 0904, 0925, 0926, 0936, 0941, 0962, 0991, 1022, 1097, 1098, 1101, 1112, 1122, 1127, 1129, 1131, 1132, 1133, 1147, 1220, and 1224. (CIAT)

0913

26050 MOSQUERA V., O. 1985. Influencia de la inoculación con micorriza sobre la respuesta del fríjol Carioca a la fertilización fosfórica. (Influence of the inoculation with mycorrhiza on the response of Carioca beans to phosphoric fertilization). In Sieverding, E.; Sánchez de Prager, M.; Bravo O., N., eds. Curso Nacional sobre Micorrizas, 1o., Cali, Colombia, 1984. Investigaciones sobre micorrizas en Colombia: memorias. Palmira, Universidad Nacional de Colombia. pp.154-160. Span., Sum. Span., 5 Refs. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Inoculation; Mycorrhizae; Fertilizers; P; Nutrient uptake; Yields; Colombia.

Preliminary results on bean response to inoculation with mycorrhizas and P fertilization in an acid infertile soil under greenhouse conditions are reported. It was found that inoculation with a selected mycorrhizal strain increased the percentage of root infection in both sterilized and natural soil. Likewise, DM and bean pod production increased and finally the extraction of P by the aerial part of bean plant. In spite of the fact that the native mycorrhizal population in the studied soil is high and efficient, the introduction of a selected strain gave a positive response, which provides good evidence for a possible practical utilization of mycorrhizal inoculation in order to achieve greater efficiency and economy in the use of phosphoric fertilizers. (AS-CIAT)

0914

26939 NGOLI, G.P.; TARIMO, A.J.P. 1985. Effect of grass mulch on grain and total dry matter yield of field beans (Phaseolus vulgaris L.). In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.29-34. Engl., Sum. Engl., 10 Refs., Illus. (Dept. of Crop Science, Faculty of Agriculture, Sokoine Univ. of Agriculture, P.O. Box 3005, Morogoro, Tanzania)

Phaseolus vulgaris; Cultivars; Mulching; Yields; Dry matter; Yield components; Tanzania.

An expt. was conducted at the Sokoine U. of Agriculture (Morogoro, Tanzania) to study the effects of a grass mulch on grain and total DM yield of 3 bean var. (Kabanima, Canadian Wonder, and Selian Wonder). Two treatments, mulched (M1) and control (M0), were used. The results showed that mulching had no significant effect on either grain or total DM yields of the 3 var. Likewise,

the yield components pods/plant and seeds/pod were not affected by the mulching treatment. The shelling percentage was, however, higher in the unmulched than in the mulched plots, indicating that mulching might have influenced DM partitioning to the pods. The shelling percentages were 58.3 and 55.1 for M0 and M1, resp. Of the 3 var. Canadian Wonder yielded the highest; grain yields were 0.162, 0.141, and 0.047 kg/square meter for Canadian Wonder, Selian Wonder, and Kabanima, resp. The var. differences reflected other environmental responses rather than the mulching treatments. Mulching of beans seems to have more effect on the morphological characteristics than on the accumulation of either economic or biological yields. (AS)

0915

26221 ORTEGA, J. 1985. Manejo de la acidez y encalamiento de los suelos. (Management of soil acidity and liming). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.347-361. Span., 68 Refs.

Phaseolus vulgaris; pH; Al; Fertilizers; Soil amendments; Cultivars; Selection; Colombia.

Strategies for managing the problem of soil acidity without making massive lime applications are proposed. The 1st strategy consists of the addition of lime to reduce Al saturation, taking into account 3 basic considerations: dose determination, utilization of good quality materials for liming, and estimation of residual effects of lime. The 2nd strategy proposes the addition of lime to supply Ca and Mg and to stimulate its movement in the subsoil, taking into account Ca and Mg availability, fertilizer requirements, and the descending movement of Ca and Mg. The 3rd strategy involves the utilization of bean var. tolerant to Al and Mg through the selection of a great no. of ecotypes whether in culture solutions, in the greenhouse, in the field, or in a combination of the 3. (CIAT)

0916

26925 PEREIRA, E.B.; CARDOSO, A.A.; VIEIRA, C.; LOURES, E.G.; KUGIZAKI, Y. 1985. Viabilidade economica do composto organico na cultura do feijao. (Economic viability of using organic manure in beans). Cariacica-ES, Brasil, Empresa Capixaba de Pesquisa Agropecuária. Comunicado Técnico no.40. 4p. Port., 2 Refs. (Empresa Capixaba de Pesquisa Agropecuária, Caixa Postal 125, 29.154 Campo Grande, Cariacica-ES, Brasil)

Phaseolus vulgaris; Manures; Green manures; Dung; Yields; Brazil.

The economic viability of using an organic manure composed of a mixture of bean hay, maize hay, and cattle manure to fertilize bean cv. Negrito 897 was investigated in Vicosa (Minas Gerais, Brazil). The rates used were 15 t/ha applied to the furrow or 37.5 and 75.0 t/ha incorporated into the soil at a 20-cm depth. The organic manure was applied with or without a chemical fertilizer. During the rainy season, the highest yields (1287 kg/ha) and economic returns were obtained with the rate of 75 t/ha. As the application rate of organic manure increased, a higher economic advantage was observed compared with the chemical fertilizer alone. During the dry season, the highest yields (2222 kg/ha) and returns were obtained with 75 t organic manure/ha + chemical fertilizer, compared with 1852 kg/ha obtained with the application of 75 t/ha alone. The economic viability of using the organic manure either alone or with a chemical fertilizer was confirmed. (CIAT)

0917

21878 PEREZ A., A. 1979. La fertilización del fríjol en la porción central del Valle del Cibao. (Bean fertilization in the central part of the Cibao Valley). In Annual Meeting of the Caribbean Food Crops Society, 16th., Santo Domingo, República Dominicana, 1979. Proceedings. Santo Domingo.

pp.369-379. Span., Sum. Span., Fr., Engl., 3 Refs., Illus.

Phaseolus vulgaris; Fertilizers; N; P; Yields; Dominican Republic.

The response of bean var. C-14 and Pomradour to fertilization was studied in the Cibao Valley, Dominican Republic. Different doses between 0-288 kg N or P were applied per hectare. Beans responded to doses up to 288 kg N/ha with yields of 2165 kg/ha whereas with P, the highest yields (1826 kg/ha) were obtained with applications of 72 kg P/ha. The av. yield of the check treatment was 1143 kg/ha. (AS-CIAT)

0918

22662 RENNIE, R.J.; KEMP, G.A. 1984. (15)N-determined time course for N2 fixation in two cultivars of field bean. Agronomy Journal 76(1):146-154. Engl., Sum. Engl., 23 Refs., Illus. (Research Station Agriculture, Lethbridge, Alberta, Canada T1J 4B1)

Phaseolus vulgaris; Cultivars; Nitrogen fixation; Nodulation; N; Fertilizers; Rhizobium phaseoli; Canada.

Dinitrogen (N2) fixation was measured for 2 bean cv., Aurora and Kentwood, in a 2-yr field expt. at 4 growth stages and 2 levels of fertilizer N (10 and 40 kg/ha), as $Ca(NO_3)_2$. Both (15)N-isotope dilution and nodulation parameters were used to determine if nitrogenase activity at these growth stages could explain Aurora's superiority in symbiotic N2 fixation. Nodules actively reduced C2H2 at the 1st trifoliate stage and acetylene-reducing activity increased until anthesis or various stages of pod filling, depending on the cv. and the year. The addition of fertilizer N at 40 kg/ha did not alter the pattern of acetylene-reducing activity over time although nitrogenase activity was affected. Although nodules reduced low levels of C2H2 at physiological maturity, no activity was observed at harvest maturity. The acetylene-reducing activity severely underestimated N2 fixation (as determined by (15)N-isotope dilution) and it is believed that N2 fixation in beans has been underrated solely because of the inadequacies of acetylene-reducing activity. Galt barley served as an excellent nonfixing control plant for (15)N-isotope dilution to measure N2 fixation in these bean cv. because its pattern of assimilating N from the soils was similar to that of the beans at all growth stages. (Microbiology Abstracts)

0919

26928 SCHERER, E.E.; CASTILHOS, E.G. DE; AITA, C. 1986. Utilizacao de esterco líquido de suínos como fonte de nitrogenio para as culturas de milho e feijao. (The use of liquid swine manure as a source of nitrogen for maize and bean crops). Florianópolis-SC, Brasil, Empresa Catarinense de Pesquisa Agropecuária. Pesquisa em Andamento no.56. 4p. Port., 3 Refs. (Empresa Catarinense de Pesquisa Agropecuária, Estacao Exptl. de Chapecó, Caixa Postal 151, Chapecó-SC, Brasil)

Phaseolus vulgaris; Manures; Dung; Brazil.

Liquid swine manure (6.5 percent DM) was evaluated as a source of N for maize and bean crops at rates of 0, 20, 40, and 80 cubic meters/ha in 2 different soils in western Santa Catarina, Brazil. The max. production of 37 sacks of beans/ha was obtained with 80 cubic meters swine manure compared with 30 sacks of beans obtained in the control treatment. However, the 5 and 6 additional sacks of beans obtained with the application of 40 cubic meters liquid swine manure could be more profitable. This has to be confirmed through an economic analysis. The rate of 40 cubic meters could also satisfy the N requirements of beans as well as provide other nutrients (P and K). (CIAT)

0920

26584 SHUKLA, P.D.; ADHIKARI, K.S.; DIVAKAR, B.L. 1984. Effect of lime on growth, yield and quality of French bean (Phaseolus vulgaris). Progressive Horticulture 16(1-2):48-51. Engl., Sum. Engl., 6 Refs. (Horticultural Experiments & Training Centre, Chaubattia, Uttar Pradesh, Almora, India)

Phaseolus vulgaris; Snap beans; Agricultural lime; Yields; Yield components; Protein content; Growth; pH; India.

In an investigation carried out in 1977-79 at Horticultural Expt. and Training Centre (Chaubattia, India) during 3 successive growing seasons of the French bean crop, the application of lime at 12 t/ha improved plant height, pod length, seed yield, and 100-seed wt. The increase in lime level up to 8 t/ha raised soil pH to a high level. (AS)

0921

26509 SILVEIRA, P.M. DA; STEINMETZ, S.; GUIMARAES, C.M.; AIDAR, H.; CARVALHO, J.R.P. DE 1984. Laminas de agua e turnos de rega na cultura do feijoeiro de inverno. (Irrigation levels and frequency in beans during the winter season). Pesquisa Agropecuária Brasileira 19(2):219-223. Port., Sum. Port., Engl., 8 Refs., Illus. (Empresa Brasileira de Pesquisa Agropecuária, Centro Nacional de Pesquisa de Arroz e Feijao, Caixa Postal 179, 74.000 Goiania-GO, Brasil)

Phaseolus vulgaris; Agronomic characters; Irrigation; Yields; Brazil.

In a field expt. in Goiania (Brazil) in the winter of 1982, Phaseolus vulgaris cv. CNF-0010 was given 2, 4, or 6 mm water daily at 1-, 4-, 7-, or 10-day intervals. Seed yields were affected more by irrigation level than frequency and were highest (1.9 t/ha) where 1 mm was applied daily. Root density was highest at 4 mm/day. Amount of water used averaged 173, 295, and 411 mm for the 2-, 4-, and 6-mm/day treatments, resp. (Soils and Fertilizers)

0922

26579 SINGH, R.; SINGH, D.V. 1984. Effectiveness of liming materials, their doses and fineness on yield and nutrient uptake by French-bean in acidic soils of the Kumaon hills. Indian Journal of Agricultural Sciences 54(6):491-495. Engl., Sum. Engl., 10 Refs., Illus. (Government Valley Fruit Research Station, Srinagar-Garhwal, Uttar Pradesh 246 174, India)

Phaseolus vulgaris; Agricultural lime; Nutrient uptake; Snap beans; Yields; Dry matter; India.

In field trials in the Kumaon hills of Almora, India, in 1977-78, Phaseolus vulgaris cv. Black Queen was sown on acid soil treated with sufficient (a) burnt lime, (b) calcitic limestone, (c) basic slag, or (d) dolomitic limestone to give a pH of 6.8 or 25, 50, or 75 percent of this value. Lime was applied in 3 degrees of fineness with a mesh size of -30+60 being most effective. Liming increased the yield of green pods and DM by 15.3-52.2 and 39.7-84.6 percent, resp., (b) giving the highest green pod yield of 8.73 t/ha. Application of 75 percent of requirement of (b) was equivalent to 100 percent requirement of (a), (c), and (d) in yield increase and uptake of N, P, Ca, and Mg. (Soils and Fertilizers)

0923

26236 SIQUEIRA, P.R. 1982. Función de respuesta del fríjol (Phaseolus vulgaris L.) a variaciones de humedad del suelo en tres etapas fenológicas y aspectos fisiológicos. (Response function of beans to variations of soil moisture in three phenological stages and physiological aspects). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 169 p. Span., Sum. Span., 61 Refs., Illus.

Phaseolus vulgaris; Soil moisture; Yields; Yield components; Leaf area; Flowering; Mexico.

Field and greenhouse expt. were simultaneously established at the lysimetric station of Colegio de Postgraduados de Chapingo, Mexico, to (1) evaluate the effect of different levels of available soil moisture (20, 40, 60, and 80 percent) on root development, yields, and yield components of dwarf bean cv. Canario 101 in 3 phenological stages (vegetative, flowering, and maturation); (2) find a response function based on applied moisture regimes; (3) correlate seed yield obtained in the greenhouse with that obtained in the field; and (4) evaluate the following parameters: LAI, LAD, dry wt. of canopy organs, and no. of flowers and its dynamics. For the field expt., the function for seed yield and its maximization was obtained, whereas in the greenhouse it was not possible to maximize the function found. The optimum yield in the field was 4.77 t/ha. All parameters evaluated depend on the different levels of available soil moisture. (AS (extract)-CIAT)

0924

26510 SMITH, D.L.; HUME, D.J. 1985. Effects of irrigation and fertilizer N on N2(C2H2) fixation and yield of white bean and soybean. Canadian Journal of Plant Science 65(2):307-316. Engl., Sum. Engl., 21 Refs., Illus. (Crop Science Dept., Univ. of Guelph, Ontario N1G 1ES, Canada)

Phaseolus vulgaris; Nitrogen fixation; Irrigation; Fertilizers; N; Nodulation; Yields; Canada.

In field trials in Elora and Cambridge (Ontario, Canada) in 1981-83, Phaseolus vulgaris cv. Ex Rico 23 and soybean cv. Maple Arrow were grown without irrigation or with trickle irrigation at 1 cm/day and without N fertilizer or with 100 kg N/ha as ammonium nitrate applied at sowing, followed by 5 biweekly applications of 20 kg N/ha in July and Aug. In 1983 in Elora, ground maize cobs were tilled into the soil to make soil N less available and N fertilizer rates were 200 kg/ha at sowing and 40 kg/ha biweekly. N fixation was increased 4-150 times in P. vulgaris and 2-4 times in soybeans by irrigation. Nodule dry wt./square meter and dry wt./nodule were also increased by irrigation, but nodule water content was unaffected. Fertilizer N decreased N fixation and nodulation in both species and increased total N accumulation by 10-20 percent. Seed yields were only increased by irrigation and N fertilizer in Cambridge where available soil N was lower. N fixation of soybean was greater than that of P. vulgaris, but seed yields of the latter were higher in 2 of the 4 trials and were no more limited by available N than those of soybeans. (Soils and Fertilizers)

0925

26988 SMUCKER, A.J.M.; ADAMS, M.W.; CHRISTENSON, D.R.; HOGABOAM, G.J.; McBURNEY, S.; SRIVASTAVA, A.K. 1980. Inhibition of dry bean and sugar beet production by soil physical stresses. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing, 1980 Research Report. pp.116-135. Engl.

Phaseolus vulgaris; Soil compaction; Water absorption; Nutrient uptake; Yields; Cultivars; Land preparation; USA.

Methods and resources to investigate the influence of soil compaction on the uptake of water and nutrients by roots of dry beans and sugar beets were developed in a 5-yr program of Michigan State U. in cooperation with the U.S. Department of Agriculture. The treatments were (1) min. or no secondary tillage, (2) excessive secondary tillage compaction, and (3) excessive secondary tillage. Dry beans planted by the seed presswheel method emerged at the rate of approx. 90 percent without secondary tillage seedbed preparation. Min. tillage planting methods provided a soil environment that promoted plant

shoot and root growth, increasing yields by up to 240 percent. Secondary tillage severely reduced the yield of beans on several soil types. The dry bean cv. No. 61380 appears to be somewhat tolerant to moderate soil compaction. (CIAT)

0926

26984 TAYLOR, J.; GHADERI, A. 1980. Can we eliminate the compaction treatment in advanced strain testing? In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. pp.103-105. Engl.

Phaseolus vulgaris; Cultivars; Germplasm; Soil compaction; Yields; USA.

In 1979 and 1980, 65 black and white bean entries, including 7 commercial checks, were tested for yield at the Saginaw Bean and Beet Research Farm (Michigan, USA) at 2 levels of soil compaction. All sources of variance were highly significant, except the entry x compaction interaction. A correlation analysis was run between noncompacted and compacted yields over 2 yr. The correlation coefficient was 0.84, which is highly significant. This indicates that low yielding lines tended to be low at both levels of compaction and high yielding lines tended to be high at both levels of compaction. Comparing the means of the 2 treatments, a 12 percent yield reduction was obtained from the effect of soil compaction. (CIAT)

0927

26940 TESHA, A.J. 1985. Comparative drought tolerance in selected common bean cultivars. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.35-37. Engl., Sum. Engl., 4 Refs. (Dept. of Botany, Univ. of Dar es Salaam, P.O. Box 35060, Dar es Salaam, Tanzania)

Phaseolus vulgaris; Cultivars; Resistance; Drought; Water stress; Yields; Tanzania.

Twelve bean cv. were taken for initial screening for drought tolerance in the greenhouse during 1983. Based on the results obtained, cv. TMO 101 and TMO 125 were considered fairly drought tolerant while TMO 104 and TMO 110 were susceptible. These 4 cv. were taken for further studies during 1984-85 to determine electrical conductivity in the greenhouse and seed yield in the field (Dar es Salaam, Tanzania). Field results confirmed the earlier findings that TMO 125 is highly tolerant while TMO 110 is highly susceptible. There was a high negative correlation between electrical conductivity and crop yield under water stress conditions. (AS)

0928

26522 URQUIAGA C., S.; LIBARDI, P.L.; REICHARDT, K.; MORAES, S.O.; VICTORIA, R.L. 1984. Variacao do nitrogenio nativo e do proveniente do fertilizante, em Terra Roxa Estruturada, durante o desenvolvimento de uma cultura de feijao. (Variation of natural nitrogen and fertilizer-derived nitrogen in Terra Roxa Estruturada soil during the bean crop cycle). Revista Brasileira de Cioncia do Solo 8(2):223-227. Port., Sum. Port., Engl., 19 Refs.

Phaseolus vulgaris; Fertilizers; N; Dry matter; Soil fertility; Brazil.

A field expt. was conducted on Terra Roxa (Paleudalf) soil in Piracicaba (Sao Paulo, Brazil) to study the variation of natural N and fertilizer-derived N in the soil during the crop cycle of bean cv. Carioca. The crop was fertilized with ammonium sulfate, highly enriched with (15)N at 42 kg/ha, and with simple superphosphate at 150 kg/ha. Total N and fertilizer-derived N were determined at 5 different times during the crop cycle, at 8 depths of

the soil profile (every 15 cm until 120 cm). The total amount of N stored up to 120 cm of the soil profile was around 11,168 kg/ha. The total N removed by the plants was less than 1.1 percent of the amount of total N stored in the soil. The variation of total N in the soil profile was markedly higher than the variation of the amount of N removed by the plants during the crop cycle. At the end of the cycle, 9.18 kg fertilized-derived N/ha remained in the soil, mainly in the surface layer (0-45 cm). (AS)

0929

26573 URREA F., C.A.; ORTEGA, J.E.; ESCOBAR G., J.A. 1985. Respuesta de cuatro variedades de fríjol (Phaseolus vulgaris L.) a niveles y fuentes de fósforo en dos profundidades de aplicación y a déficit de agua en suelos ácidos. (Response of four bean varieties to phosphorus levels and sources at two application depths and to water stress in acid soils). Acta Agronómica 35(1):47-60. Span., Sum. Span., Engl., 8 Refs., Illus.

Phaseolus vulgaris; Cultivars; Fertilizers; P; Water stress; Yields; Yield components; Colombia.

Four bean var. (Carioca, G-4000, Puebla 152, and ICA-Pijao) were planted at regular intervals on a Orthoxic Paleuhumult soil at the CIAT-Quilichao substation (Cauca, Colombia). P sources (triple superphosphate 20 percent and Thomas slag 6 percent) were applied at 2 rates (66 and 131 kg/ha) and at 2 depths (5 and 20 cm). Two checks were used: disturbed and undisturbed soil. Yields were reduced by 70 percent when beans were grown under water stress conditions; therefore P fertilization is not an economic method of increasing production. No differences were found between P application depths. Var. Carioca and G-4000 were efficient at low levels of soil P and tolerated water stress; ICA-Pijao (inefficient) and Puebla 152 (efficient) did not tolerate drought. Efficient var. at low levels of P accumulate greater amounts of N and P in the roots. Root length is not an important parameter to classify the efficiency of bean var. in the presence of low soil P. (AS)

0930

26051 VASQUEZ Y VASQUEZ, M. 1984. Efecto de sequía impuesta en distintas épocas en el rendimiento y sus componentes en cinco genotipos precoces e intermedios de fríjol común (Phaseolus vulgaris L.). (Effect of drought imposed during different periods on yield and yield components in five early-maturing and intermediate bean genotypes).. Tesis Ing.Agr. Guatemala, Universidad de San Carlos. 72p. Span., Sum. Span., 10 Refs., Illus.

Phaseolus vulgaris; Cultivars; Drought; Irrigation; Yields; Yield components; Flowering; Guatemala.

An expt. was carried out at the exptl. station of the Instituto de Ciencia y Tecnología Agrícolas (Jutiapa, Guatemala) to determine the effect of drought (5, 6, 7, 8, and 10 waterings for treatments 1, 2, 3, 4, and 5, resp.) on yield and yield components of 5 bean var. (ICTA Tamazulapa, Centa Izalco, P-006, Bat 41, and Rabia de Gato). Data were recorded for each var. on days to flowering, physiological maturity, no. of seeds/pod, no. of pods/plant, wt. of 100 seeds, and yield. All var. showed an increase in yield as the no. of irrigation treatments increased, except for var. Rabia de Gato, whose highest yield was obtained with 8 waterings. The highest yield was obtained with var. ICTA Tamazulapa. The most affected yield components were no. of pods/plant and wt. of 100 seeds. Var. P-006 produced the largest no. of seeds/pod. (AS (extract)-CIAT)

0931

26035 WALLACE, D.H.; GARRETT, P.; SANDSTED, R.F.; WIEN, H.C.; MASAYA, P.N.; ARREIGO, S. 1982. Agronomic, sociological and genetic aspects of bean yield and adaptation. In Bean/Cowpea Collaborative Research Support Program. U.S.A. 1982 Annual Report. East Lansing, Michigan State

University. pp.48-52. Engl.

Phaseolus vulgaris; Adaptation; Photoperiod; Temperature; Germplasm; Plant habit; Flowering; Cultivars; Agricultural projects; Guatemala.

The objectives, achievements, and plans for 1983 of the project on agronomic, sociological, and genetic aspects of bean yield and adaptation in Guatemala are presented. Emphasis was placed on expt. to study the genetic aspects of bean yield and adaptation; daylength and temp. were the factors most studied under field and controlled conditions to evaluate bean germplasm of determinate and indeterminate growth habits, as well as various parental materials and progeny generations. Early to very late flowering of determinate beans resulted from a quantitative regulation of an apical dominance for reproductive growth by the genotype-photoperiod-temp. complex. Three general classes of var. were observed among 9 var. planted under controlled temp. but natural photoperiod: (1) photoperiod-insensitive var. (Redkloud and Harvester), (2) quantitatively sensitive var. (Redkote, Linea 17, Accession 274, and Great Northern Nebraska no. 1 sel. 27), and qualitatively sensitive indeterminate var. (PI 202831, 291002, and 291006). Photoperiod-insensitive lines were present in all plant types of the 304 lines included in the 1982 CIAT preliminary trials, but only 2 occurred in climbing beans. Flowering was delayed 57-70 days in a location with a mean temp. of 14 degrees Celsius, while the min. days to flowering was 27-33 days. The optimum temp. for flowering was 23 degrees Celsius. (CIAT)

0932

26555 WEAVER, M.L.; TIMM, H.; NG, H.; BURKE, D.W.; SILBERNAGEL, M.J.; FOSTER, K. 1985. Pod retention and seed yield of beans in response to chemical foliar applications. HortScience 20(3):429-431. Engl., Sum. Engl., 16 Refs. (Western Regional Research Center, United States Dept. of Agriculture, Agricultural Research Service, Berkeley, CA 94710, USA)

Phaseolus vulgaris; Pollen; Leaves; Minerals and nutrients; Ca; B; Yields; Plant habit; Yield components; USA.

Chemicals often associated with pollen germination and pollen tube growth in vitro were applied under field conditions in Davis (California, USA) to foliage of determinate, semideterminate, and indeterminate beans to evaluate pod and seed yield response. Sprays of calcium nitrate, boric acid, ethylenediaminotetraacetic acid, detergent Micro, and different sugars altered pod retention and seed yield, but response varied with bean source. (AS)

0933

26593 WICKLIFF, C.; VOLK, V.V.; TINGEY, D.T.; GRIFFIS, W.L.; TRUNK, M.Y.; WITHEROW, J.L. 1984. Response of tall fescue, bush bean, and maize to chrome tannery sludge in soils. Environmental Pollution 33(4):353-377. Engl., Sum. Engl., 34 Refs. (Toxics & Pesticides Branch, Corvallis Environmental Research Laboratory, Office of Research & Development, United States Environmental Protection Agency, Corvallis, OR 97333, USA)

Phaseolus vulgaris; Fertilizers; Minerals and nutrients; N; Cr; Ca; Mineral content; USA.

In glasshouse expt., DM yields of tall fescue, Phaseolus vulgaris, and maize in all but the 1st harvest were greater with the addition of tannery sludge containing 1.6 percent Cr than with commercial N fertilizer in trials on soils containing 38 and 7 percent organic C and with N contents of 1.3 and 0.2 percent, resp. Levels of contaminating trace elements in the plant tops were within safe limits. (Horticultural Abstracts)

0934

26599 ZERBI, G.; CHIARANDA, F.Q. 1984. L'importanza della gestione irrigua per il fagiolo in ambiente meridionale. (The importance of irrigation management for beans in a meridional environment). Informatore Agrario 40(48):45-47. Ital., 7 Refs., Illus.

Phaseolus vulgaris; Irrigation; Water requirements; Italy.

From a review of work in southern Italy on the water requirements of beans, the need for water throughout the growth of the crop, especially during leaf development, is stressed. Measurements of the vol. required can be made from evaporation tanks or from established empirical equations based on temp. data. Irrigation needs based on these data, soil type, etc., can be up to 200-300 cubic meters/ha every 4-6 days. The use of tensiometers placed at depths of 25-30 cm is also recommended. (Field Crop Abstracts)

0935

26566 ZINDLER-FRANK, E.; HORNER, H.T. 1985. Influence of humidity and atmospheres without O2 or CO2 on formation of calcium oxalate crystals in three legume taxa. Journal of Plant Physiology 120(4):301-311. Engl., Sum. Engl., 38 Refs., Illus. (Fakultat fur Biologie, Universitat Konstanz, D-7750 Konstanz, Federal Republic of Germany)

Phaseolus vulgaris; Relative humidity; Transpiration; Photosynthesis; Plant respiration; German Federal Republic.

High RH greatly reduces transpiration and causes a pronounced decrease in crystal formation in Phaseolus vulgaris, but not in Canavalia ensiformis and Rhynchosia caribaea. Variation in Ca concn. of the nutrient solution does not alter these results. An atmosphere without O has no significant influence on crystal development, nor has an atmosphere without CO2. These results suggest that oxalate biosynthesis in C3 legumes may not be directly associated with photorespiration and photosynthesis. Likewise, there appears to be no simple relationship between transpiration rate and calcium oxalate crystal production. Further work is warranted in order to expand upon these findings. (AS) See also 0862 0879 0890 0941 0943 0944 0954 0962 0970 0976 0977 0979 0991 0995 1007 1073 1083 1097 1098 1119 1135 1143 1155 1158 1181 1182 1183 1187

D02 CULTIVATION PRACTICES: PLANTING, WEED CONTROL AND HARVESTING

0936

25973 ADAMS, M.W. 1980. Yield sampling from the Roy Greenia test. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. p.65. Engl.

Phaseolus vulgaris; Cultivars; Ozone; Spacing; Branching; Plant damage; USA.

The bean strains Tuscola, Fleetwood, 790053, 61618 (Chilean seed), 61618 (Michigan seed), 61380, and 61356 were evaluated for O3 damage and row spacing at the Roy Greenia farm east of Richmond (Michigan, USA). Tuscola was severely affected by O3 damage. The wide row spacing appeared more favorable to Fleetwood, which branched abundantly. (CIAT)

0937

26032 BARRIOS, A.; ORTEGA, S.; BRITO, J.G. DE; RODRIGUEZ, E.; WAGNER, M.; RONDON, A.; DEBROT, E.; GUEVARA, Y.; ARNAL, E. 1984. El cultivo de la caraota negra en la Depresión del Lago de Valencia y el Valle del Río Tucutunemo. (Black bean cultivation in the lowlands of Lake Valencia and Tucutunemo river valley). Carta Agraria 6(3):1-12. Span., Illus.

Phaseolus vulgaris; Agronomic characters; Planting; Timing; Land preparation; Fertilizers; Irrigation; Weeding; Diseases and pathogens; Pests; Pest control; Harvesting; Venezuela.

Aspects of black bean production in the lowlands of Lake Valencia and Tucutunemo river valley (Venezuela) are presented. The region is briefly described, together with the characteristics (plant type and agronomy) of the recommended black bean var. Tacarigua. Other aspects described are planting date and method, soil preparation, fertilization, weed control, irrigation, diseases, insect pests, and harvesting. Tables with the main weeds and recommended herbicides and rates, the most important diseases and their chemical and/or cultural control, and the main pests and their control are included. (CIAT)

0938

25054 BASCUR B., G. 1985. Problemas generales de la producción de frejol en Chile. (General problems of bean production in Chile). In Curso Internacional de Investigación sobre Producción de Frejol (Phaseolus vulgaris), Santiago, Chile, 1985. Trabajos presentados. Santiago, Instituto de Investigaciones Agropecuarias. Estación Experimental La Platina. 20p. Span., Illus. (Estación Experimental La Platina, Inst. de Investigaciones Agropecuarias, Casilla 5447, Santiago, Chile)

Phaseolus vulgaris; Planting; Timing; Spacing; Land preparation; Harvesting; Threshing; Chile.

Two agronomic problems that limit bean production in Chile are discussed: (1) difficulties in crop establishment related to planting date, depth, and density, var., and soil preparation; (2) problems at harvesting related to uprooting of plants, threshing, and seed quality. Solutions are proposed. (CIAT)

0939

26252 BURNSIDE, K.R. 1984. Today's herbicide: Sonalan. Weeds Today 15(3):1. Engl., Illus. (Regional Research Manager, Northwest Research Region, Lilly Research Laboratories, Indianapolis, Indiana, USA)

Phaseolus vulgaris; Herbicides; USA.

Chemical and physical properties, toxicology, mode of action, and spectrum of

activity of ethalfluralin are discussed in relation to its use in beans, soybeans, and cucurbits. (Weed Abstracts)

0940

26053 CURSO INTERNACIONAL DE INVESTIGACION SOBRE PRODUCCION DE FREJOL (PHASEOLUS VULGARIS), SANTIAGO, CHILE, 1985. Trabajos presentados. (Proceedings). Santiago, Instituto de Investigaciones Agropecuarias. Estación Experimental La Platina. 280p. Span., 105 Refs., Illus.

Phaseolus vulgaris; Production; Cultivation; Weeding; Planting; Spacing; Intercropping; Zea mays; Plant breeding; Injurious insects; Insect control; Deterioration; Seed; Chile.

The papers presented at the international course on bean production research held in Santiago, Chile, in early 1985 are compiled. Topics dealt with cover bean production problems in Chile, weed and insect pest control, planting and population densities, irrigation, fertilization, breeding, and maize/bean associations. The bean breeding program at the Instituto de Investigaciones Agropecuarias is also presented. Individual papers are recorded in this publication under the following consecutive no.: 0854, 0938, 0950, 0993, 1087, 1117, 1154, and 1213. (CIAT)

0941

26989 ERICKSON, A.E.; BORON, K.; LOGSDON, S. 1980. Physical stress on beans. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. pp.136-138. Engl.

Phaseolus vulgaris; Land preparation; Soil compaction; Planting; Rooting; Growth; Yields; USA.

Studies were made to (1) compare the equidistant punch planting on a larger scale with conventional row planting; (2) study water stress of beans and compare it with that of other crops; and (3) study in detail the physical properties of Charity clay soil and the rooting of beans. The following treatments were established: (a) deep tillage (row planted by planter); (b) deep tillage (equidistant punch planted by hand); (c) fall plowed, and (d) compaction. Conditions for the water stress studies never developed. The emergence on all plots was similar due to the favorable, moist conditions. Plant growth was different as measured by fresh wt. and leaf area. Plants on deep-tilled plots grew larger with more leaf area. The yield on the compact treatment was half that of the conventional treatment, which in turn was slightly less than that of the deep tillage treatment. (CIAT)

0942

22562 HELFGOTT L., S. 1984. Control de malezas en fríjol. (Weed control in beans). In Curso Intensivo Postgrado de Investigación para la Producción de Fríjol en el Perú, 2o., Chincha, Perú, 1984. Trabajos presentados. Lima, Instituto Nacional de Investigación y Promoción Agropecuaria. Programa Nacional de Leguminosas de Grano. Guía Didáctica no.6. pp.93-104. Span., Illus. (Univ. Nacional Agraria La Molina, Apartado 456, Lima, Perú)

Phaseolus vulgaris; Weeds; Weeding; Herbicides; Peru.

The competition, characteristics, and classification of weeds in general are described. Regarding weed control in beans, information is presented on herbicide classification and names are given of some recommended for this crop. Precautions that should be taken when handling herbicides are indicated. (CIAT)

0943

26064 HILLS, W.A.; DARBY, J.F.; THAMES JUNIOR, W.H.; FORSEE JUNIOR, W.T. 1953. Bush snap bean production on the sandy soils of Florida. Gainesville, University of Florida. Agricultural Experiment Stations. Bulletin no.530. 23p. Engl., 8 Refs.

Phaseolus vulgaris; Snap beans; Cultivation; Cultivars; Diseases and pathogens; Pests; Pest control; USA.

Various aspects of bush snap bean production on the sandy soils of Florida (USA) are reviewed, namely soil and climatic requirements and cultural practices (liming, fertilization, nutritional sprays and dusts, soil preparation, planting, cultivation, harvesting, and packing). Var. Tendergreen, Wade's Bush, Stringless Black Valentine, Contender, Plentiful, Bountiful, Cherokee Wax, Logan, Topcrop, and Rival are briefly described. The main diseases (Colletotrichum lindemuthianum, Uromyces phaseoli, Erysiphe polygoni, Sclerotinia sclerotiorum, Pellicularia filamentosa, Pseudomonas phaseolicola, Xanthomonas phaseoli, and BCMV) and insect pests (cutworms, armyworms, Urbanus proteus, Empoasca fabae, Tetranychus spp., Liriomyza pusilla, thrips, Nezara viridula, Halticus bracteatus, and Elasmopalpus lignosellus) are mentioned as well as their control measures. (CIAT)

0944

26569 KLINE, W.L. 1984. Influence of reduced tillage systems on dry beans (Phaseolus vulgaris L.) grown in different crop residues. Ph.D. Thesis. Ithaca, N.Y., Cornell University. 246p. Engl., Sum. Engl., 176 Refs., Illus.

Phaseolus vulgaris; Land preparation; Cultivars; Fertilizers; USA.

A 3-yr study was conducted on the effect of growing 3 bean cv. (Midnight, Redkloud, and Redkote) in 3 tillage systems--conventional (moldboard plow), min. (chisel plow), and no-till--in 3 crop residues (alfalfa, maize, and small grains). Expt. were conducted for yield components, plant morphology, soil moisture and temp., foliar fertilization, and weed control. In maize residue, yields and morphology did not differ among tillage systems. In alfalfa residue, plots in conventional tillage yielded the highest and no-till plots the lowest. In 2 out of 3 yr, in small grain residue, plants in conventional and min. tillage did not differ in yield, but both yielded higher than no-till. Morphologically, plants in alfalfa and small grain residue had few differences between them. However, plants in no-till were generally smaller with fewer pods or seeds than in the other 2 tillage systems. Conventional and min. tillage plots during 1982 had more available moisture than no-till plots and the opposite was observed in 1983. Soil temp. differences were observed each year, but were not consistent. No-till soils were more difficult to penetrate especially in the top 7 cm of the soil profile than conventional or min. tillage soils. Tillage systems did not differ in resistance to uprooting and few differences were observed in root wt. Foliar applications of fertilizer only increased yield in maize residue in 1981. There were no differences among tillage systems in 1982. Among the herbicides in alfalfa residue, alachlor + linuron and metolachlor + dinoseb resulted in the highest yields in 1981 and 1982. (AS (extract))

0945

26936 KOINANGE, F.M.K.; MMBAGA, M.E.T.; MBUYA, O.S. 1985. Effect of number of bean seed per hill on grain yield. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.13-15. Engl., Sum. Engl., 1 Ref. (Tanzania Agricultural Research Organization, Lyamungu Research Inst., P.O. Box 3004, Moshi, Tanzania)

Phaseolus vulgaris; Planting; Spacing; Yields; Tanzania.

Four different no. of bean seeds/hill, planted at different spacings, were evaluated using a randomized complete block design with 4 replications. Yield trend observed for 3 consecutive years showed that planting 1, 2, 3, and 4 seeds/hill spaced at 50 x 10, 50 x 20, 50 x 30, and 50 x 40 cm, resp., does not affect grain yield significantly (P less than 0.05). However, 2 and 3 seeds/hill had higher 100-seed wt. and grain yield. Four seeds/hill had lower grain yield and poor seed quality. Farmers could therefore be advised to plant 2 or 3 seeds/hill, spaced 50 x 20 or 50 x 30 cm, resp., in order to save later and time used during planting and weeding. (AS)

0946

26274 LABRADA, R.; PAREDES, E.; MORALES, R. 1985. Herbicidas de presiembra para la lucha contra Cyperus rotundus en Areas de frijol y soya. (Presowing herbicides for the control of Cyperus rotundus in bean- and soybean-producing areas). Agrotecnia de Cuba 17(1):53-60. Span., Sum. Span., Engl., 9 Refs. (Inst. de Investigaciones de Sanidad Vegetal, Ministerio de la Agricultura, Ciudad de La Habana, Cuba)

Phaseolus vulgaris; Weeding; Herbicides; Weeds; Yields; Protein content; Fat content; Cuba.

Field expt. (Alquizar, Cuba) were carried out during 1981-83 to study the effect of presowing treatments with EPTC and mixtures of trifluralin on the control of Cyperus rotundus in bean var. ICA-Pijao and soybean var. R-315 crops. The greatest effectiveness and selectivity were obtained with EPTC + trifluralin at a rate of 4.0 + 0.75 and 2.4 + 1.5 kg a.i./ha, resp. These doses allowed good control of C. rotundus and of other annual weed species, as well as yields superior or equal to that of the hand-weeded control. Neither mixture affected the fat and protein contents of soybean grains nor the protein content of beans. (CIAT)

0947

26279 LUGO-MERCADO, H.M.; BADILLO-FELICIANO, J.; ORTIZ-ALVARADO, F.H. 1984. Effects of no tillage and various tillage methods on yields of maize, field beans and pepper grown on a Mollisol in southern Puerto Rico. Journal of Agriculture of the University of Puerto Rico 68(4):349-354. Engl., Sum. Engl., Span., 15 Refs. (Agronomy & Soils Dept., Agricultural Experiment Station, Mayagüez Campus, Univ. of Puerto Rico, Puerto Rico)

Phaseolus vulgaris; Land preparation; Yields; Puerto Rico.

Maize, field beans, and peppers were planted in a Mollisol at the Fortuna Research Center (Puerto Rico) in 14 x 6 m plots that were (1) not plowed, (2) plowed twice, or (3) plowed 4 times at 15 or 45 cm depths, the same day or every 7 days. There were no statistical differences in maize and field bean yields between plowed or untilled plots. A similar response pattern was observed when the same test crops were planted in the same plots without disturbing the soil (residual effect). Results indicate that maize, field beans, and even peppers can be grown without tillage under the conditions prevailing at the trial site. (AS)

0948

26281 MACHADO NETO, J.G.; ANDRADE, T.L.C. 1983. Efeitos de herbicidas de pos-emergencia na cultura do feijao (Phaseolus vulgaris L.) e no controle das plantas daninhas. (Effects of postemergence herbicides on beans and on weed control). Planta Daninha 6(2):123-128. Port., Sum. Port., Engl., 6 Refs. (Univ. Estadual de Sao Paulo, Campus de Ilha Solteira, Avenida Brasil Centro, 56, 15.378 Ilha Solteira-SP, Brasil)

Phaseolus vulgaris; Herbicides; Weeding; Yields; Brazil.

In a field infested with Digitaria ciliaris (85 percent) and Amaranthus sp. (8 percent), 70 and 140 g DPX-Y6202 (quizalofop), 276 g sethoxydim, and 960 g

bentazone/ha, applied at the flowering stage of Phaseolus vulgaris, caused only slight transient injury to the crop. Sethoxydim and quizalofop controlled D. ciliaris; control with the lower rate of the latter was enhanced by the addition of 1.5 liter Assist/ha. Bentazone proved ineffective. P. vulgaris yields were not reduced by the herbicides but were cut by 29 percent in the unweeded control. (Weed Abstracts)

0949

26937 MASASHUA, P.S.M.; TAMIMO, A.J.P. 1985. Optimum planting date for beans under Morogoro conditions. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.16-20. Engl., Sum. Engl., 6 Refs. (Dept. of Crop Science, Faculty of Agriculture, Sokoine Univ. of Agriculture, P.O. Box 3005, Morogoro, Tanzania)

Phaseolus vulgaris; Cultivars; Planting; Timing; Yields; Yield components; Tanzania.

Two bean var., Kabanima and Selian Wonder, were planted 5 times during the 1985-86 cropping season in a randomized complete block design at Sokoine U. of Agriculture (Morogoro, Tanzania). Data were recorded of grain yield and yield components (pods/plant, seeds/pod, and 100-seed wt.). Due to the unreliability of rainfall during the season, the results were not systematic with the dates of planting (from March to April, 1985). However, the yield potential differences inherent in the 2 var. studied was significant. Var. Selian Wonder yielded highest at all plantings compared with var. Kabanima. Highest yields in both var. were observed from the plots planted about 3 wk. after the peak rainfall period. (AS)

0950

26055 RAMIREZ DE VALLEJO, A. 1985. Manejo y control malezas en frejol. (Weed management and control in beans). In Curso Internacional de Investigación sobre Producción de Frejol (Phaseolus vulgaris), Santiago, Chile, 1985. Trabajos presentados. Santiago, Instituto de Investigaciones Agropecuarias. Estación Experimental La Platina. 19p. Span., 11 Refs. (Estación Experimental La Platina, Inst. de Investigaciones Agropecuarias, Casilla 5447, Santiago, Chile)

Phaseolus vulgaris; Weeding; Weeds; Herbicides; Chile.

A brief literature review of weed management and control in beans is presented. The effect of weed competition on bean production is discussed as well as the factors for which weeds compete (water, soil nutrients, and light) and critical competition periods. The relationship between weed control and other cultural practices is also analyzed. Major weeds found in bean crops both worldwide and in Chile are listed. Cultural, mechanical, and chemical control methods are briefly reviewed. (CIAT)

0951

26942 SAXENA, N.C.; VICTOR, E.N.; KYAMMO, P.H.M. 1985. Design considerations for a human powered bean thresher. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.41-44. Engl., Sum. Engl., 3 Refs. (Dept. of Agricultural Engineering & Land Planning, Sokoine Univ. of Agriculture, P.O. Box 3003, Morogoro, Tanzania)

Phaseolus vulgaris; Threshing; Agricultural equipment; Tanzania.

Several associated factors to be considered in the design of an appropriate bean thresher for small farmers are listed. Each factor is discussed with particular reference to the local manufacture of the machine. The role of

rural women in the design and use is detailed. (AS)

0952

26513 SOTO, J.; AGUILERA, M. 1983. Distancia de siembra entre surco en frejol (Phaseolus vulgaris L.). (Planting distance between furrows of beans). Revista Boliviana de Investigación 1:110-111. Span., Sum. Span., Engl., 7 Refs. (Inst. de Investigaciones Agrícolas El Vallecito, Univ. Gabriel René Moreno, Casilla 702, Santa Cruz de la Sierra, Bolivia)

Phaseolus vulgaris; Planting; Spacing; Yields; Bolivia.

In a field trial in 1980-81 in Charagua (Bolivia), Phaseolus vulgaris cv. BAT 76 was sown in furrows 20-70 cm apart. Av. seed yields ranged from 0.97 t/ha at 50 cm to 1.48 t/ha at 60 cm. There was no significant difference between yields at the other spacings. (Field Crop Abstracts)

0953

26512 SOTO, J.; AGUILERA, M. 1983. Herbicidas en frejol (Phaseolus vulgaris L.). (Herbicides in beans). Revista Boliviana de Investigación 1:112-114. Span., Sum. Engl., Span., 7 Refs. (Inst. de Investigaciones Agrícolas El Vallecito, Univ. Gabriel René Moreno, Casilla 702, Santa Cruz de la Sierra, Bolivia)

Phaseolus vulgaris; Weeding; Herbicides; Yields; Bolivia.

In a field trial in 1980-81 in El Vallecito (Bolivia), the effects of 7 herbicides on Phaseolus vulgaris were evaluated. Weedy and weed-free treatments yielded 1.01 and 1.14 t seeds/ha, resp. With the preemergence application of 2.01, 1.20, and 3.00 liters/ha of metolachlor, acifluorfen, and alachlor, resp., the highest seed yields were obtained (1.39, 1.35, and 1.31 t/ha, resp.). (CIAT)

0954

22564 VOYSEST, O. 1984. Factores agronómicos en el manejo de ensayos de rendimiento en fríjol. (Agronomic factors in the management on bean yield trials). In Curso Intensivo Postgrado de Investigación para la Producción de Fríjol en el Perú, 2o., Chincha, Perú, 1984. Trabajos presentados. Lima, Instituto Nacional de Investigación y Promoción Agropecuaria. Programa Nacional de Leguminosas de Grano. Guía Didáctica no.6. pp.127-151. Span., 23 Refs. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Yields; Field experiments; Agronomic characters; Fertilizers; Planting; Irrigation; Harvest; Colombia.

Each of the agronomic factors that should be considered in the performance of preliminary yield trials in beans are described. These are selection of exptl. site taking into account the lot's history and soil characteristics, mechanized land preparation and materials required for the expt., organic and chemical fertilization, selection of var., planting (systems and densities), irrigation, and cultural practices during the exptl. period (weeding, phytosanitary conditions, observation of symptoms of deficiency of some nutrients and toxicity caused by others). (CIAT) See also 0873 0957 0958 0959 0966 0970 0972 0977 0978 0979 0980 0986 0988 0989 0990 0992 0994 0995 0997 1007 1098 1119 1148 1183

0955

26076 ACOSTA D., E. 1985. Crecimiento, rendimiento y aprovechamiento de la energía solar en maíz (Zea mays L.) y fríjol (Phaseolus vulgaris L.) en unicultivo y asociados. (Growth, yield, and utilization of solar energy in maize and beans in monoculture and in association). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 178p. Span., Sum. Span., 73 Refs., Illus.

Phaseolus vulgaris; Intercropping; Zea mays; Growth; Yields; Yield components; Photosynthesis; Mexico.

Maize var. H-28 and bean var. Negro 150 were planted in monoculture and in association under irrigation, near Chapingo, Mexico, to evaluate growth, yield and some of its components, energy content, and conversion efficiency of photosynthetically active radiation. Growth curves of the vegetative organs of monocropped and associated beans had very similar trends. DM accumulates rapidly in the stem and leaf lamina between days 45-105. In monocropped beans the growth curve is almost linear up to physiological maturity, while in association it is almost linear up to 125 days (postflowering phase). The association significatively affected the no. of pods and normal seeds/bean plant, reflected in a 34 percent reduction in agronomic yield. Overall, the energy values/g DM were greater in the organs of monocropped maize and beans. In an area of 1 square meter, the conversion efficiency of the cumulative photosynthetically-active and the dynamic radiation was always greater in monocropped maize and beans. (AS (extract)-CIAT)

0956

26018 ARIAS M., F.R.; ESTRADA A., P. DE J.; MARTINEZ O., R. 1980. Sistemas de producción de cultivos predominantes en El Salvador. (Production systems of predominant crops in El Salvador). In Moreno, R.A., ed. Reunión de consulta sobre localización de sistemas de producción de cultivos en Centroamérica, Turrialba, Costa Rica, 1979. Trabajos presentados. Turrialba, Centro Agronómico Tropical de Investigación y Enseñanza. Programa de Cultivos Anuales. Informe Técnico no.1. pp.89-168. Span., 12 Refs., Illus.

Phaseolus vulgaris; Intercropping; Zea mays; Sorghum; Maps; Production; Costs; Income; El Salvador.

The localization, delimitation, and characteristics of predominant crop production systems commonly found in El Salvador are briefly described; among these are the maize-beans and henequen-maize-beans-sorghum production systems. Maps and data on production and costs for El Salvador are provided. (CIAT)

0957

25880 BEGAZO, J.C.E.O. 1984. Consideracoes sobre o feijao como cultura consorciada do cafezal e mandioeal. (Observations on beans associated with coffee and cassava). Informe Agropecuario 10(118):50-52. Port., Sum. Port., 13 Refs., Illus. (Univ. Federal de Vicosa, 36.570 Vicosa-MG, Brasil)

Phaseolus vulgaris; Intercropping; Manihot esculenta; Coffee arabiga; Spacing; Brazil.

Beans are one of the best crops for growing in a young coffee plantation, using 4-5 bean rows in the 1st yr, 3-4 in the 2nd yr, and 3 in the 3rd yr. When beans were grown with cassava, the highest cassava yield was obtained when 1 row only of beans was grown between cassava rows. Cassava and beans can be sown at the same time (beginning of the wet period) or beans can be

sown in the dry period (Feb.-March). (Horticultural Abstracts)

0958

23175 CAETANO, L.F.; SILVEIRA, A.J. DA; VIEIRA, C.; CARDOSO, A.A. 1982. Produtividade da mandioca e do feijoeiro-comum cultivados em consórcio. (Productivity of cassava and common beans in association). In Reuniao Nacional de Pesquisa de Feijao, 1a., Goiania, Brasil, 1982. Goiania-GO, Centro Nacional de Pesquisa-Arroz, Feijao. pp.109-111. Port. (Depto. de Fitotecnia, Univ. Federal de Vicosa, 36.570 Vicosa-MG, Brasil)

Phaseolus vulgaris; Cultivars; Intercropping; Manihot esculenta; Spacing; Planting; Yields; Brazil.

Two cassava var. (Branca de Santa Catarina and Iracema) and 2 bean cv. (Negrito 897 and Preto Sessenta Dias 53) were evaluated for productivity in Coimbra (Minas Gerais, Brazil) when 1, 2, or 3 bean rows were planted between the cassava rows. Bean productivity increased as the bean population increased; Negrito 897 yielded 1457, 1896, and 2139 kg/ha with Branca de Santa Catarina and 1903, 1927, and 2453 kg/ha with Iracema at the resp. plant densities, while Preto Sessenta Dias 53 yielded 1027, 1158, and 1443 kg/ha and 879, 1198, and 1228 kg/ha with the resp. cassava var. at the resp. bean plant populations. The land equivalence index was highest for cassava associated with Preto Sessenta Dias 53, early maturing: 1.80, 1.96, and 1.96 with 1, 2, and 3 bean rows, resp. However, the selection of either bean var. will depend on the current prices of both cassava and beans. (CIAT)

0959

26244 CANDAL NETO, J.F.; DESSAUNE FILHO, N.; CUNHA, G.F. DA 1985. Combinacoes de populacoes de plantas de feijoeiro de diferentes hábitos de crescimentos nas águas e na seca em consórcio com o milho, no Espírito Santo. (Combination of plant populations of beans of different growth habits in association with maize during the dry and rainy seasons in Espírito Santo). Cariacica-ES, Brasil, Empresa Capixaba de Pesquisa Agropecuária. Pesquisa em Andamento no.31. 7p. Port. (Empresa Capixaba de Pesquisa Agropecuária, Caixa Postal 125, 29.154 Campo Grande, Cariacica-ES, Brasil)

Phaseolus vulgaris; Cultivars; Plant habit; Spacing; Intercropping; Zea mays; Rainfall; Yields; Brazil.

Bean var. Rio Tibagi (type II) and Costa Rica 1031 (type III) were intercropped with maize in Espírito Santo (Brazil) to evaluate the effects on bean yields. Beans were planted at 0, 80,000, and 160,000 plants/ha during the rainy season and at 120,000, 180,000, and 240,000 plants/ha during the dry season. The highest yields for both var. were obtained at the highest plant densities during both seasons. The land equivalence index was higher at the highest bean populations in the rainy season, with no difference between var., but the land equivalence index was higher for Rio Tibagi in the dry season. (CIAT)

0960

26923 CANDAL NETO, J.F.; CUNHA, G.F. DA 1985. Comportamento de cultivares e linhagens de feijao em consórcio com o milho no Espírito Santo. (Performance of bean cultivars and lines in association with maize in Espírito Santo). Cariacica-ES, Brasil, Empresa Capixaba de Pesquisa Agropecuária. Pesquisa em Andamento no.27. 5p. Port. (Empresa Capixaba de Pesquisa Agropecuária, Caixa Postal 125, 29.154 Campo Grande, Cariacica-ES, Brasil)

Phaseolus vulgaris; Cultivars; Yields; Intercropping; Zea mays; Adaptation; Brazil.

Fifty bean cv. and lines were evaluated for yield and disease reactions

during both the rainy and dry seasons in association with maize (var. AG 162) in Espírito Santo (Brazil). During the rainy season, germplasm yielding over 340 kg/ha was selected; 8 materials produced over 400 kg/ha--Capixaba Precoce (490 kg/ha, the max.), A 338, A 286, Ricopardo 896, A 210, SPJ 3, SPJ 6, and A 226. During the dry season, the max. yield was obtained with Preto de Cacho (1480 kg/ha); 15 materials were selected for yielding over 1000 kg/ha, among which Capixaba Precoce was again outstanding (1320 kg/ha). Colletotrichum lindemuthianum and Isariopsis griseola were observed during both seasons, and most materials were affected by both. (CIAT)

0961

26247 CASTRO G., S.O.; ARAYA V., R. 1984. Evaluación de cultivares de fríjol arbustivo (Phaseolus vulgaris) en asociación con caña de azúcar (Saccharum spp). (Evaluation of bush bean cultivars in association with sugarcane). Alajuela, Universidad de Costa Rica. Estación Experimental Agrícola Fabio Baudrit M. Boletín Técnico 17(1):13-17. Span., Sum. Span., Engl., 8 Refs.

Phaseolus vulgaris; Intercropping; Saccharum; Yields; Cultivars; Costa Rica.

Twenty-five bush bean cv. (14 red and 11 black) were tested in association with sugarcane cv. B-10-377 in Grecia, Costa Rica. The trial was conducted during the dry season with surface irrigation. The bean cv. were planted 15 days after the sugarcane harvest, using a triple balanced lattice design. There were no significant differences between the yields of the cv. (373-762 kg/ha). (AS)

0962

26965 CHRISTENSON, D.R.; BRICKER, C.; REISEN, J. 1980. Soil fertility and management for the production of sugar beets, navy beans, corn, and soybeans. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. pp.5-15. Engl.

Phaseolus vulgaris; Rotational crops; Yields; Manures; Zea mays; USA.

The effect of length of rotation, cropping system, and cropping sequence on production, yield, and quality of navy beans and sugar beets was studied at Saginaw Valley Research Farm (Michigan, USA). The effect of return of OM on yield as related to selected soil properties was also assessed. More intensive rotations (beans and beets) yielded less than less intensive rotations (maize-beans-beets). However, the interaction between cropping system and length of rotation was not significant. Yields tended to be higher in the 4-yr rotation than in the 2- and 3-yr rotations. Fusarium root rot had the lowest rating in the beets-beans rotation and the highest in the maize-beans rotation. Even though some nutrients were significantly affected by crop sequence, none, except Zn, were deficient. (CIAT)

0963

26254 CLARK, E.A.; FRANCIS, C.A. 1985. Bean-maize intercrops: a comparison of bush and climbing bean growth habits. Field Crops Research 10(2):151-166. Engl., Sum. Engl., 27 Refs., Illus. (Dept. of Crop Science, Univ. of Guelph, Ontario N1G 2W1, Canada)

Phaseolus vulgaris; Intercropping; Zea mays; Plant habit; Cultivars; Growth; Yields; Yield components; Dwarf beans; Climbing beans; Canada.

Indeterminate bush bean cv. P566 and climbing bean cv. P364 were grown both in monoculture and intercropped with maize to explain the differential yield reduction of these cv. when intercropped with maize. The 660 kg/ha yield advantage of the climbing bean over bush bean (3.02 vs. 2.36 t/ha) was a direct result of pod filling after 75 days, which was supported in part by leaf area produced after 47 days. The large climbing bean yield loss when

intercropped with maize (reduction of 1.44 t/ha in the bush bean vs. 1.96 t/ha in climbing bean) was attributed to greater overlap with the increasingly dominant maize. In climbing bean, maize caused 2-wk. reductions in both the leaf area establishment and pod filling phases. Differences in the timing and magnitude of growth responses in the indeterminate bush and climbing beans are discussed in relation to selecting beans for intercropping with maize. (AS (extract))

0964

26255 CLARK, E.A.; FRANCIS, C.A. 1985. Transgressive yielding in bean: maize intercrops; interference in time and space. Field Crops Research 11(1):37-53. Engl., Sum. Engl., 32 Refs. (Dept. of Crop Science, Univ. of Guelph, Ontario N1G 2W1, Canada)

Phaseolus vulgaris; Zea mays; Intercropping; Cultivars; Growth; Canada.

Patterns of DM and N accumulation and leaf area establishment were compared in monocrops and intercrops of Phaseolus vulgaris with maize. Growth cycles for these species were offset in time, with P. vulgaris growth significantly exceeding maize growth during the 1st 26 days. Maize DM significantly exceeded that of P. vulgaris after 47 days but N content did not differ consistently after 33 days. The staggering of growth cycles in the intercrops resulted in significantly more DM and N/square meter, and higher LAI than either component monocrop during all or part of the 1st 82 days, yet av. intercrop yields of CP, energy, and photosynthate equivalent did not exceed those of the higher yielding monocrop. Monocrop and intercrop yields are discussed in relation to the temporal and spatial overlap in resource demands by the 2 species. Potential predictors of ecological combining ability in simultaneously sown P. vulgaris/maize intercrops are considered. (AS)

0965

26927 FLESCH, R.D.; ESPINDOLA, E.A. 1986. Epocas de semeadura de milho em lavoura de feijao nas regioes norte e Planalto Catarinense. (Planting dates of maize in bean crops in the northern and Planalto regions of Santa Catarina). Florianópolis-SC, Brasil, Empresa Catarinense de Pesquisa Agropecuária. Pesquisa em Andamento no.60. 3p. Port. (Empresa Catarinense de Pesquisa Agropecuária, Estacao Exptl. de Chapecó, Caixa Postal 151, Chapecó-SC, Brasil)

Phaseolus vulgaris; Intercropping; Zea mays; Planting; Timing; Yields; Brazil.

A trial was conducted in 1983-84 and 1984-85 in Campos Novos (Santa Catarina, Brazil) to evaluate 5 relative planting dates of maize cv. Cargill 111-S in established crops of bean cv. EMPASC 201 (simultaneous planting and 20, 40, 60, and 80 days after bean emergence) and determine the best planting date at which maize produced more without affecting bean yields. The preliminary results indicated that maize planted 20 days after bean emergence produced the highest yield (2899 kg/ha) without affecting bean yields (1572 vs. 1444 kg/ha in monoculture) and is the best option in terms of additional income. The next best option was the planting of maize 40 days after bean emergence (1856 and 1578 kg maize and beans/ha, resp.). Simultaneous planting seriously affected bean yields (829 kg/ha). (CIAT)

0966

26926 FLESCH, R.D.; ESPINDOLA, E.A.; ALVES, A.C. 1985. Combinacao de épocas de semeadura e diferentes sistemas de cultivo de feijao e milho consorciados. (Combination of planting dates and different planting systems of beans and maize in association). Florianópolis-SC, Brasil, Empresa Catarinense de Pesquisa Agropecuária. Pesquisa em Andamento no.43. 4p. Port., 2 Refs. (Empresa Catarinense de Pesquisa Agropecuária, Estacao Exptl. de Chapecó, Caixa Postal 151, Chapecó-SC, Brasil)

Phaseolus vulgaris; Intercropping; Planting; Spacing; Timing; Yields; Brazil.

During 1983-84 and 1984-85 in Chapeco (Santa Catarina, Brazil) 4 associated planting systems of bean cv. Rio Tibagi/maize cv. Pioneer 6872 and 5 relative planting dates were evaluated to determine the combination with the highest economic returns. Associated planting systems were (1) 1:1 (1 row of beans:1 row of maize), (2) 2:2, (3) 2:1, and (4) 3:2 and the planting dates were (1) maize 15 days before beans, (2) simultaneous planting, (3) maize 15 days after beans, (4) maize 30 days after beans, (5) maize 45 days after beans. Bean yields as well as the economic returns increased for all systems as the maize planting date was delayed. The highest bean yield (2261 kg/ha) was obtained with the 2:1 combination and planting date 5. Based on the current maize and bean prices, the associations were always more profitable than the resp. monocultures. Plantings in Sept. and beans before maize were the most profitable; this result is valid for beans in region I of Santa Catarina. (CIAT)

0967

26929 FLESCH, R.D.; ESPINDOLA, E.A. 1985. Cultivares de feijao para consorciacao com milho em Santa Catarina. (Bean cultivars for their association with maize in Santa Catarina). Florianópolis-SC, Brasil, Empresa Catarinense de Pesquisa Agropecuária. Comunicado Técnico no.92. 11p. Port., 17 Refs. (Empresa Catarinense de Pesquisa Agropecuária, Estacao Exptl. de Chapecó, Caixa Postal 151, Chapecó-SC, Brasil)

Phaseolus vulgaris; Cultivars; Intercropping; Zea mays; Yields; Brazil.

Trials were conducted in 1980-81, 1981-82, and 1982-83 in Chapeco (Santa Catarina, Brazil) to evaluate 11 bean cv. the 1st yr and 10 each the next 2 yr, in association with maize. The results are given for 6 bean cv. that were planted in all 3 cropping seasons: Carioca, EMPASC 201-Chapeco, Turrialba 4, Iguacu, Rio Tibagi, and Paraná 1. The planting system used was 2 maize rows intercropped with 3 bean rows, planted simultaneously (40,000 maize plants and 120,000 beans plants/ha). All 6 bean cv. showed similar yield performance (av. for all cropping seasons 821 kg/ha) and can be used in association with maize in the region. The highest yield was obtained with Carioca (av. 865 kg/ha) and the lowest with Rio Tibagi (av. 791 kg/ha). The most productive cv. in association were also the most productive in monoculture. Rio Tibagi 4 had the most stable performance and Turrialba 4 the most unstable. Bean yields were severely affected by the association, with an av. reduction of 58 percent compared with monoculture (av. 1949 kg/ha). (CIAT)

0968

26260 FONTANA NETTO, F.; VIEIRA, C.; CARDOSO, A.A. 1984. Cultura associada de feijao e milho. 8. Efeitos da altura e da populacao de plantas de milho. (Associated cropping of beans and maize. 8. Effects of maize height and planting density). Revista Ceres 31(178):489-501. Port., Sum. Port., Engl., 12 Refs. (Empresa de Assistencia Técnica e Extensao Rural da Paraiba, Caixa Postal 644, 29.000 Vitoria-ES, Brasil)

Phaseolus vulgaris; Intercropping; Zea mays; Rainfall; Yields; Brazil.

In Vicosa and Coimbra (Minas Gerais, Brazil), 2 associated cropping expt. using bean var. Negrito 891 and maize var. of the normal or short type were carried out. The beans were either planted in the rainy or in the dry season. Plant densities of maize were 20,000, 30,000, 40,000, and 50,000 plants/ha. In the rainy season, beans were planted within the maize row, while in the dry season 2 rows of beans were planted between the maize rows. Maize and bean monocrops were also planted for comparison. Maize height had practically no effect on bean and maize yields. In the rainy season, the lowest maize population was the most beneficial to the bean crops. In the dry season, however, the higher plant densities of maize were the best. Associated cropping effectively increased food production/unit area. (AS)

0969

26261 FRANCO, A.A.; PESSANHA, G.G. 1984. Fixacao de nitrogenio em feijoeiro consorciado. (Nitrogen fixation in associated beans). Informe Agropecuário 10(118):74-76. Port., 13 Refs. (Empresa Brasileira de Pesquisa Agropecuaria, 23.460 Seropédica-RJ, Brasil)

Phaseolus vulgaris; Nitrogen fixation; Intercropping; Zea mays; Yields; Brazil.

Trials in Brazil showed good response from beans grown alone to seed inoculation with Rhizobium, even with cv. of 80-90 days growth period. N fixation of beans grown in association with maize in the wet and the dry season is discussed. Low yields of intercropped beans, especially when the 2 crops were sown simultaneously, has various causes and cannot be solved only by seed inoculation. (Field Crop Abstracts)

0970

26262 FREIRE, F.M.; VIEIRA, C.; CHAGAS, J.M.; SILVA, C.C. DA; ARAUJO, G.A. DE A. 1985. Cultura associada de feijao e milho. 7. Comparacao de práticas de adubacao mineral. (Associated cropping of beans and maize. 7. Comparison of mineral fertilization practices). Port., Sum. Port., Engl , 11 Refs. (Empresa de Pesquisa Agropecuária de Minas Gerais, Caixa Postal 216, 36.570 Vicosa-MG, Brasil)

Phaseolus vulgaris; Intercropping; Zea mays; Fertilizers; N; P; K; Rainfall; Brazil.

In Coimbra and Ponte Nova (Minas Gerais, Brazil) mineral fertilization practices were compared in the associated cropping of maize, rainy season beans, and dry season beans. Treatments consisted of no fertilization or the fertilization of 1, 2, and 3 crops. Maize was planted in rows 1.0 m apart, with a planting density equivalent to 30,000 plants/ha. Rainy season beans were planted within the maize rows or in 1 line between the maize rows. Dry season beans were planted in rows 0.5 m apart, i.e., 2 rows between the maize rows. The planting density for rainy season beans and dry season beans was 10-15 seeds/m. Fertilization was 30-80-30 kg NPK/ha + 40 kg N/ha as side dressing. A crop can take advantage of the fertilizer applied to another crop, but the direct fertilization of each crop was more effective. The planting of rainy season beans within the maize rows was more advantageous since it permitted fertilizer economy. Dry season beans responded to fertilization better than rainy season beans. (AS)

0971

26597 HERNANDEZ R., J.C.; VERA G., J.; SCHOONHOVEN, A. VAN; CARDONA M., C. 1984. Efecto de la asociación maíz-fríjol sobre poblaciones de insectos plagas, con énfasis en Empoasca kraemeri Ross & Moore. (Effect of bean-maize intercropping on insect pest populations, with emphasis on Empoasca kraemeri). Agrociencia no.57:25-35. Span., Sum. Span., Engl., 12 Refs.

Phaseolus vulgaris; Intercropping; Zea mays; Planting; Timing; Cultivars; Empoasca kraemeri; Plant injuries; Diabrotica; Cerotoma; Scaphytopius fuliginosus; Predators and parasites; Yields; Colombia.

The effect of maize/bean intercropping on Empoasca kraemeri population and damage, populations of other phytophagous insects, the parasitic action of Anagrus sp. on E. kraemeri, ambient temp. and RH, light intensity, and bean leaf temp. was observed. Two planting dates and 3 maize densities in 2 bean var. were used. E. kraemeri population and damage decreased with increasing maize densities. Adult populations were larger when beans were planted simultaneously with maize. Large E. kraemeri adult populations were found in bean var. EMP-81 (tolerant) and large nymph populations in BAT-41

(susceptible); the damage was greater in the latter. Diabrotica spp. populations were larger with increasing maize densities. This was more evident when var. EMP-81 was planted 15 days after maize. No effect was detected of the different maize densities on Cerotoma sp. and Scaphytopius fuliginosus populations. The largest captures of these 2 species were in var. EMP-81. S. fuliginosus was more abundant in beans planted 15 days after maize. The percentage of parasitism by Anagrus sp. was higher in the association, whereas the percentage of unhatched E. kraemeri eggs was lower. Light intensity and temp. in bean leaf tissues decreased as maize densities increased. Leaf tissue temp. was higher in var. BAT-41. Bean yields were lower in the association, compared with the bean monocrop, possibly due to the competition for light with the maize crop. (AS)

0972

21879 JIMENEZ, R. 1979. Rendimiento de fríjol/maíz en siembra intercalada. (Yields of beans/maize sown in association). In Annual Meeting of the Caribbean Food Crops Society, 16th., Santo Domingo, República Dominicana, 1979. Proceedings. Santo Domingo. pp.229-250. Span., Sum. Span., Fr., Engl., 4 Refs., Illus.

Phaseolus vulgaris; Zea mays; Intercropping; Yields; Planting; Spacing; Dominican Republic.

Studies carried out on beans and maize in monoculture and in association regarding the effect of population density (222,000-250,000 bean plants + 20,000-56,000 maize plants/ha) and relative planting time (from 15 days before to 40 days after planting of 1 of the crops with regard to the other) under dry conditions are detailed. A randomized block design and a split-split plot design were used, with 3 and 4 replications, resp. The changes in the relative planting time significantly affected the yield of both intercrops, while the changes in density only affected maize yields significantly. The highest yields, both physical and economic, for the bean/maize intercropping system were achieved by planting maize at 0.90-1.20 m between rows and 0.20 m between plants (55,000-41,111 plants/ha), establishing the beans in the center at 0.30 m between rows and 0.10 m between plants (222,000 plants/ha). It was determined that the best bean/maize intercropping patterns gave higher grain yields than either of the 2 monocrops. (AS)

0973

26016 KASS, D.L. 1980. Algunos sistemas de producción de cultivos anuales en Guatemala. (Some anual crop production systems in Guatemala). In Moreno, R.A., ed. Reunión de consulta sobre localización de sistemas de producción de cultivos en Centroamérica, Turrialba, Costa Rica, 1979. Trabajos presentados. Turrialba, Centro Agronómico Tropical de Investigación y Enseñanza. Programa de Cultivos Anuales. Informe Técnico no.1. pp.7-47. Span., 4 Refs., Illus.

Phaseolus vulgaris; Intercropping; Zea mays; Relay crops; Sorghum; Maps; Guatemala.

The localization, delimitation, and characteristics of the annual crop production systems commonly found in Guatemala--monocropped beans, relayed beans-sorghum, and maize/beans in association--are briefly described. Maps and planting schedules are provided. (CIAT)

0974

26935 KOINANGE, E.M.K.; MMBAGA, M.E.T.; MBUYA, O.S. 1985. Screening bean cultivars for intercropping with maize. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.8-12. Engl., Sum. Engl., 8 Refs. (Tanzania Agricultural Research Organization, Lyamungu Research Inst., P.O. Box 3004, Moshi, Tanzania)

Phaseolus vulgaris; Cultivars; Intercropping; Zea mays; Yields; Tanzania.

Twelve bean cv. were evaluated under sole cropping and in association with maize (H632) for 5 yr in Lambo (Tanzania) in an attempt to improve land use efficiency in subsistence farming. A randomized complete block design was used with 25 treatment combinations replicated 4 times. Most of the bean cv. included in the trial yielded higher under sole cropping. Maize grain yield was not significantly (P less than 0.05) reduced by intercropping with beans. Although lower bean yields were obtained with intercropping, significantly high LER were obtained with most cv. This indicates that most potential bean cv. also prove superior under intercropping conditions and farmers can still be encouraged to intercrop beans with maize. (AS)

0975

23887 KUBWALO, F.X.F. 1981. Effect of topping maize and interplanting with beans on yield and yield components. Lilongwe, Malawi, Bunda College of Agriculture. Project no.5. 13p. Engl., Sum. Engl., 23 Refs.

Phaseolus vulgaris; Zea mays; Intercropping; Defoliation; Yields; Yield components; Malawi.

The effect of topping maize and interplanting with beans on yield and yield components was investigated at Bunda College Farm (Malawi) during the 1980-81 crop season. Defoliation levels used were (1) no defoliation, (2) defoliation of tassel only, (3) defoliation of tassel + 2 top leaves, (4) defoliation of tassel + 4 top leaves. Bean yields were not significantly affected by the levels of defoliation, but they were significantly reduced when grown in association with maize. Yields were 1370, 518, 546, 468, and 437 kg/ha, resp., for the control (pure bean stand), T1, T2, T3, and T4. Bean yield components did not indicate clear responses to the defoliation levels. (AS (extract))

0976

26280 MACHADO, C.M.N.; FLECK, N.G.; SOUZA, R.S. DE 1984. Comportamento dos componentes do rendimento des culturas consorciadas. (Performance of yield components in associated crops). Pesquisa Agropecuária Brasileira 19(8):985-997. Port., Sum. Port., Engl., 17 Refs., Illus. (Faculdade de Agronomia, Univ. Federal do Rio Grande do Sul, Caixa Postal 776, 90.000 Porto Alegre-RS, Brasil)

Phaseolus vulgaris; Intercropping; Zea mays; Helianthus annuus; Yields; Fertilizers; N; Weeding; Yield components; Brazil.

In field trials in Rio Grande do Sul (Brazil) in 1981, beans, sunflower, and maize were sown in early Sept. either in pure stand or in associations of beans/sunflower, beans/maize, or maize/sunflower, and given 0 or 80 kg N/ha. N application and control of weeds by hoeing increased bean seed yield most when grown in pure stand or in association with maize. Grain yield of maize was increased in association with beans but reduced by sunflower. Competitive ability was high in sunflower and no. of achenes/head increased from 535 in pure stand to 760 when grown in association with beans. Plant populations were not affected by cropping system. (Soils and Fertilizers)

0977

25886 MANRIQUE E., R.; GOMEZ S., R. 1984. Cultivos asociados con caña panelera en la Hoya del Río Suárez. (Crops associated with sugarcane in the Suarez river basin). In Congreso de la Sociedad Colombiana de Técnicos de la Caña de Azúcar, 1er., Cali, Colombia, 1984. Trabajos presentados. Cali, Centro de Investigación de la Caña de Azúcar. pp.101-122. Span., Sum. Span., 4 Refs., Illus.

Phaseolus vulgaris; Intercropping; Zea mays; Saccharum officinarum; Spacing;

Fertilizers; Cultivars; Yields; Colombia.

The results of the research carried out by the Instituto Colombiano Agropecuario in the Suarez river basin (Colombia) to identify and analyze the traditional technology of the different crop arrangements with sugarcane (among them, dwarf and climbing beans) and their interaction with the climate, the soil, and the management system. Furthermore, some traditional systems are compared regarding agronomic and economic aspects. Modifications to the factors population density, var., and fertilization were introduced to the best systems found. (CIAT)

0978

26938 MBUYA, O.S.; KOINANGE, E.M.K.; MMBAGA, M.E.T. 1985. Optimum bean (Phaseolus vulgaris) density in association with maize. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.21-28. Engl., Sum. Engl., 7 Refs. (Tanzania Agricultural Research Organization, Lyamungu Research Inst., P.O. Box 3004, Moshi, Tanzania)

Phaseolus vulgaris; Cultivars; Planting; Spacing; Intercropping; Zea mays; Yields; Yield components; Tanzania.

Four bean cv. (Canadian Wonder, P311-A-L T23, and T3) were evaluated at 3 densities (102,564, 148,148, and 190,476 plants/ha) in association with maize in Lambo (Tanzania). A randomized complete block design with 4 replications was used. Var. differences in bean seed yield were observed in both monoculture and associated cropping. The 3 bean densities showed no significant (P less than 0.05) seed yield differences, indicating that any of the densities can be used in association with maize. Increasing bean density also did not reduce maize grain yield significantly. However, bean seed yield increased with increasing bean density, thus suggesting that at lower densities growth resources are not fully exploited. Bearing in mind the high prices of seed bean, the economics of seed should be worked out to justify the increased revenue obtained by using the highest density. However, where seed bean is cheap, the highest density of 190,476 plants/ha (75 x 7 cm) is recommended. (AS)

0979

26933 MINJAS, A.N.; SALEMA, M.P., eds. 1985. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. 188p. Engl., Illus. (Dept. of Crop Science, Sokoine Univ. of Agriculture, P.O. Box 3005, Morogoro, Tanzania)

Phaseolus vulgaris; Intercropping; Planting; Timing; Spacing; Resistance; Drought; Germplasm; Adaptation; Ophiomyia phaseoli; Yields; Bean common mosaic virus; Isariopsis griseola; Uromyces phaseoli; Socioeconomic aspects; Marketing; Tanzania.

The papers presented at the 4th Workshop on Bean Research in Tanzania, held in 1985 as part of the Bean/Cowpea Collaborative Research Support Program/Sokoine U. of Agriculture, are compiled. The major objective is to develop for small farmers high yielding and widely adapted beans that are resistant to major diseases and insects, and to heat and drought stresses; likewise, they should cook quickly and be able to fix their own atmospheric N. Research results are presented in agronomy and physiology (use of mulches, intercropping systems with maize, planting dates and densities, and tolerance to drought), appropriate technology (human-powered bean thresher), breeding (yield trials), entomology (Ophiomyia phaseoli), nutritional improvement (cookability), and pathology (BCMV, Phaeoisariopsis griseola, Colletotrichum lindemuthianum, Pseudomonas syringae, and Uromyces phaseoli). Supportive research work is also presented especially regarding farmer socioeconomic aspects and technology transfer. Individual papers are recorded in this publication under the following consecutive no.: 0862, 0915, 0927, 0945,

0949, 0951, 0974, 0978, 0980, 0994, 1004, 1006, 1011, 1043, 1118, 1123, 1134, 1136, 1138, 1139, 1140, 1141, 1164, 1195, 1197, 1198, 1199, 1201, 1202, and 1203. (CIAT)

0980

26947 MOHAMED, A.H.; KAREL, A.K. 1985. Effect of plant population density on insect pests and seed yield of common beans intercropped with maize. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.69-77. Engl., Sum. Engl., 18 Refs. (Dept. of Crop Science, Sokoine Univ. of Agriculture, P.O. Box 3042, Morogoro, Tanzania)

Phaseolus vulgaris; Planting; Spacing; Varietal mixtures; Intercropping; Zea mays; Injurious insects; Yields; Tanzania.

The effect of 4 plant population densities on insect pests and on seed yield of common beans intercropped with maize was studied at the Sokoine U. of Agriculture (Morogoro, Tanzania). Main treatments were pure stands and mixtures of the component crops, and subtreatments were the 4 plant population densities. Results showed higher pest incidence and insect damage in pure stand beans than in mixtures. Higher plant population densities had higher pest incidence and damage, except for bean fly incidence and damage by leafhoppers and pod-sucking bugs; these were high in plots with low bean plant population density. The mixtures had a yield advantage at all plant populations, except for the 1/3 maize and 2/3 beans mixture. The highest yield advantage was obtained for the 2/3 maize and 1/3 beans treatment, suggesting that it is the optimum combined proportion for the 2 species. Low population of important insect pests and efficient utilization of environmental resources are discussed as possible reasons for yield advantages in mixtures. (AS)

0981

26021 MOLINA, M.; BONILLA, N.; BOLAÑOS, L.; PALENCIA, A. 1980. Caracterización exploratoria de los sistemas de producción agrícola más importantes de Costa Rica. (Exploratory characterization of the most important crop production systems in Costa Rica). In Moreno, R.A., ed. Reunión de consulta sobre localización de sistemas de producción de cultivos en Centroamérica, Turrialba, Costa Rica, 1979. Trabajos presentados. Turrialba, Centro Agronómico Tropical de Investigación y Enseñanza. Programa de Cultivos Anuales. Informe Técnico no.1. pp.221-274. Span., Illus.

Phaseolus vulgaris; Intercropping; Zea mays; Rotational crops; Saccharum officinarum; Coffee arabiga; Lycopersicum esculentum; Costa Rica.

The localization, delimitation, and characteristics of predominant crop production systems commonly found in Costa Rica are briefly described; among these are maize/beans in association (dry Pacific and Atlantic regions), maize-beans in rotation (central Pacific region and Central Western Valley), sugarcane/beans and tomato/beans in association (Central Western Valley), maize-beans-tobacco (central Puriscal), and beans/coffee (northern region). Maps and overall data on production and area planted are provided. (CIAT)

0982

26015 MORENO, R.A., ed. 1980. Reunión de consulta sobre localizaeión de sistemas de producción de cultivos en Centroamérica, Turrialba, Costa Rica, 1979. (Consultation meeting on the localization of crop production systems in Central America, Turrialba, Costa Rica, 1979. Papers presented). Turrialba, Centro Agronómico Tropical de Investigación y Enseñanza. Programa de Cultivos Anuales. Informe Técnico no.1. 314p. Span., 38 Refs., Illus.

Phaseolus vulgaris; Cultivation systems; Guatemala; Honduras; El Salvador;

Nicaragua; Panama; Costa Rica.

The papers presented at the 1979 consultation meeting, conducted in Turrialba, Costa Rica, on the localization, delimitation, and characterization of crop production systems, among them beans, in Guatemala, Honduras, El Salvador, Nicaragua, Panama, and Costa Rica, are compiled. Individual papers are recorded in this publication under the following consecutive no.: 0956, 0973, 0981, 0985, 0987, and 0990. (CIAT)

0983

23495 NEUMANN, I.F. 1984. La promotion des cultures associees au projet. (Promotion of associated cropping systems in the project). Nyabisindu, Rwanda, Projet Agro-pastoral de Nyabisindu. Etudes et Experiences no.4. 80p. Fr., 6 Refs., Illus.

Phaseolus vulgaris; Intercropping; Zea mays; Agricultural projects; Rwanda.

The experiences of the Projet Agro-pastoral de Nyabisindu, Rwanda, related to the development of improved crop associations, their dissemination and importance, are described. The traditional associated cropping systems are summarized and analyzed based on the results of the survey carried out by the project among 66 farmers. Recommendations on the dissemination of associated cropping to control diseases and erosion are given. The maize-bean association is grown as a vegetable. With a 0.55 x 0.50 m spacing and 35 t manure/ha, 133 and 41 g, resp., of maize and beans are obtained per plant. (CIAT)

0984

26294 PEREIRA, P.A.A.; ROCHA, R.E.M. DA; ARAUJO, R.S. 1984. Nodulacao do feijoeiro em monocultivo e associado com fileiras de milho maduro. (Nodulation of beans in monoculture and intercropped between rows of mature maize). Pesquisa Agropecuária Brasileira 19(8):951-954. Port., Sum. Port., Engl., 9 Refs., Illus. (Empresa Brasileira de Pesquisa Agropecuária, Centro Nacional de Pesquisa de Arroz e Feijao, Caixa Postal 179, 74.000 Goiania-GO, Brasil)

Phaseolus vulgaris; Zea mays; Intercropping; Nitrogen fixation; Nodulation; Cultivars; Yields; Rhizobium phaseoli; Brazil.

A field expt. was conducted in Goiania, Brazil, to evaluate nodulation and grain yield of beans planted in association with maize after its physiological maturity. More nodules were observed and they remained for a longer time on the roots of bean plants associated with maize. However, the bean monocrop showed larger grain yields in all treatments, regardless of N supply. (AS)

0985

26019 PINEDA L., L.; HERNANDEZ G., G.; LEMUS C., R.A.; MARIN C., E.J. 1980. Informe de Nicaragua para la reunión de consulta para la localización y delimitación de sistemas de producción de cultivos en el Istmo Centroamericano. (Nicaragua's report for the consultation meeting for the localization and delimitation of crop production systems on the Central American isthmus). In Moreno, R.A., ed. Reunión de consulta sobre localización de sistemas de producción de cultivos en Centroamérica, Turrialba, Costa Rica, 1979. Trabajos presentados. Turrialba, Centro Agronómico Tropical de Investigación y Enseñanza. Programa de Cultivos Anuales. Informe Técnico no.1. pp.169-193. Span., 4 Refs., Illus.

Phaseolus vulgaris; Relay crops; Zea mays; Fertilizers; Pest control; Planting; Spacing; Technology evaluation; Technological package; Maps; Nicaragua.

The localization, delimitation, and characteristics of the maize and beans

monoculture and relay systems in Nicaragua are described. An economic analysis is presented, comparing the traditional farmers' system and a proposed improved system (fertilization, pest control, and plant density). In 1978 only 15.2 percent of the potential surface area for bean cultivation (406,479 ha) was planted to this crop. (CIAT)

0986

26574 RAMALHO, M.A.P.; COELHO, A.M.; TEIXEIRA, A.L.S. 1985. Consórcio de milho-verde e feijão em diferentes épocas de plantio na entressafra. (Green maize-bean intercropping during the off-season). Pesquisa Agropecuária Brasileira 20(7):799-806. Port., Sum. Port., Engl., 20 Refs. (Escola Superior de Agricultura de Lavras, Caixa Postal 37, 37.200 Lavras-MG, Brasil)

Phaseolus vulgaris; Intercropping; Zea mays; Planting; Timing; Yields; Dry matter; Brazil.

Different planting times of maize and beans in association within the off-season were evaluated at Centro Nacional de Pesquisa de Milho e Sorgo (Minas Gerais, Brazil) in expt. between Feb. and May, with 3 periods in 1982 and 4 periods in 1983. In each period a different expt. was carried out in randomized blocks with 3 replications and 6 treatments. Two maize var., BR 126 and BR 105, and bean var. CNF 010 and Rio Tibagi were used. Each maize var. was also planted in monoculture. The production of commercial roasting ears and dry bean grains as the DM production of both crops were evaluated. The results showed that good roasting ear production is possible, mainly in Feb. and March plantings. A 20 percent reduction of commercial roasting ear and maize DM resulted when planted in association with beans. Therefore, the maize-bean intercropping system during these periods will hardly be economically successful. There was no influence of the several bean and maize var. over intercropping efficiency. (AS)

0987

26017 ROSALES, F.E. 1980. Granos básicos en Honduras y algunos de sus sistemas de cultivos. (Grain staples in Honduras and some of their cropping systems). In Moreno, R.A., ed. Reunión de consulta sobre localización de sistemas de producción de cultivos en Centroamérica, Turrialba, Costa Rica, 1979. Trabajos presentados. Turrialba, Centro Agronómico Tropical de Investigación y Enseñanza. Programa de Cultivos Anuales. Informe Técnico no.1. pp.48-88. Span., Illus.

Phaseolus vulgaris; Intercropping; Zea mays; Rotational crops; Maps; Production; Honduras.

The localization, delimitation, and characteristics of the grain crop (maize, beans, rice, and sorghum) production systems commonly found in Honduras are briefly described. These are maize-maize and beans-beans double cropping systems, maize/beans in association, maize-beans in rotation, and maize-maize/beans cropping system. Maps and bean production data (1978-79) for Honduras are provided. (CIAT)

0988

26048 SALEZ, P. 1985. Le point des recherches sur les systemes de culture associee mais-legumineuse dans l'Ouest Cameroun. (Research of maize-legume associated cropping systems in western Cameroon). Dschang, Cameroon, Institut de la Recherche Agronomique. 9p. Paper presented at Colloque sur les Légumineuses Alimentaires, Niamey, 1985. Fr., Sum. Fr., 9 Refs. (Institut de la Recherche Agronomique, B.P. 44, Dschang, Cameroon)

Phaseolus vulgaris; Intercropping; Zea mays; Spacing; Planting; Fertilizers; Nodulation; Cameroon.

The main results of research carried out since 1972 in western Cameroon are

presented regarding the maize-soybean and maize-bean associated cropping systems. The possibilities of improving these systems through var. selection, planting distances, and plant densities for the 2 species as well as through fertilization are being studied. Comparisons were made between the associated crops and the monocrops regarding diseases, legume nodulation, and time of the trials. (AS (extract)-CIAT)

0989

26380 SILVA, J.F. DA; SILVA, N.G. DA 1984. Controle de plantas daninhas em feijao (Phaseolus vulgaris L.) consorciado com outras culturas. (Weed control in beans associated with other crops). Informe Agropecuario 10(118):70-74. Port., 20 Refs., Illus. (Univ. Federal de Vicosa, 36.570 Vicosa-MG, Brasil)

Phaseolus vulgaris; Intercropping; Manihot esculenta; Saccharum officinarum; Herbicides; Brazil.

Information is given on several herbicides which have been tested, or are considered of potential value for use with Phaseolus vulgaris grown in association with other crops, including cassava and sugarcane, particularly as to their effectiveness on weed species and method of application. These include alachlor, chloramben, pendimethalin, metolachlor, trifluralin, EPTC, oryzalin, bentazon, sethoxydim, linuron, glyphosate, and paraquat. (Weed Abstracts)

0990

26020 SILVERA, G.; JONAS, J.; IBAÑEZ, R.; BEJARANO, W. 1980. Identificación, localización, delimitación y caracterización de sistemas de producción de cultivos en Panamá (Primera aproximación). (Identification, localization, delimitation, and characterization of crop production systems in Panama. (First approximation)). In Moreno, R.A., ed. Reunión de consulta sobre localización de sistemas de producción de cultivos en Centroamérica, Turrialba, Costa Rica, 1979. Trabajos presentados. Turrialba, Centro Agronómico Tropical de Investigación y Enseñanza. Programa de Cultivos Anuales. Informe Técnico no.1. pp.194-220. Span., 18 Refs., Illus.

Phaseolus vulgaris; Rotational crops; Zea mays; Manihot esculenta; Maps; Planting; Timing; Panama.

The localization, delimitation, and characteristics of predominant crop production systems commonly found in Panama are briefly described; among these are rice-maize-beans and maize-beans in rotation and cassava or cocoyam-rice-(maize-maize/beans) in association. Maps and planting schedules are provided. (CIAT)

0991

26987 SMUCKER, A.J.M.; TESAR, M.B.; McBURNEY, S.; OAKS, J. 1980. Influence of drybean and alfalfa rotation on the productivity of a Charity clay soil. Final report for 1977-1980. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. pp.114-115. Engl.

Phaseolus vulgaris; Rotational crops; Medicago sativa; Soil fertility; Yields; USA.

An expt. was established to determine the influence of 1-3 yr of alfalfa on the soil structure and fertility of a Charity clay soil as well as its effect on alfalfa and bean yields. Navy bean Sanilac was planted continuously (4 yr). The 1st yr after alfalfa, dry bean yields were approx. 393 to 504 kg/ha greater. More than 2 yr of alfalfa appeared to have little beneficial effect on dry bean yields. (CIAT)

0992

26514 SOUZA FILHO, B.F. DE; ANDRADE, M.J.B. DE 1985. Sistemas de producao de feijao em consórcio com a cana-de-acúcar. (Bean production systems in association with sugarcane). Pesquisa Agropecuária Brasileira 20(3):343-348. Port., Sum. Port., Engl., 5 Refs., Illus. (Empresa de Pesquisa Agropecuária do Estado do Rio de Janeiro, Caixa Postal 151, 28.100 Campos-RJ, Brasil)

Phaseolus vulgaris; Saccharum officinarum; Intercropping; Planting; Spacing; Timing; Cultivars; Yields; Brazil.

The bean/sugarcane intercropping system presents social and economic advantages and therefore has a great potential in northern Rio de Janeiro, Brazil. To adapt technologies for the system, 3 tillage methods were investigated on 4 sowing dates using 2 bean cv.: one of normal cycle and the other of early cycle. The exptl. design was a split plot in randomized complete blocks with 3 replications, 2 expt. being carried out in 1981-83 at the Campos exptl. station. The tillage method which gave the best results, without damaging the sugarcane, was the use of 2 rows of beans at 0.25 m from the sugarcane rows. The bean sowing period up to 15 days after the sugarcane planting was the best for intercropping. However, different responses in yield were observed between the bean cv. The intercropping system raised the LER by about 60 percent, increased the net monthly income by 220 percent, and reduced the cost of the bean/sugarcane plantation up to 35 percent as compared with the sugarcane monoculture. (AS)

0993

26056 TAY U., J. 1985. Asociación de cultivos maíz y porotos. (Maize/beans in association). In Curso Internacional de Investigación sobre Producción de Frejol (Phaseolus vulgaris), Santiago, Chile, 1985. Trabajos presentados. Santiago, Instituto de Investigaciones Agropecuarias. Estación Experimental La Platina. 26p. Span., 16 Refs. (Estación Experimental Quilimapu, Programa Leguminosas de Grano, Chillán, Chile)

Phaseolus vulgaris; Intercropping; Zea mays; Yields; Cultivars; Chile.

The fundamentals, advantages, and disadvantages of maize/bean in association are reviewed. Definitions of terminology related to associated crops and examples of Latin American countries where the different types of associations with beans prevail are given. The results of studies carried out in Chile on maize/beans in association are summarized. In general, maize yields were not affected by the association, but bean yields were reduced; however, total income/unit area was always higher for maize/beans in association. Bean var. Pinto 114 and Hallados Dorados always showed the highest yields in association. The conclusions from results obtained with maize/beans in association at CIAT are also presented; these indicate that tall and late-maturing bean var., with type IV-A and IV-B growth habits, are the most adequate for associated cropping with maize. (CIAT)

0994

26941 ULOMI, J.W.A.; TARIMO, A.J.P. 1985. Performance of beans and maize grown in association at varying densities. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.38-40. Engl., Sum. Engl., 7 Refs. (Dept. of Crop Science, Faculty of Agriculture, Sokoine Univ. of Agriculture, P.O. Box 3005, Morogoro, Tanzania)

Phaseolus vulgaris; Intercropping; Zea mays; Planting; Spacing; Yields; Tanzania.

Beans or maize were grown in monoculture or in association at Sokoine U. of

Agriculture (Morogoro, Tanzania) at 3 density combinations: 1/4 maize and 3/4 beans, 1/2 maize and 1/2 beans, or 3/4 maize and 1/4 beans. Both monocropped maize and beans were grown at populations much higher than the optima for grain yield. The density combinations decreased the population of either crop toward the max. Results showed that yields were lowest in the monocrops and highest in the associated crops. Comparative advantages of intercropping beans with maize were exaggerated by the high LER values observed. These results reflect common trends in traditional agriculture in most of the semiarid tropics, where maize and beans are commonly intercropped. (AS)

0995

22166 URIBE G., M. 1979. Respuesta de la asociación maíz-fríjol de guía, a cinco factores controlables de la producción. (Response of maize-bean intercropping to five controllable production factors). Tesis Ing.Agr. Chapingo, México, Universidad Autónoma. 153p. Span., Sum. Span., 48 Refs., Illus.

Phaseolus vulgaris; Intercropping; Zea mays; Fertilizers; N; P; Dung; Spacing; Planting; Yields; Mexico.

In the municipality of Ocuilan de Orteaga, Mexico, 2 field trials were carried out to study the response of maize-beans in association to the application of N (30, 60, 90, and 120 kg/ha), P (0, 30, 60, and 90 kg/ha), and dung (1 and 2 t/ha), to the topological arrangement of maize (2 and 3 plants/site), and to different bean densities (1, 0, 1; 1, 1, 1; 1, 1, 2; and 1, 2, 1). Bean population density affected bean yield. The dung influenced bean and maize yields. Maize-beans in association with greater use of inputs was superior to the traditional system. (CIAT)

0996

26560 VAZQUEZ A., J.M.P.; KOHASHI SHIBATA, J. 1983. Fenología, rendimiento y componentes del rendimiento de fríjol, Phaseolus vulgaris L., y la caña de azúcar, Saccharum officinarum L., como cultivos intercalados. (Phenology, yield, and yield components of common beans and sugarcane in association). Revista Chapingo 8(39):31-35. Span., Sum. Span., Engl., 14 Refs., Illus.

Phaseolus vulgaris; Intercropping; Saccharum officinarum; Yields; Yield components; Phenology; Mexico.

The phenology, yield, and yield components of beans and sugarcane planted in association were studied in 1980-82 in Tepetzingo (Morelos, Mexico). The treatments were (1) monocropped sugarcane, (2) sugarcane intercropped with beans, and (3) monocropped beans. The production technology used by the farmers in the region was used. Results showed that the sugarcane did not affect the seed yield nor the yield components nor the biomass production of beans. Beans did not affect the sugarcane yield or its components. Intercropping these 2 species resulted in a more efficient use of fertilizers and light. (AS)

0997

26383 VIEIRA, C. 1984. Cultivo consorciado de mandioca com feijao. (Associated cropping of cassava and beans). Informe Agropecuario 10(118):43-49. Port., Sum. Port., 9 Refs., Illus. (Univ. Federal de Vicosa, 36.570 Vicosa-MG, Brasil)

Phaseolus vulgaris; Intercropping; Manihot esculenta; Planting; Spacing; Yields; Brazil.

Investigations carried out in Brazil on intercropping cassava with beans, soybeans, sorghum, groundnuts, maize, and rice, especially regarding row spacing (no. of rows and distance between rows) and yields obtained, are reported. (Field Crop Abstracts) See also 0912 0940 1005 1012 1119 1158

0998

26046 ZAMBIA. MINISTRY OF AGRICULTURE AND WATER DEVELOPMENT. 1985. The effect of maize/bean intercropping on insect pest attack on beans. In _____. Grain Legume Research. Annual Report 1984/85. Chipata, Msekera Regional Research Station. p.17. Engl.

Phaseolus vulgaris; Intercropping; Zea mays; Planting; Timing; Ophiomyia phaseoli; Heliothis zea; Aphis craccivora; Plant injuries; Zambia.

The bean cv. Misamfu Speckled Sugar was planted alone and intercropped with maize var. R 215 to study the effect of intercropping on insect pest attacks on Zambian beans at different relative sowing dates. Damage due to Ophiomyia phaseoli was heavy in all sowings and it appears that intercropping conferred no protection against it. Damage by Heliothis armigera and Maruca testulalis was reduced in the intercrops compared with monocropped beans. The incidence of Aphis craccivora was much less in all bean intercrops than in monocropped beans. (CIAT)

0999

26586 SHEPPARD, J.W. 1983. Historical perspectives of the production of disease-free seed, control and management of bacterial blights of beans in Canada. Seed Science and Technology 11(3):885-891. Engl., Sum. Engl., Fr., Germ., 16 Refs. (Seed Biology Laboratory, Agriculture Canada, Plant Products Building, 22 C.E.F. K1A 0C5, Ottawa, Canada)

Phaseolus vulgaris; Seed production; Disease control; Bacterioses; Canada.

Bacterial blight on beans was 1st observed in Canada in 1904. Since that time various regulations have been in place in an attempt to reduce losses to a manageable level. The seed select program using blight-free seed from Idaho (USA), together with field and lab. inspection of plants and seed, has been effective in reducing losses from 1,000,000 kg in 1970 to less than 2000 kg in 1977. The program still has problems and new methods of disease detection, management, and control are constantly being sought. (AS)

1000

26052 CHAVEZ L., A. 1984. Potencial de producción del fríjol en la Selva Amazónica del Perú. (Bean production potential in the Amazonian rain forest of Peru). In Seminario sobre Tecnología Apropiada para la Amazonía Peruana, 1o., Pucallpa, Perú, 1984. Trabajos presentados. Lima, Consejo Nacional de Ciencia y Tecnología. pp.132-140. Span.

Phaseolus vulgaris; Production; Cultivars; Yields; Peru.

The Centro de Investigación Agrícola de Selva y Altura (Peru) has carried out trials involving the introduction of improved bean var. from CIAT and the Instituto Nacional de Investigaciones y Promoción Agraria (INIPA), with the main objective of improving bean production in the high rain forest zone of Peru. Results are given for the preliminary yield trials conducted in the Huánuco Valley and at different sites of the rain forest where improved bush bean var. were evaluated. Information is also given of the genetic resources of beans in the Amazonian rain forest in the states of Pasco, Junín, Amazonas, San Martín, and Huánuco. (CIAT)

1001

20069 DEVOS, P.; KABENGELE, A. 1981. Legumineuses: Haricot (Phaseolus vulgaris). (Legumes: beans). In Institut des Sciences Agronomiques du Burundi. Rapport des Activites de Recherches 1980. Bujumbura. p.14. Fr.

Phaseolus vulgaris; Cultivars; Yields; Selection; Burundi.

A total of 9 bean var. were compared during the 1st cropping season (1980) at 5 different alt. and locations (Ikbo, Murongwe, Kisozi, Mosso, and Rwira) in Burundi. The trials consisted of plots of 12 square meters, replicated 6 times. Fertilizers, fungicides, and insecticides were applied for max. productivity. Highest yielding var. were Karama var. 1/2 at 800-1200 m.a.s.l. and Diacol Calima at 1200 m.a.s.l. and over (av. yields of 1966 and 1869 kg/ha, resp.). Both var. outyielded the control 0688 Colorado. Diacol Calima showed the lowest percentage of malformed and diseased grains (17.3 percent). (CIAT)

1002

26526 FAURE, B.; MILA, J.A.; PONCE, M. 1983. Estudio comparativo de cuatro variedades de fríjol común (Phaseolus vulgaris) de grano de color blanco. (A comparative study of four white-seeded common bean varieties). Ciencia y Técnica en la Agricultura. Hortalizas, Papa, Granos y Fibras 2(2):33-41. Span., Sum. Span., Engl., 11 Refs. (Estación Experimental de Papas y Granos, Ministerio de la Agricultura, La Habana, Cuba)

Phaseolus vulgaris; Cultivars; Yields; Selection; Cuba.

The performance of 3 new bean var. (BAT 84, BAT 482, and BAT 93) and the local control Bonita 93 was evaluated in 5 Cuban localities (Candelaria, El Tomeguin, Matanzas, Ciego de Avila, and Holguin) during the dry season of 1980-81. A randomized block design with 4 replications was used. The best performing introductions were BAT 93 and BAT 482, and the highest grain yields were obtained in El Tomeguin and Matanzas. (CIAT)

1003

26238 FLORES, F.A.T. 1986. Estudo comparativo do comportamento de variedades, linhas avancadas, geracoes F-7 e F-8 de feijao, entre a estacao experimental e propriedades agrícolas. (Comparative study of the performance of bean varieties, advanced lines, and F-7 and F-8 generations at experimental stations and on private farms). Tese Mestrado. Pelotas-RS, Brasil. Universidade Federal de Pelotas. 120p. Port., Sum.

Port., Engl., 35 Refs., Illus.

Phaseolus vulgaris; Cultivars; Adaptation; Genotypes; Colombia.

The performance of bean var., advanced lines, and F7 and F8 generations at La Selva exptl. station and on the private farms of the municipalities of Carmen de Viboral, San Vicente, and Marinilla (Antioquia, Colombia) was compared. A genotype x environment interaction was found at a 0.01 level of probability. Genotype x municipality and genotype x municipality x year interactions were found at a 0.05 level of probability. The absence of genotype x year interaction evidenced the importance of testing germplasm over a wide range of environments within the same year. The analysis of correlations and frequency distributions demonstrated that the evaluation made at La Selva exptl. fields was of low efficiency when related to the behavior of genotypes at the farm level, mainly regarding cv. grown under low fertility conditions and F7 lines. The stability parameters appeared to be reliable for the characterization of cv. performance in different environments. (AS (extract))

1004

26943 HAMIS, S.; GILL, B.S.; MISANGU, R.N. 1985. National bean yield trial. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.45-49. Engl., Sum. Engl., 5 Refs. (Dept. of Crop Science, Sokoine Univ. of Agriculture, P.O. Box 3005, Morogoro, Tanzania)

Phaseolus vulgaris; Cultivars; Adaptation; Resistance; Bean common mosaic virus; Isariopsis griseola; Uromyces phaseoli; Yields; Tanzania.

Thirteen bean cv. were evaluated for wide adaptability and disease resistance (BCMV, angular leaf spot, and rust) under Morogoro conditions (Tanzania). The var. were arranged in a randomized complete block design with 4 replications. TM0224, TM0216, and TM0124 showed promising yield performance (1487.11, 1360.29, and 1120.07 kg/ha, resp.). All the tested cv. were susceptible to BCMV and angular leaf spot; however, TM0125, TM0224, TM0124, TM0216, and TM0962 did not show rust symptoms. (AS)

1005

24659 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1974. Resultats de quatre essais sur legumineuses vivrieres. (Results of four trials with food legumes). Rubona. Resultats d'Essais no.2. 24p. Fr.

Phaseolus vulgaris; Cultivars; Adaptation; Yields; Stakes; Intercropping; Zea mays; Rwanda.

The results of 4 trials carried out with food legumes at Robona Station, Rwanda, in 1974 are presented. In comparative bean trials, var. Wulma, locally diffused and used as control, was superior (P = 0.01) to var. 54, 6473, Kalikabageni, Kinihira, Amarillo Ouro, and Bleu. Var. 54 is partially diffused in replacement of Wulma (little accepted because of its black seed color). Another interesting var. was Mélange de Rouges. In trials with stakes, the use of wooden perches or branches gave better results with any climbing bean var.; however, the use of maize as stakes (intercropping maize-beans) is more desirable in some instances, depending on the agronomic goals (snap beans or maize and bean grains). (CIAT)

1006

26944 IRANGA, G.M.; MISANGU, R.N.; GILL, B.S. 1985. Screening of bean germplasm for their adaptability and resistance to the most common bean diseases under Morogoro environment. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.50-56. Engl., Sum. Engl., 4 Refs. (Dept. of Crop Science, Sokoine Univ. of

Agriculture, P.O. Box 3005, Morogoro, Tanzania)

Phaseolus vulgaris; Germplasm; Plant introduction; Yields; Plant habit; Adaptation; Resistance; Bean common mosaic virus; Isariopsis griseola; Uromyces phaseoli; Tanzania.

Sixty-six bean introductions were evaluated for their important economic characters at Sokoine U. of Agriculture (Morogoro, Tanzania). Canadian Wonder was used as a check var. Due to poor germination percentage and high death counts, only 22 lines were evaluated for the final seed yield character. The introductions differed significantly in all characters, except the no. of days to 50 percent pod maturity. Among the test lines, TM0789, TM0803, TM0741, and TM0984 did not show reactions to BCMV, angular leaf spot, and rust. BCMV reaction was only noted on TM0900, TM0786, TM0793, and TM0737, which had moderate to severe reactions. TM0800, TM0789, TM0960, TM0803, TM0741, TM0786, TM0969, TM0984, TM0808, and TM0820 were free from rust reaction. Angular leaf spot was not noted in TM0789, TM0796, TM0979, TM0801, TM0803, TM0741, TM0786, TM0984, and TM0793. Therefore, a better technique is required to confirm whether or not these accessions possess true disease resistance. If confirmed, they can be used in the breeding program as superior genotypes for the disease resistance they possess. TM0958, TM0806, and TM0320 significantly outyielded the standard var.; hence, they can be considered as promising lines. (AS)

1007

25755 KENYA. MINISTRY OF AGRICULTURE. 1974. Bean Research Project. Thika, National Horticultural Research Station. Interim Report. Long-Rains 1974. 66p. Engl.

Phaseolus vulgaris; Cultivars; Adaptation; YieldsSeed color; Fertilizers; N; Rhizobium; Herbicides; Technological package; Snap beans; Canned beans; Agricultural projects; Kenya.

The results of bean research activities in Kenya during the 1974 rainy season are reported. In yield trials with 26 var., 2 black var., 90-91 and 78-79, outyielded all other materials with av. of 3549 and 3360 kg/ha, resp., over 4 sites. In white-seeded bean var. trials, line R.M. 1-6, Y47 was outstanding and showed resistance to Uromyces phaseoli. In a N/Rhizobium trial with bean var. Mexican 142, no interaction between the factors was observed. Herbicide trials showed that hand weeding was the best; however, the mixture alachlor + linuron can be recommended. No significant yield responses were found due to trace element applications. Packages of good and bad cultural practices were compared; good cultural practices (early planting, weed control, good seed quality, and fertilization) had a significant effect on yield; however, no significant differences were observed with the use of fertilization and good seed quality. Yield trials with 10 French bean var. showed that var. Premier was the highest yielder (10,625 kg pods/ha) and showed the highest percentage of marketable pods (57.8 percent = 6133 kg/ha). Lab. work with white-seeded beans for canning is summarized. (CIAT)

1008

22153 MIRANDA, P.; COSTA, A.F. DA; LIMA, G.R. DE A.; ALBUQUERQUE, M.M. DE; GOMINHO, M.S.F. 1977. Competicao de misturas de ampla base genética. (Competition of mixtures of broad genetic base). In Instituto de Pesquisas Agronomicas. Projeto feijao. Relatorio Anual de Pesquisas 1976. Recife-PE, Brasil. pp.11-15. Port., 2 Refs.

Phaseolus vulgaris; Cultivars; Varietal mixtures; Yields; Adaptation; Brazil.

The yield of 7 bean var. and 10 mixtures of different homozygote lines was evaluated in the municipalities of Bezerros, Caruaru, Itaíba, Belem do San Francisco, Petrolandia, and Santana do Ipanema (Brazil). The 10 mixtures along with var. Costa Rica, IPA-74-19, RC4, and RC5 did not present

significant statistical differences. (CIAT)

1009

26065 MONTAGUE-GORDON, E.; WAHAB, A.H.; DEHANEY, J.; WRIGHT, A. 1981. Performance of eleven varieties of dry beans (Phaseolus vulgaris) over two successive seasons on the hillsides of Jamaica. Jamaica, Instituto Interamericano de Ciencias Agrícolas. 25p. Engl., Sum. Engl., 5 Refs.

Phaseolus vulgaris; Cultivars; Yields; Yield components; Selection; Agronomic characters; Jamaica.

Eleven bean cv. were evaluated in the hilly interior of Jamaica for grain yield and yield components during 2 successive growing seasons of 1980. Grain yields were highest in the spring-planted crop, ranging from 1.2 to 3.0 t of excellent quality seeds/ha. Seed yields declined considerably in the 2nd planting and ranged from 0.55 to 1.32 t/ha. Black-seeded cv. produced the highest grain yield in both plantings. Bean rust and anthracnose constituted important diseases. Positive linear correlations were observed between the no. of pods/plant and seeds/pod, seed yield, and plant height, whereas the no. of seeds/pod was negatively correlated with seed size. (AS (extract))

1010

26234 SEINCE, J.L.; SABATIE, M. 1982. Experimentation varietale haricots secs essais 1981. (Experimentation with dry bean varieties in 1981). France, Centre Technique des Conserves de Produits Agricoles. Station Experimentale de Puyricard. Informations Techniques no.29. 29p. Fr., Illus.

Phaseolus vulgaris; Cultivars; Agronomic characters; Seed characters; Selection; Processing; Yields; France.

Two expt. and one multilocational trial were conducted at Puyricard exptl. station (France) in 1981 to assess the agronomical and technological adaptability of 21 dry bean var. for the S-W bean-growing region. The agronomical parameters measured were DM content, gross seed yields, theoretical and observed net seed yields, multiplication coefficients, and grain quality (shape, color, and 1000-seed wt. at 15 percent MC). Results are given in table form. The GN bean types, especially GN 1140, showed the best multiplication coefficients. Grain quality was satisfactory, particularly that of CL 709 and CL 106. The technological parameters measured were DM content, percentage of swollen grains after soaking, wt. increase after soaking and sterilization, characteristics of seeds and broth, and Kramer shear press values. From the technological viewpoint, the correlation between DM content, water absorption, and grain swelling was significant. Var. differences were also observed. The need for uniformly maturing stands to guarantee the producers seed lots with homogeneously dried pods is stressed. Best wt. increases in the final product were observed for long- or large-seeded var.; the performance of GN types was inferior. Best regularity of grain size and shape was shown by GN 1140, R1, Star, and FCe 10.a.6 (an early maturing var.). These var. are erect or semi-erect (except Star which is a prostrate var.) and apt for mechanical harvesting. (CIAT)

1011

26963 TIMOTHY, R. 1985. On-farm trial of a high yielding bean cultivar in Kilosa district Morogoro region. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.173-176. Engl., Sum. Engl., 1 Ref.

Phaseolus vulgaris; Cultivars; Yields; Resistance; Drought; Bean common mosaic virus; Adaptation; Tanzania.

Farmers in 3 villages of the Kilosa District (Morogoro, Tanzania) were given

the high yielding bean var. TMO 101 to be compared with their local var. TMO 101 was always superior and outstanding in terms of yield, tolerance to drought, and upright and compact architecture. However, the var. is susceptible to BCMV. Taste and color of TMO 101 were also highly acceptable to farmers. (CIAT)

1012

26042 ZAMBIA. MINISTRY OF AGRICULTURE AND WATER DEVELOPMENT. 1985. Grain Legume Research. Annual Report 1984/85. Chipata, Msekera Regional Research Station. 99p. Engl.

Phaseolus vulgaris; Cultivars; Adaptation; Yields; Resistance; Elsinoe phaseoli; Ophiomyia phaseoli; Intercropping; Zea mays; Germplasm; Insect control; Insect biology; Zambia.

The results of research work with grain legumes (beans and cowpeas) in Zambia during 1984-85 are summarized. The results are given for the country's national bean var. trial, the bean seed treatment trial to control Ophiomyia phaseoli, the bean pest resistance nursery, the study on the effect of intercropping maize/beans on insect pest attacks, and the bean observation plots. Furthermore, tables are included. Individual papers are recorded in this publication under the following consecutive no.: 0998, 1013, 1093, 1094, and 1095. (CIAT)

1013

26043 ZAMBIA. MINISTRY OF AGRICULTURE AND WATER DEVELOPMENT. 1985. Zambia national bean variety trial. In _____. Grain Legume Research. Annual Report 1984/85. Chipata, Msekera Regional Research Station. pp.3-11. Engl.

Phaseolus vulgaris; Cultivars; Adaptation; Yields; Resistance; Elsinoe phaseoli; Germplasm; Planting; Timing; Zambia; Colombia.

The results of the 1984-85 Zambian national bean var. trial, conducted at 7 sites, are presented and discussed. Across all sites, Carioca was outstanding and yielded an av. of 901 kg/ha followed by BAT 1671, BAT 85, A 436, and BAT 331 (856, 846, 801 and 784 kg/ha, resp.). These cv. and A 439 carry the dominant I-gene resistance to BCMV. In the advanced bean disease resistance nursery in Msekera, Carioca and BAT 1671 showed complete and almost complete resistance, resp., to Elsinoe phaseoli. Outstanding bean germplasm was selected from the CIAT IBYAN (dwarf beans) and the Zambian preliminary bean var. trials for further testing in next year's national bean var. trial. Outstanding germplasm was also identified from various CIAT nurseries (dwarf bean advanced lines and climbing beans of various colors for warm and cool climates), with resistance to major diseases. In on-farm trials Carioca was considered an agronomically excellent var., but there is some uncertainty regarding farmer acceptability. The results of various CIAT bean disease resistance nurseries (rust, anthracnose, and angular leaf spot) are presented and briefly discussed. In an expt. to study the effect of planting date on diseases the highest yield (902 kg/ha) of bean cv. Mbala Local was obtained at the earliest planting date (Jan. 15). (CIAT) See also 0960 0967 1114

1014

26237 ALVAREZ A., M.; CAFATI K., C.; GERDING P., M.; GUIÑEZ S., A.; LARRAIN S., P.; ORMEÑO N., J.; SEPULVEDA R., P.; TAPIA F., F. 1981. Plagas y enfermedades del frejol. (Bean pests and diseases). Santiago, Chile, Instituto de Investigaciones Agropecuarias. Estación Experimental La Platina. Boletín Técnico no.43. 60p. Span., 2 Refs., Illus.

Phaseolus vulgaris; Symptomatology; Etiology; Disease control; Insect biology; Plant injuries; Insect control; Mycoses; Bacterioses; Viroses; Nematodes; Lepidoptera; Diptera; Coleoptera; Homoptera; Thysanoptera; Injurious mites; Chile.

The symptomatology, causal agent, dissemination, and control measures of nematodes and of fungal, bacterial, and viral diseases in Chile are described. The distribution, damage, biology, and control measures of the main insect pests are also briefly described; these are classified according to plant organ affected (subterranean, foliar, and stored grain). Problems caused by physical, environmental, and chemical factors are analyzed. (CIAT)

1015

26207 PASTOR C., M.A. 1985. Conceptos básicos sobre patología del fríjol. (Basic concepts of bean pathology). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.145-155. Span., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Diseases and pathogens; Epidemiology; Inoculation; Etiology; Disease control; Resistance; Disease transmission; Colombia.

The most important bean diseases in Latin America are listed and the events that occur during the disease cycle are described: inoculation, penetration, infection, and release or dissemination of the pathogen. Disease management or control is also described; this depends on economic, environmental, physical, and biological factors. Information is given on control methods and some selection criteria, emphasizing genetic resistance (vertical, horizontal, and combinations). (CIAT) See also 0937 0979 1104

1016

26572 ANDERSON, A.J.; GUERRA, D. 1985. Responses of bean to root colonization with Pseudomonas putida in a hydroponic system. Phytopathology 75(9):992-995. Engl., Sum. Engl., 18 Refs. (Dept. of Biology, Utah State Univ., Logan, UT 84322, USA)

Phaseolus vulgaris; Pseudomonas putida; Fusarium solani phaseoli; Inoculation; Mineral content; Fe; Leaves; Nutrient solution; USA.

Colonization of bean roots by Pseudomonas putida was maintained at 0.6-1.8 x 100,000 colony-forming units/g of root tissue during growth for 18 days under hydroponic culture involving complete as well as Fe- and B- deficient media. Leaves from 16-day-old transplants colonized by P. putida had reduced Fe contents compared with uninoculated seedlings, and roots had 17-93 percent higher lignin contents than did uninoculated seedlings. Plants with roots colonized by P. putida gained more wt. after inoculation with Fusarium solani f. sp. phaseoli compared with plants grown without P. putida. In plants inoculated with both P. putida and Fusarium, foliar wilting and onset of lesion formation were delayed by 2-3 days. Colonization by P. putida decreased the amount of lignin normally generated at the lesioned root-shoot interface in plants infected by Fusarium. These data suggest that P. putida may afford some protection against F. solani in the early stage of disease development. Protection may involve alteration of the plant's defense potential through an increase in lignin in the root tissues. (AS)

1017

26073 BOELEMA, B.H. 1984. Infectivity titrations with race 2 of Pseudomonas syringae pv. phaseolicola in green beans (Phaseolus vulgaris). Phytophylactica 16(4):327-329. Engl., Sum. Engl., Afr., 5 Refs., Illus. (Horticultural Research Inst., Private Bag X293, Pretoria 0001, South Africa)

Phaseolus vulgaris; Pseudomonas phaseolicola; Races; Snap beans; Cultivars; Inoculation; South Africa.

A study was made of the dose/response relationships between race 2 of Pseudomonas syringae pv. phaseolicola and trifoliate leaves and pods of green bean cv. A var. of relationships indicated either independent action of the cells of the pathogen, or antagonism or facultative synergism among these cells. Facultative synergism was found only in infectivity titrations with pods. In 1 pathogen/cv. combination, a strong interaction among the cells of the pathogen was found at the highest inoculum dose. The consequences of these findings for the size of the inoculum dose to be used in cv. resistance trials in a glasshouse are discussed. (AS)

1018

22249 DINESEN, G. 1980. Bacterial wilt of beans (Corynebacterium flaccumfaciens (Hedges) Dowson). Danish Journal of Plant and Soil Science 84(5):361-370. Engl., Sum. Engl., Dan., 19 Refs., Illus.

Phaseolus vulgaris; Corynebacterium flaccumfaciens; Disease physiology and biochemistry; Cell walls.

The movements of Corynebacterium flaccumfaciens in bean plants and their rate were studied; whether special tissues are attacked was also determined. The electron microscope analyses aimed at establishing what takes place in the plant cell when it is attacked by C. flaccumfaciens. When bacteria are injected below the cotyledons in the middle of the stem, a certain propagation takes place in the pith with a subsequent penetration into the oldest primary xylem cells. The movements up into the plant start exclusively in the primary xylem. Bacteria can be observed in the xylem, which assumes a

brown color. The movement in the plant is relatively slow as it takes between 72-96 h from the time of the injection 2 cm below the cotyledons before bacteria can be isolated from the youngest shoot (the distance being about 6.5 cm). Electron microscope analyses showed a total degradation of the xylem cell wall. No clogging material was found, and the wilting of the plant was due to failing transportation of sap caused by xylem degradation. (AS)

1019

26282 MALIN, E.M.; BELDEN, E.L.; ROTH, D. 1985. Evaluation of the radioimmunoassay, indirect enzyme linked immunosorbent assay, and dot blot assay for the identification of Xanthomonas campestris pv. phaseoli. Canadian Journal of Plant Pathology 7(3):217-222. Engl., Sum. Engl., Fr., 21 Refs., Illus. (Dept. of Plant Sciences, Univ. of Wyoming, Laramie, WY 82071, USA)

Phaseolus vulgaris; Xanthomonas phaseoli; USA.

A radioimmunoassay, an indirect competitive ELISA, and a dot-blot modification of the ELISA were evaluated for detection and identification of Xanthomonas campestris pv. phaseoli. The radioimmunoassay and the dot blot tests were specific for X. campestris pv. phaseoli; however, significant cross reactions occurred in the indirect competitive ELISA when using anti-X. campestris pv. phaseoli antiserum against other closely related bacteria. The sensitivity level of all procedures for X. campestris pv. phaseoli was approx. 100,000 colony-forming units/ml. All procedures were unsatisfactory in reliably detecting low levels of X. campestris pv. phaseoli directly from extracts of bean seed. However, when used in conjunction with dilution plating, the dot blot assay and the radioimmunoassay would be useful in specifically identifying X. campestris pv. phaseoli. The relative merits of these tests for identification of X. campestris pv. phaseoli are discussed. (AS)

1020

26921 OCKENDON, D.J.; CURRAH, L.; ROBINSON, H.T. 1984. Bean. In National Vegetable Research Station. Annual Report 1983. Wellesbourne, Scotland. pp.56-57. Engl.

Phaseolus coccineus; Pseudomonas phaseolicola; Resistance; Germplasm; United Kingdom.

Studies on a new source of resistance to Pseudomonas phaseolicola in runner bean (Phaseolus coccineus), originally obtained from PI201312, indicated that resistance is recessive and appears to be controlled by a single major gene with modifiers. (Plant Breeding Abstracts)

1021

26210 PASTOR C., M.A. 1985. Enfermedades del fríjol causadas por bacterias. (Bacterial diseases of beans). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.207-215. Span., 27 Refs., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Pseudomonas phaseolicola; Xanthomonas phaseoli; Symptomatology; Etiology; Disease control; Cultural control; Cultivars; Resistance; Chemical control; Selection; Colombia.

The etiology, symptomatology, cultural and chemical control measures, and general aspects of control through var. resistance to bean diseases are described for the bacterial pathogens Pseudomonas syringae pv. phaseolicola and Xanthomonas campestris pv. phaseoli. Some var. resistant to these pathogens are listed. (CIAT)

1022

26975 SAETTLER, A.W.; STADT, S.J. 1980. Relationship of bean halo blight bacteria to susceptible Charlevoix and tolerant Montcalm and Seafarer bean cultivars. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. pp.69-70. Engl.

Phaseolus vulgaris; Cultivars; Isolation; Pseudomonas phaseolicola; Pathogenicity; USA.

Multiplication of rifampin-resistant isolate Pseudomonas phaseolicola R13 was studied in seedlings of bean cv. Charlevoix (susceptible) and Montcalm and Seafarer (tolerant), inoculated with the pathogen. This isolate colonized the 3rd trifoliolate leaves of Charlevoix soon after emergence. Bacterial population levels in cv. Seafarer and Montcalm were significantly lower than those detected in Charlevoix. Only 8 and 9 percent of the total bacterial population were detected on leaf surfaces of Seafarer and Montcalm, resp. Development of halo blight symptoms was min. on plants of cv. Montcalm and Seafarer. (CIAT)

1023

26516 SZABO, L.J.; MILLS, D. 1984. Integration and excision of pMC7105 in Pseudomonas syringae pv. phaseolicola: involvement of repetitive sequences. Journal of Bacteriology 157(3):821-827. Engl., Sum. Engl., 24 Refs., Illus. (The Rockefeller Univ., Dept. of Cell Biology, New York, NY 10021, USA)

Phaseolus vulgaris; Pseudomonas phaseolicola; Races; USA.

The site for integration of pMC7105 into the chromosome of Pseudomonas syringae pv. phaseolicola has been mapped to a 2.6-kilobase-pair (kb) Bg/II-EcoRI fragment on this 150-kb indigenous plasmid. Selected excision plasmids resulting from imprecise excision of pMC7105 were used to identify 1 of the plasmid-chromosome juncture fragments and to characterize the mechanism of recombination from the chromosome. A 14.2-kb BamHI plasmid-chromosome juncture fragment has been identified in pEX8060 (234 kb), an excision plasmid which carries approx. 90 kb of chromosomal sequences to the left of the site of integration. This fragment contains a portion of the 2.6-kb Bg/II-EcoRI fragment as well as chromosomal sequences. Blot hybridization with a probe made from selected fragments of pMC7105 revealed 3 distinct repetitive sequences, RS-I, RS-II, and RS-III, on this plasmid. The 2.6-kb fragment, to which the site of integration maps, also contains RS-II. Five copies of RS-II are present in pMC7105, and more than 20 copies are present in the chromosome. Eight small excision plasmids were shown to result from recombination among fragments of pMC7105 that contain common repetitive sequences. The results indicate that integration and excision of pMC7105 occur through general recombination at homologous repetitive sequences. (AS)

1024

26914 TAYLOR, J.D.; TEVERSON, D.M. 1985. Halo-blight of Phaseolus bean. In National Vegetable Research Station. Annual Report 1984. Wellesbourne, Scotland. p.87. Engl.

Phaseolus vulgaris; Pseudomonas phaseolicola; Resistance; Cultivars; Isolation; Latin America; Africa.

A collaborative project, CIAT-National Vegetable Research Station, is in progress to study the occurrence and distribution of pathogenic variants of the causal organism Pseudomonas syringae pv. phaseolicola in Latin America and Africa, and to evaluate resistance sources in beans appropriate for these areas. Some African isolates appear to belong to a previously undescribed race, now designated race 3. The resistance of PI 150414, which has been widely used in breeding programs in Europe and N. America, seems to be

nonspecific. (Plant Breeding Abstracts) See also 0999 1037 1041 1138 1144 1147 1149

1025

26026 ABAWI, G.S.; CROSIER, D.C.; COBB, A.C. 1985. Root rot of snap beans in New York. Ithaca, New York State Agricultural Experiment Station. New York's Food and Life Sciences Bulletin, no.110. 7p. Engl., Illus.

Phaseolus vulgaris; Pythium ultimum; Rhizoctonia solani; Thielaviopsis basicola; Fusarium solani phaseoli; Pratylenchus penetrans; Snap beans; Symptomatology; Disease control; Chemical control; Cultural control; USA.

Symptoms caused by Pythium ultimum (and other species), Rhizoctonia solani, Thielaviopsis basicola, Fusarium solani f. sp. phaseoli, and Pratylenchus penetrans, all causing root rots in snap beans in New York (USA), are briefly described. Short notes on control measures are provided, including chemical control, cultural practices, and plant resistance. (CIAT)

1026

26539 AL-HAZMI, A.S. 1985. Interaction of Meloidogyne incognita and Macrophomina phaseolina in a root-rot disease complex of French bean. Phytopathologische Zeitschrift 114(4):311-316. Engl., Sum. Engl., Germ., 11 Refs. (Dept. of Plant Protection, College of Agriculture, P.O. Box 2460, Riyadh, 11451, Saudi-Arabia)

Phaseolus vulgaris; Meloidogyne incognita; Macrophomina phaseoli; Snap beans; Cultivars; Saudi Arabia.

Effects of Meloidogyne incognita and Macrophomina phaseolina on root rot of 2 French bean cv. were examined in a greenhouse expt. Severity of Macrophomina root rot increased by 54.5, 94.1, and 9.6 percent when both pathogens were introduced simultaneously, the nematode 2 wk. before the fungus, and the fungus 2 wk. before the nematode, resp. Nematode infection and reproduction were adversely affected when the fungus was introduced 1st. Cv. Harvester was more tolerant to both pathogens and less susceptible to the nematode than Romano Italian. (AS)

1027

26424 ALEXANDER, H.M.; GROTH, J.V.; BOERMA, A.P. 1985. Virulence changes in Uromyces appendiculatus after five asexual generations on a partially resistant cultivar of Phaseolus vulgaris. Phytopathology 75(4):449-453. Engl., Sum. Engl., 23 Refs., Illus. (Dept. of Plant Pathology, Univ. of Minnesota, St. Paul 55108, USA)

Phaseolus vulgaris; Uromyces phaseoli; Cultivars; Races; Pathogenicity; USA.

A field population of Uromyces appendiculatus was obtained from the susceptible bean cv. Pinto 111 in SW Minnesota (USA) and maintained for 5 asexual generations on partially resistant bean cv. Slimgreen. Changes in latent period, pustule size, and urediospore production on Slimgreen and Pinto 111 over the generations were small or undetectable. In contrast, there was a large increase in the proportion of the pathogen population virulent on cv. US#3 and large decreases in the proportion virulent on Early Gallatin, Roma, and B1349 over the course of the expt. Although Minnesota populations of U.appendiculatus are polymorphic for virulence on all 4 cv. (virulence frequencies between 15-55 percent), none of the 4 is grown in the state in more than small amounts. The results illustrate that changes in virulence gene frequencies may be independent of pathogen exposure to host resistance. (AS)

1028

25213 ASMUS, G.L.; IHIHGRA, C.D. 1985. The use of a seed infection index for comparing the susceptibility of bean cultivars to internally seedborne pathogens. Seed Science and Technology 13(1):53-58. Engl., Sum. Engl.,

Fr., Germ., 9 Refs. (Univ. Federal de Vicosa, 36.570 Vicosa-MG, Brasil)

Phaseolus vulgaris; Cultivars; Alternaria alternata; Colletotrichum lindemuthianum; Isariopsis griseola; Resistance; Brazil.

A seed infection index was developed to compare the susceptibility of Phaseolus vulgaris cv. to seed infection by fungal pathogens. The cv. were grown in a randomized block design in 3 different agroclimatic regions and in 4 different planting seasons, giving a total of 10 plantings. The seed infection index for each pathogen was calculated from the square root of MP x mP x PI, where MP is the max. percentage of infected seed in any one of the plantings, mP the mean percentage of infected seeds in 10 plantings, and PI the proportion of plantings in which an infected seed was detected. MP and mP can vary between 0-100 and PI between 0-1. (AS)

1029

25867 DE LA TORRE A., R.; CARDENAS S., F.; DE LA I. DE BAUER, M. DE L. 1984. Observaciones histológicas de las reacciones de hipersensibilidad causadas por Uromyces phaseoli (Pers.) Wint. var. typica (Arth.) en fríjol (Phaseolus vulgaris L.). Revista Mexicana de Fitopatología 3(1):47-54. Span., Sum. Span., Engl., 14 Ref., Illus.

Phaseolus vulgaris; Uromyces phaseoli; Resistance; Tannin content; Mexico.

The type of hypersensitive reaction of leaves of bean selection Mayo Zacatecas No. 4 and Pinto 112, resistant and susceptible, resp., to Uromyces phaseoli var. typica, were observed with the light and electron microscopes. The presence of tannins was detected only in the necrotic area of the leaf that showed the hypersensitive reaction. Observations with the electron microscope of the cells showing the hypersensitive reaction showed that this begins, after pathogen invasion, with the condensation of small spherical bodies in the cytoplasm of the mesophyll cells. These bodies aggregate to form large, amorphous, electron-opaque bodies. Thereafter, tannins were deposited in the cells and cellular death occurred. Living hyphae were observed only in the cells adjacent to the necrotic cells or near the cells that contained electron-opaque bodies in formation, but never within them. (AS)

1030

26733 ESTACION EXPERIMENTAL DE CAGUA, VENEZUELA. 1976. La mancha harinosa de la caraota. (Floury leaf spot of beans). Noticias Agrícolas 7(33):3-4. Span., Illus.

Phaseolus vulgaris; Ramularia phaseoli; Symptomatology; Disease control; Venezuela.

The symptomatology and control measures of floury leaf spot of beans (Ramularia phaseoli) in Venezuela are described. (CIAT)

1031

26544 HEUVEL, J. VAN DEN; WATERREUS, L.P. 1985. Pectic enzymes associated with phosphate-stimulated infection of French bean leaves by Botrytis cinerea. Netherlands Journal of Plant Pathology 91(6):253-264. Engl., Sum. Engl., Germ., 13 Refs., Illus. (Willie Commelin Scholten Phytopathological Laboratory, Javalaan 20, 3743 CP Baarn, The Netherlands)

Phaseolus vulgaris; Botrytis cinerea; Snap beans; Disease physiology and biochemistry; Netherlands.

A study was conducted to find a possible correlation between pectic enzyme activity and phosphate-stimulated infection of French bean leaves by Botrytis cinerea, and to indicate which pectic enzymes, if any, are associated in particular with penetration. B. cinerea readily produced polygalacturonases

and pectin esterases in shake cultures of Richards' medium containing orthophosphate and no pectinaceous material or galacturonic acid. In inoculum droplets containing glucose and KH_2PO_4 or glucose and Na-ATP, which were used to evoke a susceptible reaction in French bean leaves, B. cinerea produced pectic enzymes. However, in inoculum droplets containing glucose but lacking phosphate, used to evoke a resistant reaction, activities of pectic enzymes remained low. As the enzyme activities already increased during the penetration stage of the infection process, it is assumed that these phosphate-stimulated activities of pectic enzymes are, at least partially, responsible for the phosphate-stimulated susceptible interaction between French bean leaves and B. cinerea. Electrophoresis in pectin-polyacrylamide gels showed that 2 polygalacturonases with a high isoelectric point value were associated with the penetration stage of the infection process. (AS)

1032

26036 LOPEZ-ROSA, J.H.; FREYTAG, G.F.; BEAVER, J.S.; ECHAVEZ-BAPEL, R.; ZAPATA-SERRANO, M.; VELEZ-MARTINEZ, H.; PAZ, P.F.; CONTRERAS, M.; DEL RIO, L.; RUCKS, P. 1983. Increase and stabilization of Honduran bean production through disease resistance. In Bean/Cowpea Collaborative Research Support Program. U.S.A. 1983 Annual Report. East Lansing, Michigan State University. pp.53-54. Engl.

Phaseolus vulgaris; Agricultural projects; Cultivars; Resistance; Uromyces phaseoli; Honduras.

The objectives, methodology, accomplishments in 1982, and plans for 1983 of the project to increase and stabilize bean production in Honduras through disease resistance are presented. Data from initial trials indicated that the black bean line B-190, highly resistant to Uromyces phaseoli, was very promising for Danli. (CIAT)

1033

26562 MENDGEN, K.; LANGE, M.; PRETSCHNEIDER, K. 1985. Quantitative estimation of the surface carbohydrates on the infection structures of rust fungi with enzymes and lectins. Archives of Microbiology 143(4):307-311. Engl., Sum. Engl., 30 Refs., Illus. (Universitat Konstanz, Fakultat fur Biologie, Lehrstuhl Phytopathologie, D-7750 Konstanz, Federal Republic of Germany)

Phaseolus vulgaris; Uromyces phaseoli; Disease physiology and biochemistry; German Federal Republic.

Lectins of several species, among them Phaseolus vulgaris, were tested for binding to the structures of Puccinia coronata and Uromyces appendiculatus. The germ tubes of both rust fungi have chitin on their surface. The substomatal vesicles and the infection hyphae of U. appendiculatus and P. coronata have not much chitin on their surface, but mainly glucans. The phytohemagglutinins (a lectin from bean) binds to the substomatal vesicle of U. appendiculatus. The appressoria of both rust fungi unite the surface characteristics of the germ tube and substomatal vesicle. All lectins and enzymes that bind to either of the latter structures bind to the appressorium in a pattern, typical for each rust. (CIAT)

1034

26067 MENDOZA M., A. 1984. Uso de benomil, maneb y la cobertura del suelo en el control de la mustia hilachosa en 4 cultivares mejorados de frijol común (Phaseolus vulgaris L.) en dos localidades bajas y húmedas de Guatemala. (Use of benomyl, maneb, and soil mulch in the control of web blight in 4 improved bean cultivars at two lowland, humid sites in Guatemala). Tesis Ing.Agr. Guatemala, Universidad de San Carlos. 46p. Span., Sum. Span., 20 Refs.

Phaseolus vulgaris; Cultivars; Rhizoctonia solani; Disease control; Chemical

control; Cultural control; Yields; Guatemala.

The effect of 6 web blight (Thanatephorus cucumeris) control treatments in 4 bean cv. (Culma, Turrialba 1, ICTA Quetzal, and ICTA D145) was assessed in the localities of La Nueva Concepción and Bulbuxya, Guatemala. Treatments consisted in the use of mulch and the fungicides benomyl and maneb applied at different frequencies. The use of mulch + benomyl in 4 applications showed the lowest web blight incidence, the highest profitability, and the highest yields. No significant differences were found as to severity or yield among the var. at both sites. In La Nueva Concepción, web blight attack was greater and yields lower. The economic damage was 72.23 and 26.06 percent in La Nueva Concepción and Bulbuxya, resp. (AS (extract)-CIAT)

1035

26292 O'CONNELL, R.J.; BAILEY, J.A.; RICHMOND, D.V. 1985. Cytology and physiology of infection of Phaseolus vulgaris by Colletotrichum lindemuthianum. Physiological Plant Pathology 27(1):75-98. Engl., Sum. Engl., 51 Refs., Illus. (Long Ashton Research Station, Univ. of Bristol, Dept. of Agriculture & Horticulture, Long Ashton, Bristol BS18 9AF, England)

Phaseolus vulgaris; Colletotrichum lindemuthianum; Disease physiology and biochemistry; Cultivars; Snap beans; Hosts and pathogens; United Kingdom.

The progress of infection by Colletotrichum lindemuthianum was examined in susceptible and resistant French bean hypocotyls producing spreading lesions or single hypersensitive cells, resp. In susceptible tissue, intracellular infection vesicles formed in epidermal cells, which remained alive. Intracellular primary hyphae developed from the vesicles and colonized further host cells. A matrix layer separated the hyphal wall from the invaginated host plasmalemma. After a period of biotrophy lasting less than 24 h, the cytoplasm of infected cells gradually degenerated. This was associated with loss of the ability of cells to plasmolyse and to exclude tannic acid, here used as a permeability tracer with plant tissue for the 1st time. Loss of the ability of the tonoplast to contract and for neutral red to accumulate in the vacuole occurred later, and was considered to indicate cell death. In cv. containing the pigment malvidin-3,5-diglucoside, loss of color coincided with tonoplast rupture. During the development of the primary mycelium, the sequence of a brief biotrophic phase followed by gradual degeneration and death was repeated as each host cell became infected. Thus, despite the absence of tissue browning, only recently colonized cells at the edge of the infection were alive. As lesions appeared, narrower secondary hyphae grew within host cell walls. Death of host protoplasts and wall dissolution then occurred in advance of secondary hyphae. In resistant tissue, infection vesicles were not formed, and the fungus was restricted in single hypersensitive epidermal cells. Most hyphae appeared dead, but some had normal ultrastructure. These findings are discussed in relation to race specificity and the importance of biotrophy to successful pathogenesis by C. lindemuthianum. (AS)

1036

26209 PASTOR C., M.A. 1985. Enfermedades del fríjol causadas por hongos. (Fungal diseases of beans). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.169-206. Span., 95 Refs., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Uromyces phaseoli; Colletotrichum lindemuthianum; Isariopsis griseola; Rhizoctonia solani; Ascochyta phaseolorum; Macrophomina phaseoli; Fusarium solani phaseoli; Fusarium oxysporum; Pythium; Symptomatology; Etiology; Disease control; Cultural control; Chemical control; Resistance; Cultivars; Colombia.

The etiology, symptomatology, cultural and chemical control measures, and general aspects of control through var. resistance to bean diseases are described for the following fungal pathogens: Uromyces phaseoli, Colletotrichum lindemuthianum, Isariopsis griseola, Rhizoctonia solani, Ascochyta phaseolorum, Macrophomina phaseoli, Fusarium solani phaseoli, F. oxysporum, and Pythium sp. A list of the check var. of the International Bean Rust Nursery (with broad resistance to the pathogen), evaluated during 1975-85, is included. (CIAT)

1037

26208 PASTOR C., M.A. 1985. Técnicas, materiales y métodos utilizados en la evaluación de fríjol por su reacción a las enfermedades. (Techniques, materials, and methods used in the evaluation of beans for reaction to diseases). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.157-168. Span. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Germplasm; Uromyces phaseoli; Inoculation; Colletotrichum lindemuthianum; Isariopsis griseola; Isolation; Sclerotium rolfsii; Rhizoctonia solani; Fusarium; Xanthomonas phaseoli; Pseudomonas phaseolicola; Colombia.

The methodology used for the evaluation of bean germplasm for its reaction to diseases is described. Techniques for the isolation, conservation, inoculum increment, and plant inoculation are included for the pathogens Uromyces phaseoli, Colletotrichum lindemuthianum, Isariopsis griseola, Sclerotium rolfsii, Rhizoctonia solani, Fusarium sp., Xanthomonas campestris pv. phaseoli, and Pseudomonas syringae pv. phaseolicola. (CIAT)

1038

25650 RAO, B.M.; PANKAJA, S.; PRAKASH, H.S.; SHETTY, H.S. 1984. Aflaroot production in French bean by Aspergillus flavus. Indian Phytopathology 37(4):730-731. Engl., 11 Refs. (Dept. of Applied Botany, Univ. of Mysore, Mysore 570 006, India)

Phaseolus vulgaris; Aspergillus flavus; Symptomatology; Snap beans; Toxins; India.

The production of the aflaroot symptom (attributed to aflatoxin production), seed rot, and seedling mortality in French beans by Aspergillus flavus is briefly reported. A total of 100 seeds of 3 samples of French bean were used; the fungus was recorded in all seed components: coat, cotyledon, and embryo. (CIAT)

1039

26905 RIZK, A.M.; HAMMOUDA, F.M.; ISMAIL, S.I.; AZZAM, S.A.; WOOD, G. 1984. Studies on green beans (Phaseolus vulgaris L.). 1. Phytoalexins of the pods. Qualitas Plantarum Plant Foods for Human Nutrition 34(3):203-209. Engl., Sum. Engl., 17 Refs., Illus. (Pharmaceutical Science Laboratory, National Research Centre, Dokki, Cairo, Egypt)

Phaseolus vulgaris; Phytoalexins; Fusarium solani phaseoli; Penicillium patulum; Phytophthora megasperma; Egypt.

The phytoalexins produced after the inoculation of green bean pods with the spore suspension of 3 fungi (Fusarium solani, Penicillium patulum, and Phytophthora megasperma) were studied. Five phytoalexins were isolated and identified as phaseollin, coumestrol, kievitone, phaseollidin, and 6-alpha-hydroxyphaseollin. Their identity was proved according to TLC, UV, light, and mass spectrometry by comparison with authentics. The preliminary screening of their antifungal activity was carried out. (AS)

1040

26300 ROSADO M., F.J.; GARCIA E., R. 1985. Incidencia de la mustia hilachoza (Thanatephorus cucumeris) en fríjol común como resultado del manejo del suelo. (Incidence of web blight on bean as a result of soil management). Revista Mexicana de Fitopatología 3(2):27-34. Span., Sum. Span., Engl., 22 Refs., Illus. (Colegio Superior de Agricultura Tropical, Depto. de Prácticas de Campo, H. Cárdenas Tabasco, Colegio de Postgraduados, Centro de Fitopatología, 56230, Chapingo, México)

Phaseolus vulgaris; Rhizoctonia solani; Fertilizers; N; Green manures; Yields; Mexico.

Studies on the humid tropics of Mexico were carried out in 1980-81 to determine the influence of soil management of cultivated beans on the incidence of Thanatephorus cucumeris. In addition to the control (with natural OM without tillage), 8 treatments were evaluated as follows: (1) without natural OM + fallow (tillage), (2) with natural OM + fallow, (3) with natural OM + fallow + fertilization, (4) without OM stubble + fallow, (5) with natural OM + 2 t maize stover/ha, (6) with natural OM + 4 t maize stover/ha, (7) with natural OM + 6 t maize stover/ha, and (8) with natural OM + maize-bean intercropping. The incidence of web blight was higher in those treatments involving tillage; however, their yields were higher. Apparently climatic conditions were not appropriate for T. cucumeris and thus its effect on yield was not marked. Those treatments without OM incorporation apparently reduced disease incidence. (CIAT)

1041

26504 SANTOS, A.F. DOS; ATHAYDE, J.T.; PACOVA, B.E.V.; VARGAS, A.A.T. 1984. Severidade e prevalencia de patógenos do feijoeiro no Estado do Espírito Santo 1981/1982. (Severity and prevalence of bean pathogens in the state of Espirito Santo, Brazil, 1981-82). Fitopatologia Brasileira 9(2):221-226. Port., Sum. Port., Engl., 6 Refs. (Empresa Brasileira de Pesquisa Agropecuária, Comissao Executiva do Plano de Lavoura Cacaueira, Caixa Postal 7, 45.600 Itabuna-BA, Brazil)

Phaseolus vulgaris; Colletotrichum lindemuthianum; Isariopsis griseola; Uromyces phaseoli; Cercospora vanderystii; Ascochyta fabae; Sclerotium rolfsii; Alternaria solani; Whetzelinia sclerotiorum; Fusarium oxysporum; Xanthomonas phaseoli; Pathogenicity; Brazil.

A disease survey was conducted during 3 consecutive bean crops (1981 dry and rainy seasons, 1982 dry season) to study the pathogens occurring in the state of Espírito Santo, Brazil. Bean anthracnose presented the highest av. indexes of severity (2.00, 2.00, and 2.28), prevalence indexes (2.91, 2.33, and 2.28), and disease indexes (4.53, 2.14, and 2.58) for all 3 crops, resp. Angular leaf spot was the most frequent disease (85.0, 53.0, and 78.5 percent), although it had av. severity indexes of 1.95, 1.69, and 1.85, av. prevalence indexes of 2.35, 2.00, and 1.72, and disease indexes of 3.89, 1.79, and 2.49; these were lower than those presented by anthracnose. Bean rust, gray leaf spot, Ascochyta leaf spot, southern blight, Alternaria leaf spot, white mold, Fusarium yellows, common bacterial blight, and viral diseases were also observed. (AS)

1042

26915 SCALA, F.; ZOINA, A. 1983. Poligalatturonasi prodotte da Athelia (Sclerotium) rolfsii in vitro e in vivo. Polygalacturonases produced by Athelia (Sclerotium) rolfsii in vitro and in vivo). Annali della Facolta di Scienze Agrarie della Universita degli Studi di Napoli Portici 17(2):172-178. Ital., Sum. Ital., Engl., 22 Refs., Illus.

Phaseolus vulgaris; Sclerotium rolfsii; Disease physiology and biochemistry; Italy.

Sclerotium rolfsii produced large amounts of polygalacturonases in liquid cultures with pectin or autoclaved bean hypocotyls as C source and in infected bean and squash tissues. A basal polygalacturonase activity was found in cultures with glucose as sole C source. In culture there was a single peak of activity at pH 5.23, while infected tissues had 2 peaks at pH 5.23 and 5.95. Activity of all the isoenzymes was highest at pH 4.00. Each peak exhibited both endo- and exo-polygalacturonase activities. (AS)

1043

26955 SENGOOBA, T.N. 1985. Fungicidal control of angular leaf spot of beans (Phaseolus vulgaris L.) in Uganda. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.135-144. Engl., Sum. Engl., 8 Refs., Illus. (Kawanda Research Station, P.O. Box 7065, Kampala, Uganda)

Phaseolus vulgaris; Isariopsis griseola; Cultivars; Disease control; Chemical control; Yields; Uganda.

The control of angular leaf spot (Phaeoisariopsis griseola) in Uganda was studied using 3 fungicides (benomyl, triphenyltin acetate, and mancozeb). The variables included rate, frequency, no. of applications, and cv. The no. of applications was varied by changing the initial or final spraying dates. The 3 fungicides used checked leaf defoliation but benomyl gave the best results. The rates of 1.0, 0.6, and 0.5 kg/ha for mancozeb, benomyl, and triphenyltin acetate, resp., were sufficient to control the disease. Weekly sprays gave better results than applications every 14 or 28 days. The earlier the spraying started, the more effective were the control treatments. The min. no. of fungicidal applications which gave significant disease control were 1, 3, and 5 for benomyl, triphenyltin acetate, and mancozeb, resp. In the trial which involved 6 different cv., significant increases in yield were obtained in 5 of the cv. following fungicidal applications. Rust (Uromyces phaseoli), another important disease that developed on the crops, was effectively controlled by mancozeb and triphenyltin acetate but not by benomyl. (AS)

1044

26531 SHAIK, M. 1985. Race-nonspecific resistance in bean cultivars to races of Uromyces appendiculatus var. appendiculatus and its correlation with leaf epidermal characteristics. Phytopathology 75(4):478-481. Engl., Sum. Engl., 17 Refs. (Dept. of Plant Pathology, Univ. of Nebraska, Lincoln, NB 68583-0722, USA)

Phaseolus vulgaris; Cultivars; Uromyces phaseoli; Resistance; Races; USA.

Five Phaseolus vulgaris cv. were inoculated with 3 Jamaican races (J4, J10, and J19) of Uromyces appendiculatus. The cv. differed in the no. of pustules/square centimeter of leaf regardless of the race or leaf position inoculated. In general, the order of cv. from most to least resistant was Jamaica Red, 27R, Round Red, Miss Kelly, and Portland Red. Mean no. of pustules/square centimeter was correlated positively with mean stomatal density on the adaxial leaf surface and negatively with mean hair density on both surfaces. However, a no. of additional factors are probably involved in the apparent relationship between epidermal characteristics and the development of fewer pustules. The feature of race-nonspecific resistance reported appears to be independent of the race-specific resistance present in the cv. studied. Jamaica Red, which developed fewest pustules, showed race-specific resistance to none of the Jamaican races tested. Other components of resistance, such as development of smaller or more sparsely sporulating pustules or longer latent periods, were not exhibited by cv. that developed fewer pustules/unit area. (AS)

1045

26583 SINDHAN, G.S. 1983. Effect of temperature and relative humidity on the development of anthracnose of French bean. Progressive Horticulture 15(1-2):132-135. Engl., Sum. Engl., 5 Refs. (Dept. of Plant Pathology, Haryana Agricultural Univ., Hissar, India)

Phaseolus vulgaris; Colletotrichum lindemuthianum; Temperature; Relative humidity; India.

The optimum range of temp. for the development of anthracnose (Colletotrichum lindemuthianum) lies between 18-27 degrees Celsius, with max. intensity at 21 degrees Celsius. Below and above this temp. disease intensity is considerably reduced. The optimum range of humidity for disease development lies between 91.2-100.0 percent. Infection was completely checked below 80.5 percent RH. Min. postinoculation moist period for initiation of disease was 12 h, with max. infection at 96 h. Preinoculation moist period resulted in increased infection but was not as effective as postinoculation moist period for initiation and development of the disease. (AS)

1046

26907 SMITH, D.A.; WHEELER, H.F.; BANKS, S.W.; CLEVELAND, T.E. 1984. Association between lowered kievitone hydratase activity and reduced virulence to bean in variants of Fusarium solani f. sp. phaseoli. Physiological Plant Pathology 25(2):135-147. Engl., Sum. Engl., 36 Refs., Illus. (Plant Pathology Dept., Univ. of Kentucky, Lexington, KY 40546-0091, USA)

Phaseolus vulgaris; Fusarium solani phaseoli; Pathogenicity; Enzymes; Disease physiology and biochemistry; USA.

The activity of kievitone hydratase (KHase), the enzyme catalyzing detoxification of the phytoalexin, kievitone, to kievitone hydrate (KH), in extracts of Fusarium solani f. sp. phaseoli-infected hypocotyls of Phaseolus vulgaris increased for several days and reached a peak at 5 days after inoculation. Several variants of the virulent isolate of F. solani f. sp. phaseoli were obtained, either following exposure of the fungus to the mutagenic chemical, N-methyl-N'-nitro-N-nitrosoguanidine, or by making transfers from naturally occurring sectors in agar cultures. These variants were monitored for pathogenicity to bean, sensitivity to kievitone, and ability to cause clearing of an opaque, kievitone-amended, modified Fries agar, an assay which indicated KHase activity. All variants with reduced KHase activity were more sensitive to kievitone and were less pathogenic to bean than the virulent strain from which they were derived. No virulent isolate that lacked KHase was found. The presence of KHase in Fusarium-infected bean tissues soon after inoculation, and for several days thereafter, as well as the association between lowered KHase activity and reduced virulence, suggest that this enzyme plays a role in the development of the fungus in its host's tissues. These results are consistent with detoxification of the isoflavonoid, kievitone, by F. solani f. sp. phaseoli, being important to the pathogenic behavior of this fungus. (AS)

1047

26588 STAMLES, R.C.; GROSS, D.; TIBURZY, R.; HOCH, H.C.; HASSOUNA, S.; WEBB, W.W. 1984. Changes in DNA content of nuclei in rust uredospore germlings during the start of differentiation. Experimental Mycology 8(3):245-255. Engl., Sum. Engl., 16 Refs., Illus. (Boyce Thompson Inst. of Plant Research, Cornell Univ., Ithaca, NY 14853, USA)

Phaseolus vulgaris; Uromyces phaseoli; Disease physiology and biochemistry; USA.

Digital video microscopy in conjunction with the DNA-binding fluorescent probe 4',6-diamidino-2-phenylindole were used to determine the relative DNA

content of single nuclei in germ tubes of urediospores of Uromyces phaseoli from bean germinating on an inductive surface. The start of DNA replication was nearly coincident with mitosis 2.0-2.5 h after the start of germination and the appressorium was completed 30 min later. The fluorescence power of nuclei was about the same before DNA replication began as at the end of mitosis; hence, the germ tube nuclei were in the G1 phase of the cell cycle before mitosis. (AS (extract))

1048

26589 STAMLES, R.C.; HASSCUNA, S.; LACCETTI, L.; HOCH, H.C. 1984. Metabolic alterations in bean rust germlings during differentiation induced by the potassium ion. Experimental Mycology 8(3):183-192. Engl., Sum. Engl., 26 Refs., Illus. (Boyce Thompson Inst. for Plant Research, Cornell Univ., Itha . NY 14853, USA)

Phaseolus vulgaris; Uromyces phaseoli; Disease physiology and biochemistry; USA.

Germling metabolism was surveyed for changes which occur in response to K salts. K(+) induced a small but significant shift in metabolism of urediospore germlings of Uromyces phaseoli from bean toward an increased rate of protein synthesis at the expense of sugars. Studies on respiration showed that a shift occurred about the time of appressoria development. Continued synthesis of protein was required for appearance of appressoria. DNA replication and mitosis were also induced by K(+). Although the induction of infection structures by either chemicals or contact stimuli starts mitosis, the 2 processes may be different. (AS (extract))

1049

26515 STAVELY, J.R. 1984. Pathogenic specialization in Uromyces phaseoli in the United States and rust resistance in beans. Plant Disease 68(2):95-99. Engl., Sum. Engl., 25 Refs., Illus. (Beltsville Agricultural Research Center, United States Dept. of Agriculture, Agricultural Research Service, Beltsville, MD 20705, USA)

Phaseolus vulgaris; Cultivars; Uromyces phaseoli; Races; Resistance; Pathogenicity; Selection; USA.

Twenty races were identified from single-uredinial isolates of Uromyces phaseoli by using 19 differential bean cv. Although these races did not include all of those occurring on beans in the USA, a few major races were included. At least 16 of these races differ from any previously described races of this fungus. A major objective of this research was to obtain races that were virulent on bean cv. with broad rust resistance. Among such cv., Aurora, NEP-2, Olathe, and Mexico 309 are susceptible, resp., to 9, 6, 6, and 3 of these 20 races. A high degree of variability and great potential for races that break host resistance exist in U. phaseoli. The most resistant cv. of more than 400 tested was Compuesto Negro Chimaltenango, which was resistant to all 20 races. (AS)

1050

26902 TU, J.C. 1985. Biology of Alternaria alternata, the causal agent of black pod disease of white bean in southwestern Ontario. Canadian Journal of Plant Science 65(4):913-919. Engl., Sum. Engl., Fr., 10 Refs. (Research Station, Agriculture Canada, Harrow, Ontario NOR 1G0, Canada)

Phaseolus vulgaris; Alternaria alternata; Etiology; Canada.

During the growing season Alternaria alternata was isolated from leaves of many weed species commonly found in or around a white bean field at Harrow Research Station (Ontario, Canada). The fungus was also found on bean plants at all stages of growth. Population densities of A. alternata on the leaves of bean plants grown from surface-sterilized and nonsterilized seeds were

similar. Population densities of A. alternata on the leaves of weeds and beans increased as the growing season advanced. The increase in the population of A. alternata was correlated with natural senescence of leaf tissues. Sugars and ninhydrin-positive substances in the leaf wash increased with plant age. At a given growth stage, the concn. of sugars and ninhydrin-positive substances found in leaf washes of cv. susceptible to A. alternata were higher than that of tolerant cv. (AS)

1051

26543 VAN BRUGGEN, A.H.C.; ARNESON, P.A. 1985. A quantifiable type of inoculum of Rhizoctonia solani. Plant Disease 69(11):966-969. Engl., Sum. Engl., 27 Refs. (Dept. of Plant Pathology, Cornell Univ., Ithaca, NY 14853, USA)

Phaseolus vulgaris; Snap beans; Rhizoctonia solani; Etiology; Pathogenicity; USA.

Production of sclerotia of Rhizoctonia solani was compared on 6 types of substrates in vitro. Autoclaved green bean pods were the most efficient substrate. About 1 million sclerotia measuring 300-710 microns in diameter were produced on 1 kg frozen cut beans. The viability of sclerotia on PDA was greater with increasing size of sclerotia. Similarly, the ability of large sclerotia to grow on sand and infect a bean hypocotyl piece was better than that of small sclerotia. Sclerotia formed on bean pods were more vigorous than sclerotia of the same size produced on leaves. Only growth of small sclerotia from bean leaves was stimulated by the presence of a hypocotyl piece. (AS)

1052

26545 WIETOR-ORLANSI, E.A.; SMITH, D.A. 1985. Metabolism of the phytoalexin, phaseollinisoflavan, by Fusarium solani f. sp. phaseoli. Physiological Plant Pathology 27(2):197-207. Engl., Sum. Engl., 26 Refs., Illus. (Center on Disease & Aging, Univ. of Kentucky, Lexington, KY 40546, USA)

Phaseolus vulgaris; Phytoalexins; Fusarium solani phaseoli; Toxins; USA.

Phaseollinisoflavan, an isoflavonoid phytoalexin produced by Phaseolus vulgaris, was metabolized by Fusarium solani f. sp. phaseoli. A major product of this reaction, designated metabolite-1 (M-1), was isolated from fungal cultures; whereas phaseollinisoflavan could not be recovered from the fungal culture medium 24 h after its addition, the level of M-1 rose steadily between 9-24 h. Bioassays of radial mycelial growth or of DM accumulation involving F. solani f. sp. phaseoli, Pythium myriotylum, Phytophthora cryptogea, and Rhizoctonia solani indicated that M-1 was less fungitoxic than phaseollinisoflavan. In addition to its production in liquid cultures treated with phaseollinisoflavan, M-1 was also isolated from Fusarium-infected bean tissues; trace amounts of M-1 were detected 2 days after inoculation and levels rose to at least 1 mg/g dry wt. 8 days later. Purification of M-1 involved solvent partitioning, TLC, gel filtration, and gas chromatography. Partial characterization indicated that the mol. wt. of this metabolite was 342, 18 mass units greater than that of phaseollinisoflavan, suggesting the addition of the elements of water to the phytoalexin. (AS) See also 1004 1006 1016 1057 1068 1121 1122 1123 1124 1134 1136 1138 1140 1141 1145 1149 1150

1053

22560 AVALOS Q., F. 1984. Insectos vectores de virus en fríjol. (Insect vectors of viruses in beans). In Curso Intensivo Postgrado de Investigación para la Producción de Fríjol en el Perú, 2o., Chincha, Perú, 1984. Trabajos presentados. Lima, Instituto Nacional de Investigación y Promoción Agropecuaria. Programa Nacional de Leguminosas de Grano. Guía Didáctica no.6. pp.83-85. Span.

Phaseolus vulgaris; Viroses; Vectors; Disease transmission; Injurious insects; Peru.

The main viral diseases in beans transmitted by aphids, chrysomelids, white flies, leafhoppers, and thrips are mentioned. (CIAT)

1054

26253 CAPOOR, S.P.; RAO, D.G.; SAWANT, D.M. 1985. A note on a virus disease of French bean. Indian Phytopathology 38(1):152-154. Engl., 5 Refs., Illus. (7 Barrow Road, Lal Bagh, Lucknow 226 001, India)

Phaseolus vulgaris; Snap beans; Viroses; Cultivars; India.

The viral nature of a disease observed on snap bean cv. Stringless Green Pod, grown in the glasshouse, was confirmed. The virus may be related to BCMV or BYMV regarding the size of virus particles; however, it differs from them on the basis of its physical properties, and because it has different types of insect vectors. Proposed designations for this virus are French bean mosaic virus (FBMV), bean virus 5, or Marmor phaseoli f. rugosum nov. sp. (CIAT)

1055

26530 FAZIO, G. DE 1985. O mosaico dourado do feijoeiro no Brasil. (Bean golden mosaic in Brazil). Fitopatologia Brasileira 10(1):41-48. Engl., Sum. Engl., Port., 32 Refs. (Secao de Virologia Fitopatológica e Fisiopatologia, Inst. Biológico, Caixa Postal 7119, Sao Paulo, Brasil)

Phaseolus vulgaris; Bean golden mosaic virus; Symptomatology; Etiology; Vectors; Hosts and pathogens; Disease control; Cultivars; Resistance; Brazil.

BGMV, widely distributed in Brazil, causes the most serious viral disease of Phaseolus vulgaris. Different aspects such as symptomatology, etiology, vectors, and hosts are discussed as well as the attempts to control the virus in the country. (CIAT)

1056

21874 GALVEZ, G.E. 1979. El mosaico dorado del fríjol, su etiología y control. (Bean golden mosaic virus: its etiology and control). In Annual Meeting of the Caribbean Food Crops Society, 16th., Santo Domingo, República Dominicana, 1979. Proceedings. Santo Domingo. pp.107-112. Span., 9 Refs.

Phaseolus vulgaris; Bean golden mosaic virus; Etiology; Disease control; Vectors; Resistance; Costa Rica.

A brief literature review on the etiology, characterization, vector control, and var. resistance to BGMV is presented. (CIAT)

1057

26265 CHAJA, I.S.; CHANT, S.R. 1985. The effects of co-infection by sunn-hemp mosaic virus (SHMV) and Fusarium oxysporum on the growth of French bean. Phytopathologische Zeitschrift 113(3):252-259. Engl., Sum. Engl., Germ., 24 Refs., Illus. (Dept. of Biological Sciences, Chelsea College, Univ. of London, Hortensia Road, London SW10 0QX, England)

Phaseolus vulgaris; Snap beans; Cultivars; Fusarium oxysporum; Sunn-hemp mosaic virus; Inoculation; Growth; United Kingdom.

In the seedlings of 3 French bean cv., Prince, Masterpiece, and Pinto, coinfection by sunn hemp mosaic virus with either of the vascular wilt pathogens, Fusarium oxysporum f. sp. phaseoli or f. sp. tracheiphilum, caused greater losses in total fresh wt. and in leaf area compared with uninfected plants or plants infected singly with any one of these pathogens. Coinfection of a 4th cv., Canadian Wonder, had no greater effects on growth reduction than single infection. The concn. of sunn-hemp mosaic virus in the leaves of cv. Prince, and to a greater extent in the leaves of cv. Masterpiece, increased more after double infection than with infection by the virus alone. The nature and possible mechanisms of the pathogenic effects in French bean are discussed. (AS)

1058

26743 HOWARTH, A.J.; CATON, J.; BOSSERT, M.; GOODMAN, R.M. 1985. Nucleotide sequence of bean golden mosaic virus and a model for gene regulation in geminiviruses. Proceedings of the National Academy of Sciences of the United States of America 82(11):3572-3576. Engl., Sum. Engl., 54 Refs., Illus. (Dept. of Plant Pathology, Univ. of Illinois, Urbana, IL 61801, USA)

Phaseolus vulgaris; Bean golden mosaic virus; DNA; USA.

The sequence of the genome of BGMV, which comprises 2 circular single-stranded DNA molecules (2640 and 2587 nucleotides long) of mostly unique sequence, was defined. Comparison of the sequences of BGMV and of CLV, which share serological relationship but are very different in host range and geographical origin, shows that each virus has a unique 200-nucleotide sequence (common region) on each 2.6-kilobase molecule of its genome. The common regions of the 2 viruses have no sequence homology except for a short inverted repeat near the 3' end. Six open reading frames were identified that possess considerable sequence homology between the 2 viruses and, in BGMV, may encode proteins of 15.6, 19.6, 27.7, 29.7, 33.1, and 40.2 kilodaltons. Conserved open reading frames are found in both the viral strand and the complementary strand, are approx. the same size, and are in the same orientation with respect to the common region in both viruses. Temporal regulation in geminiviruses may depend on the polarity of transcription and the common region may represent a replication origin and contain elements that serve to modulate gene expression. (AS)

1059

26920 KULKARNI, H.Y. 1972. Survey of viruses affecting East African major food crops. Ph.D. Thesis. Kenya, University of Nairobi. 105p. Engl., Sum. Engl., 105 Refs., Illus.

Phaseolus vulgaris; Bean common mosaic virus; Cultivars; Resistance; Bean yellow spot virus; Serology; Vectors; Yields; Disease transmission; Symptomatology; Kenya; Tanzania; Uganda.

Viral diseases of maize and beans in East Africa were surveyed to (1) assess the economic significance of the individual pathogens; (2) identify the viruses on the basis of host range, physical properties, particle morphology, and serology; and (3) evaluate possible sources of resistance. The results of several extensive field surveys in Kenya, Tanzania, and Uganda indicated that beans were widely infected with BCMV. Resistance tests indicated 4 American bean var. to be probably immune to the virus: Great Northern 1140, Tendercrop, Topcrop, and Selection 184. A new bean viral pathogen, yellow-spot virus, was also reported and is described. This virus is transmitted mechanically, by Aphis fabae, and through seed. Infectivity was associated with 738 plus or minus 31 nm filamentous particles. Bean

yellow-spot virus reduced yield by 20 percent. The virus was apparently related to 7 other viruses of the potato Y group, including East African BCMV and pea mosaic virus, but not to European BCMV and BYMV nor to 5 other viruses of the potato Y group. A high proportion of a representative sample of aphids trapped in bean plots in the Kenya Highlands were vectors of BCMV (61 percent) and BYMV (39 percent). However, BYMV was never isolated from beans during the survey. Correlation of virus incidence and aphid population was demonstrated. (AS (extract))

1060

26211 MORALES, F.J. 1985. Enfermedades causadas por virus. (Viral diseases). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.217-227. Span., 29 Refs., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Bean common mosaic virus; Bean yellow mosaic virus; Bean golden mosaic virus; Bean chlorotic mottle virus; Symptomatology; Etiology; Disease transmission; Disease control; Chemical control; Cultural control; Resistance; Cultivars; Colombia.

The symptomatology and control measures of BCMV, BYMV, BGMV, and bean chlorotic mottle virus are briefly described. General aspects regarding the genetic control of viruses and the use of chemicals to control insect vectors are discussed. Some bean lines and/or var. resistant to BCMV, BGMV, and bean chlorotic mottle virus are mentioned. (CIAT)

1061

26538 SEHGAL, O.P.; EL-HASSAN, S.; MURTI, K.G.; HSU, C.H. 1985. Characterization of virion RNAs of southern bean mosaic virus by electron microscopy. Phytopathologische Zeitschrift 113(1):9-16. Engl., Sum. Engl., Germ., 19 Refs. (Dept. of Plant Pathology, Univ. of Missouri, Columbia, MO 65211, USA)

Phaseolus vulgaris; Bean southern mosaic virus; Electron microscopy; Identification; USA.

Electron microscopy of denatured RNA of BSMV shows 2 principal linear components, 0.31 plus or minus 0.08 microns (subgenomic RNAs, mol. wt. 0.51 x 10 E6) and 0.80 plus or minus 0.17 microns (genomic RNA, mol. wt. 1.3 x 10 E6, 25S). Nondenatured RNA (approx. 32S) from heat-inactivated virions measure 1.0 plus or minus 0.20 microns (mol. wt. 1.64 x 10 E6) but is poorly infectious. Upon denaturation the 32S RNA disaggregates into components of lengths typical of the genomic and subgenomic RNAs and infectivity is restored. (AS)

1062

26517 TATCHELL, S.P.; BAGGETT, J.R.; HAMPTON, R.O. 1985. Relationship between resistance to severe and type strains of bean yellow mosaic virus. Journal of the American Society for Horticultural Science 110(1):96-99. Engl., Sum. Engl., 10 Refs., Illus. (Dept. of Biology, Univ. of Pennsylvania, Philadelphia, PA 19104, USA)

Phaseolus vulgaris; Bean yellow mosaic virus; Races; Resistance; Plant breeding; Inheritance; Genetics; USA.

The inheritance of resistance in beans to typical BYMV was compared with the severe strain (BYMV-S). When F3 families of BYMV-resistant Great Northern UI 31 (GN31) x susceptible Dwarf Horticultural were tested for resistance to each virus strain, occurrence of homozygous resistant families was conditioned by 3 recessive genes for BYMV and 2 recessive genes for BYMV-S. Of the 132 families tested, 122 were susceptible to both BYMV and BYMV-S, 6 were resistant to BYMV-S and susceptible to BYMV, 4 were susceptible to

BYMV-S and resistant to BYMV, and none were resistant to both. This ratio closely fits a theoretical 945:63:15:1, indicating that resistance to BYMV and to BYMV-S are inherited independently. When GN31 was crossed with breeding line S1-5, also resistant to both virus strains, F3 progenies included families susceptible to 1 or both virus strains, possibly through the complimentary interaction of modifiers. Chi square tests indicated independent inheritance of resistances to BYMV and BYMV-S in GN31 x S1-5 progenies. (AS)

1063

26521 TRINDADE, D.R.; COSTA, C.L.; KITAJIMA, E.W.; LIN, M.T. 1984. Identificacao e caracterizacao de estirpes do virus do mosaico comum do feijoeiro no Brasil. (Identification and characterization of Brazilian strains of bean common mosaic virus). Fitopatologia Brasileira 9(1):1-12. Port., Sum. Port., Engl., 9 Refs., Illus. (Empresa Brasileira de Pesquisa Agropecuária, Centro Nacional de Pesquisa da Seringueira, Caixa Postal 319, 69.000 Manaus-AM, Brasil)

Phaseolus vulgaris; Bean common mosaic virus; Races; Isolation; Cultivars; Brazil.

Bean seeds collected from various regions of Brazil, sown in a greenhouse to obtain virus-infected plants, were used as sources of BCMV. Virus isolates were obtained from these plants through aphid Myzus persicae transmission. The physical properties were determined for all the virus isolates and their particle morphology and cytoplasmic inclusion were studied under electron microscope in leaf dip and ultrathin section preparations, resp. Sixteen virus isolates were classified into recognized BCMV strains by host reactions on the following differential cv.: Dubbele Witte, Stringless Green Refuge, Imuna, Puregold Wax, Sanilac, Michelite 62, Redlands Greenleaf B, Great Northern UI 123, Monroe, Great Northern UI 31, Red Mexican UI 35, Jubila, Top Crop, Improved Tendergreen, Widusa, and Amanda. Based on this method, 4 isolates (2 from Minas Gerais, 1 from Paraná, and 1 from Goiás) were classified in strain group I. Nine other isolates (2 from Paraná, 2 from Rio Grande do Sul, and 1 each from Goiás, Pará, Santa Catarina, Sao Paulo, and Bahia) were classified in group II, while all 3 isolates from the Federal District were included in group IV. These results indicate that at least 3 groups of BCMV strains exist in Brazil according to the classification system of Drijfhout et al. (1978). (AS)

1064

26557 WALKEY, D.G.A.; WEBB, M.J.W. 1984. The use of a simple electron microscope serology procedure to observe relationships of seven potyviruses. Phytopathologische Zeitschrift 110(4):319-327. Engl., Sum. Engl., Germ., 21 Refs., Illus. (Plant Pathology Section, National Vegetable Research Station, Wellesbourne, Warwick, CV35 9EF, England)

Phaseolus vulgaris; Bea. , .low mosaic virus; Bean common mosaic virus; Serology; United Kingdom.

The relationships between BYMV, BCMV, clover yellow vein, lettuce mosaic, potato virus Y, turnip mosaic, and celery mosaic viruses were studied in homologous and heterologous reactions, using simple and relatively rapid electron microscope serology decoration (coating) tests. The degree of relationship between these viruses was assessed by the intensity of antibody coating when the viruses were decorated by heterologous antibodies. A close relationship was observed between BYMV and clover yellow vein virus, and between BYMV and lettuce mosaic virus. Celery mosaic virus was quite closely related to BYMV and clover yellow vein virus. Antibodies to BCMV and BYMV intensely decorated different strains of their own virus, but decoration was negligible in cross reactions. (AS) See also 0895 1004 1006 1110 1114 1118 1121 1136 1138 1146 1153

1065

26258 ELLIOTT, A.P.; BIRD, G.W. 1985. Pathogenicity of Pratylenchus penetrans to navy bean (Phaseolus vulgaris L.). Journal of Nematology 17(2):81-85. Engl., Sum. Engl., 11 Refs., Illus. (Dept. of Plant Pathology & Physiology, Virginia Polytechnic Inst. & State Univ., Blacksburg, VA 24061, USA)

Phaseolus vulgaris; Cultivars; Pratylenchus penetrans; Leaf area; Shoots; Resistance; Yields; USA.

The pathogenicity of Pratylenchus penetrans to Phaseolus vulgaris was evaluated in greenhouse expt. Shoot and root fresh wt. of cv. Sanilac plants were increased 4 and 21 percent, resp., by an initial population density of 25 P. penetrans/100 cubic centimeters soil. Leaf area and shoot fresh and dry wt. were decreased by an initial population density of 50 or more P. penetrans/100 cubic centimeters soil. A significant positive linear relationship existed between initial soil population densities of P. penetrans and final soil and root population densities of this nematode. Three bean cv., Sanilac, Seafarer, and Tuscola, were susceptible to P. penetrans, and yields were reduced by 43-76 percent when plants were exposed to an initial population density of 150 P. penetrans/100 cubic centimeters soil. P. penetrans also reproduced on bean cv. Saginaw, Gratiot, and Kentwood, but did not decrease bean yields, suggesting that these cv. were tolerant to this nematode. (AS)

1066

26264 GAST, R.E.; WILSON, R.G.; KERR, E.D. 1984. Lesion nematode (Pratylenchus spp.) infection of weed species and fieldbeans (Phaseolus vulgaris). Weed Science 32(5):616-620. Engl., Sum. Engl., 24 Refs., Illus. (Univ. of Nebraska, Scottsbluff, NE 69361, USA)

Phaseolus vulgaris; Nematodes; USA.

Field research was conducted during the summers of 1981 and 1982 in order to determine relative infection and population increase of lesion nematodes (Pratylenchus spp.) on 7 weed species that commonly occur in Phaseolus vulgaris fields in western Nebraska (USA). Weeds were grown at 3 densities, with and without P. vulgaris. No difference in nematode infection rate was found among weed population levels. Nematodes/g dry root were not different in weeds grown with or without P. vulgaris. There was a significant difference among most weed species when nematodes/g dry root were estimated. (AS (extract))

1067

21875 MARTINEZ, M.; MORETA, D.; DE LA CRUZ, P. 1979. Situación nematológica en el cultivo de fríjol en el Valle de San Juan de la Maguana. (Situation of nematodes in bean crops in the San Juan de la Maguana Valley). In Annual Meeting of the Caribbean Food Crops Society, 16th., Santo Domingo, República Dominicana, 1979. Proceedings. Santo Domingo. pp.123-132. Span., Sum. Span., Fr., Engl.

Phaseolus vulgaris; Nematodes; Dominican Republic.

The genera of nematodes associated with beans, their percentage and frequency of incidence were determined in the San Juan de la Maguana Valley, Dominican Republic. Ten genera of nematodes were found associated with the crop: Tylenchus spp. Psilenchus spp., Ditylenchus spp., Criconemoides spp., Rotylenchus spp., Meloidogyne spp., Tylenchorhynchus spp., Pratylenchus spp., Trichodorus spp., and Aphelenchus spp. Meloidogyne spp. showed the highest percentage of incidence in the soil and roots. (AS (extract)) See also 0852 1026

1068

26235 ACHWANYA, O.F. 1984. Effects of ozone, sulfur dioxide and alpha and delta races of Colletotrichum lindemuthianum (Sacc. & Magn.) Bri. and Cav. on bean (Phaseolus vulgaris L.). Ph.D. Thesis. Blacksburg, Virginia Polytechnic Institute and State University. 166p. Engl., Sum. Engl., 227 Refs., Illus.

Phaseolus vulgaris; Cultivars; Ozone; SO2; Air pollution; Colletotrichum lindemuthianum; Plant injuries; Chlorophyll; Biomass production; Kenya; USA.

A no. of bean cv. were evaluated for their response to the air pollutants O3 and SO2, singly and in combination, as well as for their reaction to the alpha and delta races of Colletotrichum lindemuthianum. Variation in response to both the pollutants and the fungus was noted among the cv. Anthracnose caused a reduction in the biomass of some cv. of the order of 50 percent. A negative correlation of (r = -0.72, p less than 0.0001) was found between the disease severity and the total plant biomass. Greater than additive effects of O3 + SO2 mixtures were demonstrated. Chlorophyll content and biomass were found to be reliable variables for assessing treatment effects. The pollutants appeared to stimulate the disease development. Greater pollutant injury was also noted in the presence of the anthracnose disease. The results indicated that there was an interaction between the fungal disease and the air pollutants. Implications for evaluating bean cv. for resistance to C. lindemuthianum under polluted atmosphere are suggested. (Dissertation Abstracts International)

1069

26240 AMIRO, B.D. 1983. Studies of ozone flux and leaf temperature in Phaseolus vulgaris L. Thesis Ph.D. Ontario, Canada, University of Guelph. 115p. Engl., Sum. Engl., 117 Refs., Illus.

Phaseolus vulgaris; Ozone; Leaves; Temperature; Air pollution; Foliage; Canada.

In studies with Phaseolus vulgaris leaves placed in a cuvette, leaf temp. was accurately monitored using a specially-developed infrared thermometer. Data are presented which indicate that the use of either O3 concn. or dosage is insufficient to predict when foliar injury will occur. The onset of visual foliar injury depended on O3 flux density and time. The length of exposure period required for visual injury to occur was very sensitive to leaf diffusive conductance. In the O3-resistant cv. Gold Crop, there was an absolute O3 flux density threshold below which it did not become injured. Above this threshold it responded to O3 similarly to the O3-sensitive cv. Seafarer. (Horticultural Abstracts)

1070

26903 EHART, D.L.; JOLLIFFE, P.A. 1985. Leaf injury to bean plants grown in carbon dioxide enriched atmospheres. Canadian Journal of Botany 63(11):2015-2020. Engl., Sum. Engl., Fr., 27 Refs., Illus. (Dept. of Plant Science, Univ. of British Columbia, Vancouver, B.C., Canada V6T 2A2)

Phaseolus vulgaris; Plant injuries; Plant physiological disorders; CO2; Canada.

Bush bean plants grown in atmospheres enriched with CO2 (1400 microliters/liter) showed marked reductions in photosynthetic capacity and accelerated chlorosis of primary leaves. Leaf injury was observed only in CO2-enriched plants, but the degree of injury was regulated by secondary factors, light and temp. Conditions of relatively high light intensity (340-370 micromoles/m(2)/s photosynthetic photon flux density) or cool temp. (20 degrees Celsius) promoted leaf injury of CO2-enriched plants. Leaf starch

accumulation was highest under conditions that caused injury. The enhanced chlorosis and corresponding decline in photosynthetic activity, however, were not related to changes in stomatal diffusive resistance or leaf water status. Contaminant gases, such as ethylene, were not detectable in the CO2-enrichment chambers. (AS)

1071

26241 LEE, E.H.; JERSEY, J.A.; GIFFORD, C.; BENNETT, J. 1984. Differential ozone tolerance in soybean and snapbeans: analysis of ascorbic acid in O3-susceptible and O3-resistant cultivars by high-performance liquid chromatography. Environmental and Experimental Botany 24(4):331-341. Engl., Sum. Engl., 38 Refs., Illus. (United States Dept. of Agriculture, Agricultural Research Service, Plant Stress Laboratory, Beltsville, MD 20705, USA)

Phaseolus vulgaris; Snap beans; Cultivars; Ozone; Leaves; Stomata; Plant injuries; Resistance; USA.

The relationship between foliar O3 tolerance and leaf ascorbic acid concn. in O3-susceptible (O3-S) soybean cv. Hark and O3-resistant (O3-R) soybean cv. Hood and in Phaseolus vulgaris cv. BBL-290 (O3-S) and Astro (O3-R) was examined by using high-performance liquid chromatography. Isocratic separation of ascorbic acid for leaf tissues was accomplished in less than 5 min on a microBondapak C-8 reverse phase column using 2 percent NH4H2PO4 (pH 2.8) as the solvent. Tissues were extracted with 6 percent metaphosphoric acid containing 1 x 10 E-6 molar EDTA. Resistant cv. contained more ascorbic acid in their trifoliate leaves than did the corresponding susceptible cv. Young trifoliate leaves were highly tolerant to O3 and had proportionally higher ascorbic acid concn. than newly expanded leaves. A threshold concn. of approx. 1000 micrograms ascorbic acid/g leaf fresh wt. was required for good O3 protection. O stress was shown to induce the production and accumulation of ascorbic acid in O3-treated leaves. Possible mechanisms for enhanced tolerance to O3 stress are discussed. (AS)

1072

26226 TEMPLE, P.J.; CAO, H.F.; TAYLOR, O.C. 1985. Effects of SO2 on stomatal conductance and growth of Phaseolus vulgaris. Environmental Pollution (Series A) 37(3):267-279. Engl., Sum. Engl., 40 Refs., Illus. (Statewide Air Pollution Research Center, Univ. of California, Riverside, CA 92521, USA)

Phaseolus vulgaris; SO2; Stomata; Leaf area; Growth; Plant injuries; Plant physiological disorders; Air pollution; USA.

Exposure of pinto beans to 0.15, 0.25, and 0.50 ml/liter SO2 at an identical daily dose for 4 wk. reduced leaf area, shoot and root dry wt. and increased shoot:root ratios and specific leaf areas. Plants with cotyledons removed immediately after germination were smaller than intact plants but responses to SO2 were similar in both groups. Increasing the SO2 concn. reduced growth to a greater extent than increasing the duration of exposure. Stomatal conductances decreased immediately after exposure as a function of increased SO2 concn. but conductances returned to control levels 1 day after termination of exposure. Reductions in stomatal conductance in response to SO2 were proportional to reductions in plant growth. The results support the concept that SO2 at dosages below levels at which foliar injury symptoms develop can decrease stomatal conductance, reduce plant growth, and alter partitioning of DM into leaves, shoots, and roots. The contention that slower growing plants show greater growth responses to SO2 than the more rapidly developing plants was not supported. (AS)

1073

26520 TINGEY, D.T.; HOGSETT, W.E. 1985. Water stress reduces ozone injury via a stomatal mechanism. Plant Physiology 77(4):944-947. Engl., Sum.

Engl., 24 Refs., Illus. (United States Environmental Protection Agency, 200 S.W. 35th Street, Corvallis, OR 97333, USA)

Phaseolus vulgaris; Water stress; Ozone; Stomata; Plant injuries; USA.

Pinto bean plants were established and transferred to membrane systems which controlled the osmotic potential around the roots at -35 or -80 kPa for 5 days prior to O3 treatment (0 or 1 microliters/liter for 2 h). Both water-stressed and unstressed plants were sprayed with various concn. of ABA to close the stomata or with fusicoccin to induce stomatal opening. The abaxial stomatal resistance of primary and trifoliate leaves was measured just before O3 exposure. Plant response to O3 was determined by stress ethylene production and chlorophyll loss. Both water stress and ABA induced stomatal closure and reduced O3 injury. In water-stressed plants, fusicoccin induced stomatal opening and those plants were as sensitive to O3 as were the unstressed plants. The data suggest that water stress protects plants from O3 injury mainly through its influence on stomatal aperture rather than through biochemical or anatomical changes. (Review of Plant Pathology) See also 0936 1127

1074

22561 AVALOS Q., F. 1984. Control integrado de las plagas del fríjol. (Integrated control of bean pests). In Curso Intensivo Postgrado de Investigación para la Producción de Fríjol en el Perú, 2o., Chinch , Perú, 1984. Trabajos presentados. Lima, Instituto Nacional de Investigación y Promoción Agropecuaria. Programa Nacional de Leguminosas de Grano. Guía Didáctica no.6. pp.86-92. Span.

Phaseolus vulgaris; Insect control; Integrated control; Biological control; Predators and parasites; Peru.

The characteristics of integrated pest control, control methodologies, economic injury thresholds, and the phenology and population dynamics of arthropods are described. Beneficial species to the crop and their hosts in Peru are listed. (CIAT)

1075

26213 CARDONA, C.; ZUÑIGA, T. 1985. Metodología de investigación en entomología de fríjol. (Research methodology in bean entomology). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.241-246. Span., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Entomology; Empoasca kraemeri; Apion godmani; Germplasm; Selection; Resistance; Cultivars; Colombia.

The general objectives of CIAT's bean entomolo, program are mentioned. The 1st priority has been given to var. resistance as an ideal pest control method. At CIAT's headquarters (Palmira, Colombia), studies are conducted on Empoasca kraemeri, mites, and storage insects; var. resistance to Apion godmani and Epinotia aporema is being studied at other institutions. The steps of genetic improvement of beans for resistance to E. kraemeri are described: selection of sources of resistance, hybridization of selected materials, and selection of resistant progenies. (CIAT)

1076

26214 HALLMAN, G. 1985. El control químico de plagas de fríjol. (Chemical control of bean pests). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.247-256. Span., 1 Ref., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Injurious insects; Insect control; Chemical control; Colombia.

A description is given of the different manners in which insecticide toxicity is expressed (lethal dose, continuous dose, lethal time, lethal concn., and effective dose), insect resistance to chemicals, insecticide types, application, and the role of chemical control in integrated pest control. Insect pests of beans in Latin America are listed. (CIAT)

1077

26212 ZUÑIGA, T. 1985. Conceptos básicos de entomología y manejo de plagas. (Basic concepts of entomology and pest management). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.231-239. Span., 5 Refs., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Entomology; Resistance; Empoasca kraemeri; Apion godmani;

Colombia.

The natural factors affecting insect pest mortality are described as an important aspect in the regulation of populations. Through graphs of population density vs. time, the position of equilibrium of an insect population, the economic threshold, and the level of economic damage are indicated. General aspects of var. resistance are discussed, namely: antixenosis, tolerance, and antibiosis, the latter regarding Apion godmani and Empoasca kraemeri. (CIAT) See also 0895 0937 1104 1216 1217

1078

22555 AVALOS Q., F. 1984. Descripción y daños de las principales plagas que atacan al fríjol en el Perú. (Description and damage of the main pests attacking beans in Peru). In Curso Intensivo Postgrado de Investigación para la Producción de Fríjol en el Perú, 2o., Chincha, Perú, 1984. Trabajos presentados. Lima, Instituto Nacional de Investigación y Promoción Agropecuaria. Programa Nacional de Leguminosas de Grano. Guía Didáctica no.6. pp.37-41. Span.

Phaseolus vulgaris; Injurious insects; Peru.

A list of the main insect pests affecting bean production in Peru is presented. At the present time, control measures are being carried out in about 14 species that cause losses of up to 20 percent in bean production. Among the most important insects are Elasmopalpus lignosellus, Spodoptera sp., Prodenia oridania, Empoasca kraemeri, Bemisia tuberculata, Liriomyza huidobrensis, Epinotia aporema, Laspeyresia leguminis, and mites. Brief information is included on some control measures of these insects. (CIAT)

1079

22557 AVALOS Q., F. 1984. Gusanos barrenadores de brotes y vainas: desinfección y control. (Shoot- and pod-boring insects: disinfection and control). In Curso Intensivo Postgrado de Investigación para la Producción de Fríjol en el Perú, 2o., Chincha, Perú, 1984. Trabajos presentados. Lima, Instituto Nacional de Investigación y Promoción Agropecuaria. Programa Nacional de Leguminosas de Grano. Guía Didáctica no.6. pp.51-54. Span.

Phaseolus vulgaris; Epinotia opposita; Insect biology; Insect control; Chemical control; Peru.

A brief description is given of the geographical distribution, host plants, biology, plant damage, natural enemies, control (cultural, var., chemical, and integrated) for the pod- and shoot-boring insects of beans, specifically Epinotia aporema. (CIAT)

1080

26523 BECHINSKI, E.J.; STOLTZ, R.L. 1985. Presence-absence sequential decision plans for Tetranychus urticae (Acari:Tetranychidae) in garden-seed beans, Phaseolus vulgaris. Journal of Economic Entomology 78(6):1475-1480. Engl., Sum. Engl., 16 Refs., Illus. (Dept. of Plant, Soil & Entomological Sciences, Univ. of Idaho, District III Extension Office, 1330 Filer Avenue East, Twin Falls, ID 83301, USA)

Phaseolus vulgaris; Tetranychus telarius; Entomology; USA.

A sequential decision plan was developed for assessing economic importance of spider mites (Tetranychus urticae) in Phaseolus vulgaris. Precision and cost analyses showed that sample units should consist of single trifoliolate leaves picked from the bottom third of the plant canopy. Provisional economic thresholds were established for 2 preharvest intervals in terms of proportion of leaves infested with 5 or more mites and 10 or more mites/leaf. Upper and lower critical limits of the sequential decision plan were defined. (AS (extract))

1081

26049 CHICOMA P., F. 1982. Control químico de Acanthoscelides obtectus Say. (Chemical control of Acanthoscelides obtectus). In Taller Nacional sobre Manejo de Plagas en Fríjol, 1o., Vista Florida, Chiclayo, Perú, 1982. Estrategias a desarrollar, conclusiones y recomendaciones. Chiclayo, Centro de Investigación y Promoción Agropecuaria. 4p. Span., 4 Refs.

Phaseolus vulgaris; Acanthoscelides obtectus; Chemical control; Insect control; Stored grain pests; Peru.

The efficiency of 2 insecticides (pirimiphos-methyl and fenitrothion) and vegetal oil in controlling the bean bruchid (Acanthoscelides obtectus) in Peru was evaluated. The 2 insecticides controlled bruchids for 34 days, compared with only 46 h for the vegetal oil. (CIAT)

1082

21873 CRUZ C. 1979. Insecticidas y tiempo de aplicación para el control del lorito verde, Empoasca spp. en Puerto Rico. (Insecticides and time of application for the control of leafhoppers, Empoasca spp., in Puerto Rico). In Annual Meeting of the Caribbean Food Crops Society, 16th., Santo Domingo, República Dominicana, 1979. Proceedings. Santo Domingo. pp.83-97. Span., Sum. Span., Fr., Engl., 3 Refs.

Phaseolus vulgaris; Empoasca kraemeri; Insect control; Chemical control; Puerto Rico.

To determine the most appropriate time for the control of the leafhopper, Empoasca spp., in beans, various trials with carbofuran and oxamyl were conducted at the Isabela agricultural expt. Substation in Puerto Rico. The trials were carried out on small plots arranged in randomized complete blocks with 4 or 6 replications. The treatments in the different expt. have been evaluated in different seasons after planting, different periods, and different quantities. The nymphal leafhopper population, the visual index of damage symptoms, and dry grain yield were recorded. The results indicated that the critical application time for chemical control was during the 1st 4-5 wk. after planting. This was noticeable when systemic and granulated insecticides were applied to the soil than when foliar insecticides were used. With foliar insecticides it was found that the greater the no. of applications the higher the dry grain yield. With the greater no. of applications of oxamyl, production increased 3-fold. Nevertheless, a single application of carbofuran at the rate of 2.2 kg a.i./ha, during the 1st mo. after planting was sufficient to triple dry grain production.

1083

26278 DELLA LUCIA, T.M.C.; CHANDLER, L.; CASALI, V.W.D.; CALVAO, J.D.; FREIRE, J.A.H.; COSTA, L.M. DA 1984. Aplicacao da tabela de vida das culturas as pragas de Phaseolus vulgaris L. em quatro níveis de adubacao. 2. Em áreas de baixa fertilidade. (Application of the crop life table to bean pests under four levels of fertilization. 2. In low-fertility areas). Revista Ceres 31(178):444-463. Port., Sum. Port., Engl., 28 Refs., Illus. (Depto. de Fitotecnia de Univ. Federal de Vicosa, 36.570 Vicosa-MG, Brasil)

Phaseolus vulgaris; Fertilizers; Developmental stages; Injurious insects; Production; Agrotis ipsilon; Acanthoscelides obtectus; Etiella zinckenella; Brazil.

Field expt. were conducted at the U. Federal de Vicosa (Brazil) to determine the relationship between levels of fertilization and bean production, especially regarding production losses caused by insect pests. Agrotis ipsilon, Etiella zinckenella, and acanthoscelides obtectus were the most important insects during the bean crop cycle. Components of production were treated by the method of simple cluster analysis to determine fertilizer level-bean production relationship. Losses caused by insects tended to decrease with increasing fertilization rates. Production increased with soil fertility. (CIAT)

1034

26541 ELTOUM, E.M.A.; BERRY, R.E. 1985. Influence of garden symphylan (Symphyla: Scutigerellidae) root injury on physiological processes in snap beans. Environmental Entomology 14(4):408-412. Engl., Sum. Engl., 24 Refs. (Dept. of Entomology, Oregon State Univ., Corvallis, OR 97331, USA)

Phaseolus vulgaris; Scutigerella immaculata; Plant injuries; Photosynthesis; Plant physiological disorders; USA.

Studies were conducted to determine the effects of garden symphylan (Scutigerella immaculata) root injury on physiological processes of bush snap beans. Root injury caused by 10 or 20 symphylans significantly affected physiological processes in snap beans, but plants infested with 5 symphylans were not significantly different from noninfested plants. Symphylan-induced root injury significantly reduced leaf water potential and increased soluble leaf carbohydrates in plants infested with 10 or 20 symphylans. Photosynthesis, measured as assimilation of (14)CO2, was also significantly reduced in plants infested with 10 or 20 symphylans. Total dry wt. of shoots and roots of plants infested with 10 or 20 symphylans was significantly reduced 32 days after infestation. Fresh wt. of pods was significantly lower in infested plants at harvest (38 days after infestation). (AS)

1085

25628 FISHER, E.H. 1946. Applying hormone to increase bean yield. Food Packer 27(11):61-62,64. Engl., Illus.

Phaseolus vulgaris; Lygus oblineatus; Insect control; Plant growth substances; Yields; USA.

The use of alpha-naphthalene acetic acid dusts to avoid bean bud, flower, and pod abscission due to Lygus oblineatus attacks is reported. Bean yields were increased 24 percent at hormone concn. of 40-80 ppm and increases were due to a higher grain production rather than to increases in grain size. Alpha-naphthalene acetic acid sprays at 57 kg pressure were detrimental on bean plants at the same concn. as dusts since flowers and small grains were knocked off. (CIAT)

1086

26285 MENDEZ S., H.; ORTIZ L., J.C.; HALLMAN, G. 1984. Efecto del ataque de Empoasca kraemeri Ross and Moore (Homoptera:Cicadellidae) sobre el rendimiento en dos variedades de fríjol (Phaseolus vulgaris L.) en cuatro etapas de desarrollo. (Effect of Empoasca kraemeri (Homoptera:Cicadellidae) attack on yield of two bean varieties in four developmental stages). Acta Agronómica 34(3):48-57. Span., Sum. Span., Engl., 7 Refs., Illus.

Phaseolus vulgaris; Cultivars; Developmental stages; Empoasca kraemeri; Yields; Colombia.

To determine the effect on yield of Empoasca kraemeri attack during different stages of bean growth, field trial was carried out using 2 bean var.: Diacol-Calima (susceptible to E. kraemeri) and EMP-81 (tolerant). Growth stages were divided into 4 2-wk. periods: 14-28 days after planting (vegetative growth), 28-42 days (flowering), 42-56 days (pod fill), and 56-70 days (maturity). Plantings were made at 2-wk. intervals so that all of the stages were present in a replicate at the same time, during which they were infested with adults and nymphs of E. kraemeri. At the end of the 2-wk. period the infestation was terminated. Four replicates were planted, each on a different date. There were no significant differences in yield between the 1st 3 growth stages, although they yielded less compared with the uninfested check. The final growth stage (56-70 days) was not significantly different from the check in yield. It was not possible to achieve E. kraemeri infestation levels in the last growth stage as high as those in the 1st 3,

possibly due to nonpreference of E. kraemeri for maturing beans. (AS)

1087

26059 QUIROZ E., C. 1985. Descripción, daño y control de las principales plagas del frejol en condiciones de campo. (Description, damage, and control of the main bean insect pests under field conditions). In Curso Internacional de Investigación sobre Producción de Frejol (Phaseolus vulgaris), Santiago, Chile, 1985. Trabajos presentados. Santiago, Instituto de Investigaciones Agropecuarias. Estación Experimental La Platina. 20p. Span.

Phaseolus vulgaris; Insect biology; Plant injuries; Insect control; Integrated control; Delia platura; Elasmopalpus lignosellus; Agrotis; Homoptera; Empoasca camara; Tetranychus; Liriomyza quadrata; Epinotia aporema; Chile.

The overall control strategies of bean insect pests, including chemical, cultural, biological, and genetic control methods, are briefly discussed, and the main insect pests found in the crop in Chile are described. A description is given of the biology, damage, and control of soil and seedling pests (Delia platura, Elasmopalpus lignosellus, and Agrotis spp.), leaf insects (Rachiplusia sp., aphids, Empoasca camara, Tetranychus spp., and Liriomyza quadrata), and pod insects (Epinotia aporema). (CIAT)

1088

26503 SANTA CECILIA, L.V.C.; ABREU, A.DE F.B. 1984. Flutuacao populacional da cigarrinha-verde em cultivares de feijoeiro em Minas Gerais. (Population fluctuation of the leafhopper on bean cultivars in Minas Gerais). Perquisa Agropecuaria Brasileira 19(8):921-923. Port., Sum. Port., Engl., 5 Refs. (Empresa de Assistencia Tecnica e Extensao Rural do Estado de Minas Gerais Empresa de Pesquisa Agropecuaria do Estado de Minas Gerais, Caixa Postal 176, 37.200 Lavras-MG, Brasil)

Phaseolus vulgaris; Cultivars; Empoasca kraemeri; Brazil.

The population fluctuation of Empoasca kraemeri on 18 bean cv. was studied in 3 localities of southern Minas Gerais (Lavras, Machado, and Careacu), Brazil, during the rainy and dry seasons. Insect samplings of nymphal stages were made 20, 48, and 70 days after planting. The highest nymph population occurred at 70 days after planting, except in Lavras (48 days). The highest population density was observed on cv. Palmital Precoce. Pest incidence was higher during the dry period, occurring most in Careacu. (CIAT)

1089

26216 SCHOONHOVEN, A. VAN; CARDONA, C. 1985. Plagas que atacan el follaje. (Leaf-feeding insects). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.263-274. Span., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Diabrotica balteata; Cerotema facialis; Empoasca kraemeri; Epilachna varivestis; Trichoplusia ni; Bemisia tabaci; Homoptera; Polyphagotarsonemus latus; Agromyza; Tetranychus telarius; Insect biology; Insect control; Colombia.

The biology, damage caused, and control (cultural, chemical, and var. resistance) of the following insect pests attacking bean plant foliage are described: chrysomelids, Empoasca kraemeri, Epilachna varivestis, Trichoplusia ni, Bemisia tabaci, aphids, Tetranychus spp. Polyphagotarsonemus latus, Agromyza spp., and Hemichalepus spp. (CIAT)

1090

26215 SCHOONHOVEN, A. VAN 1985. Plagas que atacan la plántula. (Seedling-attacking pests). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.257-262. Span., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Delia platura; Slugs; Coleoptera; Elasmopalpus lignosellus; Vaginulus plebeius; Agrotis; Spodoptera; Insect control; Colombia.

The following insect pests attacking bean seedlings are briefly described and the damage they cause is mentioned: Delia platura, Gryllus spp., Phyllophaga spp., Elasmopalpus lignosellus, slugs, and cutworms. Some cultural and chemical control measures are indicated. (CIAT)

1091

26217 SCHOONHOVEN, A. VAN; CARDONA, C. 1985. Plagas que atacan las vainas. (Pod-attacking pests). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.275-278. Span., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Apion godmani; Insect control; Epinotia aporema; Maruca testulalis; Heliothis zea; Colombia.

The biology of pod-attacking insect pests of beans (Apion godmani, Epinotia aporema, Maruca testulalis, and Heliothis spp.) is briefly described. Cultural and chemical control measures are indicated. Some biological control measures are indicated for the case of Heliothis. (CIAT)

1092

22558 SOTO, O. 1984. El minador de la hoja, descripción y control. (The leaf miner, description and control). In Curso Intensivo Postgrado de Investigación para la Producción de Fríjol en el Perú, 2o., Chincha, Perú, 1984. Trabajos presentados. Lima, Instituto Nacional de Investigación y Promoción Agropecuaria. Programa Nacional de Leguminosas de Grano. Guía Didáctica no.6. pp.55-58. Span., 9 Refs.

Phaseolus vulgaris; Liriomyza; Insect biology; Insect control; Peru.

The morphology, biology, monitoring, and control measures of the insects belonging to the genus Liriomyza (leaf miners) are briefly described. (CIAT)

1093

26047 ZAMBIA. MINISTRY OF AGRICULTURE AND WATER DEVELOPMENT. 1985. Bean observation plots. In _____. Grain Legume Research. Annual Report 1984/85. Chipata, Msekera Regional Research Station. pp.18-20. Engl.

Phaseolus vulgaris; Insect biology; Ophiomyia phaseoli; Ophiomyia spencerella; Ophiomyia centrosematis; Predators and parasites; Zambia.

Bean observation plots were established at 11 Zambian sites to obtain data on the biology of the species of bean fly. Three Ophiomyia species were identified, namely O. phaseoli, O. spencerella, and O. centrosematis, the former 2 being of major importance. O. spencerella appears to prefer higher rainfall areas at medium to higher alt., while O. centrosematis appears to prefer medium to low alt.; O. phaseoli was found at all sites. Marked seasonal differences occurred between O. phaseoli and O. spencerella; the former is predominant in the early part of the season (mid-Dec. to early Jan.), both occur in the mid-season, and the latter is predominant in the late part of the season. Opius melanagromyzae appears to play an important role in regulating Ophiomyia spp. populations in the mid to late season.

(CIAT)

1094

26045 ZAMBIA. MINISTRY OF AGRICULTURE AND WATER DEVELOPMENT. 1985. Bean pest resistance nursery. In _____. Grain Legume Research. Annual Report 1984/85. Chipata, Msekera Regional Research Station. pp.14-16. Engl.

Phaseolus vulgaris; Cultivars; Resistance; Ophiomyia phaseoli; Ophiomyia spencerella; Aphis craccivora; Maruca testulalis; Ootheca; Zambia.

Thirty-two bean cv. were evaluated for resistance/tolerance to insect pests in Zambia. A few cv. showed moderate to severe damage by Aphis craccivora, Maruca testulalis, and Ootheca sp. Ten cv. were tolerant/resistant to Ophiomyia phaseoli. Cv. G04485, G04489, and G056 S also showed resistance to Ophiomyia spencerella. (CIAT)

1095

26044 ZAMBIA. MINISTRY OF AGRICULTURE AND WATER DEVELOPMENT. 1985. Bean seed treatment trial. In _____. Grain Legume Research. Annual Report 1984/85. Chipata, Msekera Regional Research Station. pp.12-13. Engl.

Phaseolus vulgaris; Ophiomyia phaseoli; Insect control; Chemical control; Seed treatment; Zambia.

An expt. was conducted at Msekera Regional Station (Zambia) in 1984-85 to study the protection against Ophiomyia phaseoli by insecticide treatments (pirimiphos-ethyl, dieldrin, and endosulfan) of bean seed at 3 planting dates (Dec. 6 and 29, Jan. 17). Dieldrin and endosulfan gave excellent control. Early plantings benefit from seed dressings, but plantings after mid-Jan. would probably not benefit due to a natural regulati of the pest by parasites. It is recommended that early-planted bean especially in a maize/bean intercrop, should receive an insecticide seed dressing, particularly endosulfan. (CIAT) See also 0940 09.; 0980 0998 1012 1014 1139 1211 1212 1213 1214 1215 1218 1219

1096

26039 ADAMS, M.W.; BARNES-McCONNELL, P.W.; MILLER, J.; EDJE, T. 1982. Genetic, agronomic, and socio-cultural analysis of diversity among bean land races in Malawi. In Bean/Cowpea Collaborative Research Support Program. U.S.A. 1982 Annual Report. East Lansing, Michigan State University. pp.70-73. Engl.

Phaseolus vulgaris; Germplasm; Seed characters; Agricultural projects; Crossbreeding; Malawi.

The objectives and achievements of the project to analyze the genetic, agronomic, and sociocultural diversity of bean land races in Malawi are presented. A total of 113 collections were made and their overall characteristics are described. Field plantings at Michigan State U. (USA) of 97 seed types from Malawi support the hypothesis that some of the genetic diversity could be due to natural outcrossing. Activities for 1983 are briefly outlined. (CIAT)

1097

26971 ADAMS, M.W.; TAYLOR, J.L. 1980. Advanced strain testing and discussion of results. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. pp.46-59. Engl.

Phaseolus vulgaris; Genotypes; Cultivars; Yields; Plant architecture; Soil compaction; Plant breeding; USA.

Results of the advanced bean strain testing are analyzed to (1) identify the lines having high yield potential, acceptable plant architecture, seed quality and maturity, and (2) determine line performance under moderately compacted soil conditions. Of the 330 exptl. selections in multiple-row replicated yield tests, 162 were judged worthy of harvest. The mean yield of these 162 selections on noncompacted soil was better than the mean yield of the standard navy var. used as checks. The Great Northern, Small Red, and Pinto strains, although vegetatively vigorous and satisfactorily adapted to summer season daylengths and temp., are exceedingly prone to become decumbent in the late pod-filling stage. At harvest they are flat upon the ground; for this reason, during wet periods, the pods absorb moisture from the soil and suffer mold. (CIAT)

1098

26972 ADAMS, M.W. 1980. Cooperative tests with the new architypes. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. pp.61-64. Engl.

Phaseolus vulgaris; Cultivars; Germplasm; Yields; Planting; Spacing; Fertilizers; N; Herbicides; Soil compaction; USA.

Results of evaluations made with the navy bean architypes selected by the var. development program of Michigan State U., USA, are given. Evaluations have been made on yield, row widths, planting density, N fertilization, herbicides, compaction, and direct harvest. (CIAT)

1099

26527 BEAVER, J.S.; PANIAGUA, C.V.; COYNE, D.P.; FREITAG, G.F. 1985. Yield stability of dry bean genotypes in the Dominican Republic. Crop Science 25(6):923-926. Engl., Sum. Engl., 11 Refs. (Dept. of Agronomy & Soils, Univ. of Puerto Rico, Mayagüez, Puerto Rico 00708)

Phaseolus vulgaris; Genotypes; Yields; Dominican Republic.

The seed yield and stability of performance of dry bean genotypes grown in the Dominican Republic were measured using data from the 1981-82 and 1982-83 growing seasons. Genotype-environment interactions were analyzed using regression techniques. Heterogeneity among regression coefficients accounted for a significant portion of the genotype-environment interaction. The determinate red-mottled genotypes that are grown widely in the Dominican Republic produced seed yields equal to or less than the mean of the tests, had an av. yield response to environments of varying levels of productivity, and showed significant deviations from regression. On the other hand, indeterminate genotypes, such as black-seeded La Vega and white-seeded 2W-33-2, produced greater than av. mean seed yields, had an av. or greater-than-av. response to environments of varying levels of productivity, and possessed min. deviations from regression during both growing seasons. These results suggest that the development of indeterminate red-mottled genotypes might improve the yield level and stability of this bean class. (AS)

1100

25894 CULLIMORE J.V.; GEBHARDT, C.; SAARELAINEN, R.; MIFLIN, B.J.; IDLER, K.B.; BARKER, R.F. 1984. Glutamine synthetase of Phaseolus vulgaris L.: organ-specific expression of a multigene family. Journal of Molecular and Applied Genetics 2(6):589-599. Engl., Sum. Engl., 47 Refs., Illus. (Dept. of Biological Sciences, Univ. of Warwick, Coventry, CV4 7AL, England)

Phaseolus vulgaris; DNA; Rhizobium phaseoli; RNA; Nodulation; Genes; United Kingdom.

A recombinant plasmid (pcPvNGS-01) containing sequences related to glutamine synthetase (GS) was identified from a cDNA library constructed from poly(A+) RNA isolated from root nodules of Phaseolus vulgaris. The identification of this recombinant relied on the observations that: (a) the clone hybridized strongly to purified GS mRNA; (b) in hybrid-select translation expt., the clone selected mRNA that produced a polypeptide identical in mol. wt. to purified GS subunits which was immunoprecipitated with anti-GS-antiserum; and (c) the translated nucleotide sequence of the cloned cDNA was homologous to a partial amino acid sequence of higher plant GS. The cloned cDNA hybridized to poly(A+) RNA of different mobilities from leaves, roots, and nodules of P. vulgaris. In RNA "dot" blots washed at different stringencies, differences were observed both in the relative amounts of GS mRNA in different tissues and in the strength of their hybridization to the cDNA probe. The cloned probe hybridized to several fragments of restricted P. vulgaris DNA but not to DNA from Rhizobium phaseoli. It is suggested that GS is coded for by a small multigene family showing organ-specific expression. (AS)

1101

26982 GHADERI, A.; ADAMS, M.W. 1980. Preliminary studies on the inheritance of structural components of plant architecture in dry bean (Phaseolus vulgaris L.). In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. pp.96-99. Engl.

Phaseolus vulgaris; Inheritance; Plant architecture; Cultivars; Crossbreeding; USA.

An expt. was carried out to obtain information on the mode of inheritance of morphological components of plant architecture and their contribution to bean seed yield. Three crosses were made that involved the following genotypes: (1) Seafarer, a standard navy bean with determinate bush and early growth habit; (2) #791515, a breeding line producing one single stem with no lateral branches; and (3) #790780, a plant selection with desirable architectural plant type (architype). Estimates of broad-sense heritabilities were high for

all characters in crosses Seafarer x #790780 and Seafarer x #791515. Broad-sense heritabilities indicate that appreciable genetic variances (additive and dominance) exist in the F2 populations derived from the crosses. Based on the information obtained from the preliminary study, it could be concluded that large amounts of variability for architectural characters could be produced by crossing architecturally divergent parents. (CIAT)

1102

22506 HIDALGO, R. 1980. Catálogo descriptivo del germoplasma de fríjol común Phaseolus vulgaris L. (Descriptive catalog of bean germplasm). Cali, Colombia, Centro Internacional de Agricultura Tropical. 422p. Engl., Span.

Phaseolus vulgaris; Germplasm; Seed color; Plant habit; Seed characters; Adaptation; Resistance; Cultivars; Viroses; Xanthomonas phaseoli; Uromyces phaseoli; Colletotrichum lindemuthianum; Empoasca; Colombia.

The 1st 10,000 Phaseolus vulgaris accessions, which represent only half of the collection maintained at CIAT, are reported. The evaluation procedure is described and statistics related to frequency and percentage of color groups and growth habit within the collection are included as well as evaluation data of each accession (identification, origin, seed characteristics, morphoagronomic characters, and adaptation). A list of materials reported as resistant to diseases and insects is also given. (CIAT)

1103

26271 HUCL, P.; SCOLES, G.J. 1985. Interspecific hybridization in the common bean: a review. HortScience 20(3):352-357. Engl., Sum. Engl., 87 Refs., Illus. (Dept. of Crop Science & Plant Ecology, Univ. of Saskatchewan, Saskatoon, Canada S7N 0W0)

Phaseolus vulgaris; Hybridizing; Phaseolus coccineus; Phaseolus acutifolius; Phaseolus lunatus; Cultivars; Cytogenetics; Genetics; Canada.

Information concerning the cytogenetics, origin, and phytogeographical relationship of cultivated Phaseolus species and its wild relatives is given. The use of related domesticated and wild species (P. coccineus, P. acutifolius, P. lunatus, P. vitexis, P. polyanthus, and P. filiformis) in the improvement of common beans (P. vulgaris) through hybridization are discussed. Obstacles to gene transfer between species and the approaches used in circumventing these barriers are examined. (AS)

1104

26201 LOPEZ, M.; FERNANDEZ, F.; SCHOONHOVEN, A. VAN, eds. 1985. Fríjol: investigación y producción. (Beans: research and production). Cali, Colombia, Centro Internacional de Agricultura Tropical. 423p. Span., 376 Refs., Illus.

Phaseolus vulgaris; Plant anatomy; Plant physiology; Plant breeding; Diseases and pathogens; Injurious insects; Pest control; Fertilizers; Experiment design; Development; Colombia.

Those conferences in each discipline of the Bean Program that have had greater acceptance by the participants of the courses carried out at CIAT are presented. The material is grouped into 6 chapters covering topics on plant physiology and morphology, genetics, breeding methods, pathology, diagnosis techniques, diseases and pests, fertilization, management of acid soils, crop association, and diagnosis of field problems. Individual papers are recorded in this publication under the following consecutive no.: 0839, 0857, 0870, 0902, 0915, 1015, 1021, 1026, 1027, 1060, 1075, 1076, 1077, 1089, 1090, 1091, 1151, 1155, 1157, 1204, 1207, 1208, and 1218. (CIAT)

1105

26093 MURRAY, M.G.; KEMNARD, W.C. 1984. Altered chromatin conformation of the higher plant gene phaseolin. Biochemistry 23(18):4225-4232. Engl., Sum. Engl., 41 Refs., Illus. (Agrigenetics Advanced Research Division, Agrigenetics Corporation, Madison, WI 53716, USA)

Phaseolus vulgaris; Snap beans; Phaseollin; DNA; Genes; USA.

Micrococcal nuclease, DNase I, and S1 nuclease were used to probe alterations in the chromatin conformation of phaseolin genes which encode the major seed storage proteins of the French bean cv. Tendergreen. Comparisons were made between cotyledon tissue where the genes are expressed and leaf tissue where the genes are not expressed. Phaseolin genes are preferentially sensitive to DNase I in cotyledons relative to leaves. DNase I hypersensitive sites could not be identified in the flanking DNA of phaseolin genes in chromatin. Although S1 nuclease hypersensitive sites could be identified in DNA sequences flanking the phaseolin genes when analysis was performed on pure, supercoiled DNA, they could not be demonstrated in chromatin. (AS (extract))

1106

26245 OKONKWO, C.A.; CLAYBERG, C.D. 1984. Genetics of flower and pod color in Phaseolus vulgaris. Journal of Heredity 75(6):440-444. Engl., Sum. Engl., 10 Refs., Illus. (Federal Univ. of Technology, P.M.B. 0248, Bauchi, Nigeria)

Phaseolus vulgaris; Flowers; Pods; Inheritance; Crossbreeding; USA.

A new locus, Prp (purple pod), having 5 alleles affecting anthocyanin pigmentation of corolla and pod, is described in Phaseolus vulgaris. The allele Prp produces a dark-purple corolla and is fully dominant in this respect over the other 4 alleles that determine light-purple corolla. In the absence of Fo (rose color), Prp is responsible for medium-purple pods when homozygous and light-purple pods in combination with the other alleles. The alleles prp(sh2) and prp(sh) give green pods shaded with purple and are codominant with the prp(st) allele, which causes green pods to be striped with purple. These 4 alleles are dominant for pod color over prp, an allele causing green pods when homozygous. The interaction of these alleles with the genes Cri, V, and Ro, which also affect anthocyanin pigmentation of corolla and pod, is described. No linkages among these 4 loci were observed. (AS)

1107

26268 OSBORN, T.C.; BLISS, F.A. 1985. Effects of genetically removing lectin seed protein on horticultural and seed characteristics of common bean. Journal of the American Society for Horticultural Science 110(4):484-488. Engl., Sum. Engl., 25 Refs., Illus. (ARCO Plant Cell Research Inst., 6560 Trinity Ct., Dublin, CA 94568, USA)

Phaseolus vulgaris; Phytohemagglutinin.; Phaseollin; Backcrossing; Cultivars; Proteins; Genetics; USA.

The absence of seed lectin in common bean was shown to be inherited as a single recessive gene and allelic to genes conditioning 6 different lectin types. In inbred backcross lines, the allele from Sanilac (a navy class bean) for the presence of lectin was semidominant to the lectinless allele from U.I. 1140 (a Great Northern class bean) for quantity of lectin. Backcross lines with lectin (L/L) and without lectin (l/l) were developed using 2 lectinless donor parents (U.I. 1140 and U.I. 111, a pinto class bean) and Sanilac as the recurrent parent. Backcross lines and parents were grown in the field (Wisconsin, USA) and analyzed for days to flower, seed yield and wt., percentage protein, and quantities of lectin and phaseolin. There were significant differences between lectin genotypes (L/L vs. l/l) for all traits except yield, seed wt., and nonphaseolin nonlectin protein. Backcross lines without lectin had substantially higher levels of phaseolin and slightly more

total protein than lines with lectin. The data suggested that phaseolin overcompensated for the absence of lectin in 1/1 backcross lines. The implications of these findings toward the nutritional improvement of bean protein are discussed. (AS)

1108

22528 BOOTH, E.F. 1984. Genetic shifts in mixed bean populations. 2. Effects of regeneration. Crop Science 24(4):711-715. Engl., Sum. Engl., 21 Refs., Illus. (United States Dept. of Agriculture, Agricultural Research Service, National Seed Storage Lab., Fort Collins, CO 80523, USA)

Phaseolus vulgaris; Snap beans; Cultivars; Seed; Germination; Germplasm; Yields; Genetics; USA.

Seeds of mixed and pure line populations of 8 snap bean cv. were artificially aged and grown in the field to determine potential genetic shifts in the populations. After 3 cycles of seed regeneration, the composition of unaged populations gradually shifted in favor of 3 cv. (Black Valentine, Tendergrop, and Cherokee Wax); artificially aging seeds for 6 wk. at 32 degrees Celsius, 90 percent RH, resulted in the total elimination of 3 cv. (Kinghorn Wax, Tendergrop, and White Seeded Tendergrop). Averaged over 3 yr, Black Valentine had the highest seed yield/plant followed by Tendergrop and Cherokee Wax; cv. Bountiful had the lowest yield. Computer simulation of the effects of repeated cycles of regeneration of unaged seed populations predicted that Bountiful would be eliminated from the population after 5 cycles, assuming a sample size of 64 seeds/cycle. Cv. Kinghorn Wax, Spartan Arrow, and Landreth's Stringless Green Pod would be eliminated after 9, 10, and 15 cycles, resp. Simulation of the combined effects of seed aging (to 50 percent viability) and regeneration resulted in a prediction that only 2 cv. (Black Valentine and Cherokee Wax) would survive 15 cycles. (AS)

1109

26014 SALAZAR L., S. 1984. Evaluación de mutaciones inducidas por radiación gamma (Co-60) en dos variedades de Phaseolus vulgaris L. (Evaluation of mutations induced by gamma (Co-60) radiation in two bean varieties). Tesis Ing.Agr. Guatemala, Universidad de San Carlos. 101p. Span., Sum. Span., 54 Refs., Illus.

Phaseolus vulgaris; Seed; Cultivars; Irradiation; Mutation; Protein content; Yield components; Plant physiological disorders; Guatemala.

Different doses of Co-60 gamma rays (0, 8, 15, and 30 krad) were evaluated in seeds of bean var. Jutiapán and San Martín to (1) identify those producing more mutations and approx. 20 percent lethality; (2) select material presenting differences in earliness, leaf type, stem thickness, grain color, and other morphological mutations; (3) study the differences in sensibility to radiation of the var. treated, using the physiological effects expressed in the M1 generation as criteria; (4) recover seeds with a greater potential for improving protein quality and quantity. Acute radiation caused physiological and anatomic effects in the M1 generation that are only expressed in this generation: reduction in plant height, decrease in no. of seeds/treatment gene, low survival at high doses, and sterility. Doses of 20 and 30 krad produced 20 percent lethality in the M1, especially in var. San Martín. The 30-krad dose produced a 34 percent reduction in plant height in var. San Martín and less emergence in the field for both var. Also at 20 and 30 krad, less flowering was observed in var. Jutiapán. Compared with the control, at high doses reductions of 58 and 50 percent were observed in 100-seed wt. in the M1 for var. San Martín and Jutiapán, resp. Var. Jutiapán showed more mutations and morphological changes in the M2, but it was demonstrated that most changes obtained in the M2 are not mutations but alterations due to general environmental effects. However, good results were obtained for earliness and information is given on some broad-leaf mutants. (AC (extract)-CIAT)

1110

26505 SARRAFI, A.; ECOCHARD, R. 1985. Analyse de croisements diallèles pour les caractères agronomiques de plantes saines et virosées chez le haricot (Phaseolus vulgaris L.). (Analysis of diallel crosses for agronomic characters in healthy and virus-infected bean plants). Canadian Journal of Genetics and Cytology 27(2):233-237. Engl., Sum. Engl., Fr., 14 Refs. (Laboratoire d'Amélioration des Plantes, Ecole Nationale Supérieure Agronomique, 145 Avenue de Muret, 31076 Toulouse, France)

Phaseolus vulgaris; Agronomic characters; Crossbreeding; Viruses; Yields; Yield components; Cultivars; Genetics; France.

The study of agronomic characters of healthy and virus-infected plants in a diallel crossing program, involving 5 different bean var., shows that in both cases the general combining ability for yield and its components usually has positive or negative significant values; the max. value of the general combining ability for each yield component is characteristic of each var.; and the no. of specific combining ability cases are less numerous than those of general combining ability. Usually positive specific combining ability is obtained from 2 negative and positive cases of general combining ability because of nonadditive genes' interaction. Values for general and specific combining abilities are, in some cases, significantly modified by BCMV. This shows that quantitative genetic studies concerning agronomical and physiological characters are always influenced by external factors including culture conditions as well as parasites. The results obtained are valuable only for the studied var. and conditions in which the expt. is achieved. (AS)

1111

26587 TALBOT, D.R.; ADAMS, M.J.; SLIGHTON, J.L.; HALL, T.C. 1984. Size and organization of a multigene family encoding phaseolin, the major seed storage protein of Phaseolus vulgaris L. Molecular and General Genetics 198(1):42-49. Engl., Sum. Engl., 45 Refs., Illus. (Agrigenetics Advanced Research Laboratory, 5649 East Buckeye Road, Madison, WI 53716, USA)

Phaseolus vulgaris; Phaseolin; Proteins; Genetics; Cultivars; USA.

Solution hybridization kinetics and genomic nitrocellulose blot hybridization analyses show that the French bean storage proteins (phaseolins) are encoded as a small, homologous, multigene family consisting of approx. 7 members. Restriction endonuclease site mapping (EcoRI, BamHI, and Bgl/II) of DNA regions flanking the phaseolin genes showed that the gene family can be divided into at least 3 characteristic fragment size classes. Clones representative of 2 of these phaseolin gene classes were isolated from a lambda 1059 phage library. (AF)

1112

26981 WASSIMI, N.M.; HOOFIELD, G.L. 1980. A comparative study of seed coat color, tannin content, storage conditions, nutritional quality and cookability in dry edible beans (Phaseolus vulgaris L.) and lentils (Lens culinaris L.): their interrelationships and inheritance. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-leet research farm and related bean-leet research. East Lansing. 1980 Research Report. pp.90-94. Engl., 16 Refs.

Phaseolus vulgaris; Seed coat; Seed color; Tannin content; Storage; Nutritive value; Cooking; Genotypes; Seed characters; Inheritance; USA.

Twenty bean genotypes grown near Saginaw (Michigan, USA) during the summer of 1980 were used to initiate the screening process for finding parents to be used in the inheritance study of some of the factors influencing texture and cooking time. The preliminary results showed differences between lines for the rate of water uptake. The percentage of hard seed ranged from 0 to 56

percent with red- and brown-seeded strains. Tannin and lignin contents may be involved in the hard seed phenomenon. (CIAT) See also 0912 0931 0979 1020 1024

1113

26040 ADAMS, M.W.; REICOSKY, D.; GRAHAM, P.; ACOSTA, J. 1982. Improving resistance to environmental stress (drought, nitrogen) in beans through genetic selection for carbohydrate partioning and efficiency of biological nitrogen fixation. In Bean/Cowpea Collaborative Research Support Program. U.S.A. 1982 Annual Report. East Lansing, Michigan State University. p.74. Engl.

Phaseolus vulgaris; Agricultural projects; Plant breeding; Nitrogen fixation; Drought; Resistance; USA.

The current status and future plans of the project to improve resistance to environmental stress in beans, through genetic selection for carbohydrate partitioning and biological N fixation efficiency, are briefly described. No data are available yet. (CIAT)

1114

22552 APOLITANO S., C. 1984. La investigación actual sobre fríjol en el Programa Nacional de Leguminosas de Grano: importancia y avances de la producción en el Perú. (Current research on beans in the national grain legume program: importance and advances in production in Peru). In Curso Intensivo Postgrado de Investigación para la Producción de Fríjol en el Perú, 2o., Chincha, Perú, 1984. Trabajos presentados. Lima, Instituto Nacional de Investigación y Promoción Agropecuaria. Programa Nacional de Leguminosas de Grano. Guía Didáctica no.6. pp.4-14. Span.

Phaseolus vulgaris; Cultivars; Production; Bean common mosaic virus; Selection; Resistance; Yields; Peru.

Since 1982 the activities of the national grain legume program in Chincha, Peru, have been directed towards the development of new expti. bean lines with genetic resistance to BCMV and wide productivity and adaptation. A list of the new exptl. lines and their parents, the crosses carried out, and adaptation trials, is presented as well as statistical data of production, yield, and consumption for the years 1965-80. The factors that limit bean production in Peru are briefly analyzed as well as the program's projects to overcome these problems. (CIAT)

1115

22553 APOLITANO S., C. 1984. Nuevas líneas y variedades de fríjol para Perú, características y manejo agronómico. (New bean lines and varieties for Peru, characteristics and agronomic management). In Curso Intensivo Postgrado de Investigación para la Producción de Fríjol en el Perú, 2o., Chincha, Perú, 1984. Trabajos presentados. Lima, Instituto Nacional de Investigación y Promoción Agropecuaria. Programa Nacional de Leguminosas de Grano. Guía Didáctica no.6. pp.15-20. Span., Illus.

Phaseolus vulgaris; Cultivars; Cultivation systems; Seed color; Peru.

The national grain legume program in Peru has developed and selected new var. bean lines through trials carried out in 3 natural regions of the country: Central Coast, Sierra, and Northern Coast. The lines have been selected for their high yield, resistance to BCMV (VF-8, Pirata 2, Bat 1061, Bat 1287, Bat 1254, W 126), tolerance to rust (PF 2110-12, 210-69, 210-92, 210-128), to anthracnose (G 2828), and to Ascochyta (Cajamarca 64-1). The selected expti. lines are presented in table form, giving information on growth habit, adaptation range, production system, and seed size and color. (CIAT)

1116

25391 BANNEROT, H. 1981. L'evaluation precoce des croisements chez les plantes autogames - exemple du haricot-grain. (Preliminary evaluation of

crosses of autogamous plants--beans). Sélectionneur Francais no.29:36-51. Fr., 3 Refs., Illus. (Station de Génétique et d'Amélioration des Plantes, Inst. National de Recherche Agronomique, 78000 Versailles, France)

Phaseolus vulgaris; Crossbreeding; Selection; Heterosis; Heterozygosis; France.

Some factors that influence the preliminary selection of improved lines are examined. The success of cross breeding is determined depending on whether it produces or not lines of value; the biometric characteristics of crosses are discussed. To define the value of a cross, the median of the values of all fixed lines obtained and the variance of these values are considered. The notion of cross breeding as source of pure lines is generalized to all heterozygote plants. Some methods of preliminary selection are briefly discussed. The 1st generation accessible to experimentation is the F2, being necessary the correction of residual heterosis and heterogeneity. In beans the production of a sufficient amount of exptl. seed in F2 was achieved. In an expt. to select bean lines with resistance to mosaic, where pedigree selection was compared with the preliminary yield trials (on equal surfaces), it was demonstrated that the prediction of cross values was determined as of F3 and that the trials in F4, F5, and F6 (4 yr of trials) had only yielded a supplementary precision. On the other hand, the prediction of value of the families had only been correct as of F4. The evaluation of sources (crosses) is very and inexpensive in F3, since the precision necessary in not high (in the case mentioned the C.V. fluctuated between 15-20 percent). It is concluded that it is easier to classify preliminarily crosses than classify the descendants (families) within crosses, being more advantageous the cross of structurer as heterozygous as possible. (CIAT)

1117

26058 BALCUR B., G. 1985. Enfoque del programa de mejoramiento genético de frejol en INIA. (The approach of the bean breeding program at INIA). In Curso Internacional de Investigación sobre Producción de Frejol (Phaseolus vulgaris), Santiago, Chile, 1985. Trabajos presentados. Santiago, Instituto de Investigaciones Agropecuarias. Estación Experimental La Platina. 17p. Span., Illus. (Estación Experimental La Platina, Inst. de Investigaciones Agropecuarias, Casilla 5447, Santiago, Chile)

Phaseolus vulgaris; Plant breeding; Agricultural projects; Snap beans; Cultivars; Plant introductions; Chile.

The approach of the bean breeding program at Instituto de Investigaciones Agropecuarias (Chile) is outlined, including some general results obtained by the program. The main objective of the program is to incorporate multiple disease resistance, especially to BCMV and BYMV, into the different bean types cultivated in Chile. Breeding efforts concentrate on 4 major bean groups: beans for green pod consumption, beans for green grain consumption, and beans for dry grain consumption both domestically and for export; for each group, the Chilean bean var. included are listed. Improved parents used in breeding local var. and improved var. released by the program are also indicated. Germplasm introduction and hybridization are the main methods used in var. improvement. (CIAT)

1118

26040 BUCHURUNDI, A.N.M.; MKUMANI, C.L. 1985. Studies on the susceptibility of various bean lines to bean common mosaic virus. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.87-92. Engl., Sum. Engl., 11 Refs. (Dept. of Crop Science, Faculty of Agriculture, Sokoine Univ. of Agriculture, P.O. Box 3005, Morogoro, Tanzania)

Phaseolus vulgaris; Cultivars; Resistance; Bean common mosaic virus; Yields;

Tanzania.

The susceptibility of 6 bean var./lines (TMO 107, TMO 115, TMO 121, TMO 216, TMO 224, and TMO 135-Zolian Border) to BCMV were investigated in a split-plot expt. at the farm of Sokoine U. of Agriculture (Morogoro, Tanzania). One main plot was inoculated with BCMV while the other was used as control. Yield losses were highly significant (P = 0.01) for TMO 115, TMO 107, and TMO 125, but insignificant for TMO 216, TMO 124, and TMO 224. Yield loss for TMO 124 was only significant at the 95 percent level. TMO 216 can be grown to an advantage under the prevailing conditions. (AL)

1119

26242 DIAZ C., T.S. 1981. Cruzamiento natural en Phaseolus coccineus L. (Natural crossing in Phaseolus coccineus). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 94p. Span., Sum. Span., 39 Refs., Illus.

Phaseolus coccineus; Crossbreeding; Planting; Timing; Spacing; Fertilizers; Intercropping; Zea mays; Mexico.

The influence that the variations in planting dates, spacing between plants, fertilizer use, and monocrop and associated (maize) planting systems can have on natural crossing in Phaseolus coccineus was studied at the Montecillos exptl. field of the Colegio de Postgraduados de Chapingo, Mexico. Two P. coccineus var., Mex.-1005 (black seed, red flower and epicotyls) and Zac-636 (white seeds and flowers, green epicotyls), and maize hybrid var. H-28 were used. There were differences in the percentage of natural crossing depending on the planting date in all strata and in the whole plant. Natural crossing was higher in the upper stratum than in the middle stratum, which in turn was higher than in the lower stratum. Natural crossing decreased proportionally with increased spacing between plants on the 2 planting dates. Fertilizer application had no influence on natural crossing on the 2 planting dates; on the other hand, the planting system influenced the natural crossing within the strata and the whole plant, but depending on the planting date. Compared with P. coccineus-maize intercropping, a greater reduction in natural crossing was found in the P. coccineus monocrop planting system, by increasing plant spacing and changing from the 1st to the 2nd planting date. (CIAT)

1120

25392 POUILLOUX, C. 1981. Selection intra ou intercroisements chez les especes autogames. (Intra- or inter-crossbreeding selection in autogamous species). Sélectionneur Français no.29:53-59. Fr., 3 Refs. (Station de Génétique et d'Amélioration des Plantes, Inst. National de Recherche Agronomique, 78000 Versailles, France)

Phaseolus vulgaris; Crossbreeding; Statistical analysis; France.

With the help of a mathematical model, the possibility of determining to what extent the variance of the values of lines within a group of crosses (V inter) is greater than the variance of lines within a cross (V intra) is examined. A diploid population, where n loci (favorable loci are considered homozygote loci with 2 favorable alleles) segregate, is supposed; these contribute in identical form to the level of the character studies. Whether r(i) and r(j) (favorable loci) are greater or lower than the value n/2, the intra-crossbreeding variance will be superior to the inter-crossbreeding variance. The V inter:V intra ratio is greater with increasing level of progenitors (lines) with respect to the median. The intra-crossbreeding selection during the 1st cycle prevents the crossbreeding of progenitors to both sides of the median. However, for a preliminary classification of lines, the inter-crossbreeding selection is considered preferable as long as the bias of heterozygosis is limited. The mathematical model is applied to the F2 generations or to the group of F3 generations, according to its median

(residual heterosis of only 50 or 25 percent). The estimation of the values of lines is best carried out to the level of F2 and F3. Practical recommendations are given. (CIAT)

1121

26263 FREYTAG, G.F.; KELLY, J.D.; ADAMS, M.W.; LOPEZ R., J.; BEAVER, J.; ECHAVEZ B., R. 1985. Registration of two navy bean germplasm lines L226-10 and L227-1. Crop Science 25(4):714. Engl., 5 Refs. (United States Dept. of Agriculture, Agricultural Research Service, Mayagüez, Puerto Rico)

Phaseolus vulgaris; Germplasm; Cultivars; Agronomic characters; Resistance; Bean common mosaic virus; Uromyces phaseoli; Fusarium solani; Rhizoctonia solani; Macrophomina phaseoli; Seed characters; Puerto Rico.

The morphological and agronomic characters, the origin, and the genetic resistance to several diseases of 2 navy bean breeding lines, L226-10 and L227-1, developed and released cooperatively by Agricultural Research Station-U.S. Dept. of Agriculture, Michigan State U., and U. of Puerto Rico, are described. (CIAT)

1122

26974 GRABERI, A.; SAETTLER, A.W.; ADAMS, M.W. 1980. Prospects of breeding for anthracnose resistance. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. pp.67-68. Engl.

Phaseolus vulgaris; Cultivars; Germplasm; Seed color; Resistance; Colletotrichum lindemuthianum; Races; Crossbreeding; USA.

The different crosses carried out with navy, black, and kidney beans to search for resistance to the alpha, beta, delta, and gamma races of Colletotrichum lindemuthianum are briefly described and analyzed. Recent testing of San Fernando (black seed) and NEP-2 (white seed) has indicated that these cv. are resistant to beta, gamma, and delta races, but susceptible to the alpha race. Most of the current architypes having San Fernando or NEP-2 in their parentage show the same type of reaction. Once breeding lines with desirable reactions to the alpha, beta, gamma, and delta races are obtained, the genetic source of their resistance could be identified. (CIAT)

1123

26950 SONFWE, P. 1985. Screening bean for resistance to halo blight bacteria. In Minjas, A.N.; Solema, M.P., eds. Workshop on Bean Research in Tanzania, 8th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.93-100. Engl., Sum. Engl., 10 Refs. (Tanzania Agricultural Research Organization, P.O. Box 3004, Moshi, Tanzania)

Phaseolus vulgaris; Cultivars; Resistance; Isolation; Pseudomonas phaseolicola; Selection; Tanzania.

Thirty bean cv./lines were tested in 1985 growing season under field conditions in Lanto and Lyamungo in the Kilimanjaro region of Tanzania for resistance to 2 Kbeya isolates of Pseudomonas syringae pv. phaseolicola. Further tests were done in a shaded nursery in Lyamungo to confirm field results. Disease development was low in Lanto whereas high disease ratings were observed in Lyamungo. Five of the dry bean cv./lines tested showed a high level of resistance: 30 7928, Maple Red, BAT 317, F 285, and FB/GP 958-2; 2 were highly susceptible and the others showed intermediate levels of resistance. (AS)

1124

26289 GRAFTON, K.F.; WEISER, G.C.; LITTLEFIELD, L.J.; STAVELY, J.R. 1985. Inheritance of resistance to two races of leaf rust in dry edible bean. Crop Science 25(3):537-539. Engl., Sum. Engl., 15 Refs. (North Dakota State Univ., Fargo, ND 58105, USA)

Phaseolus vulgaris; Uromyces phaseoli; Races; Inheritance; Cultivars; Resistance; USA.

Phaseolus vulgaris cv. T39 and Aurora (resistant--hypersensitive--to Uromyces appendiculatus race 52 but susceptible to race 44) and Olathe (resistant--hypersensitive--to race 44 but susceptible to race 52) were crossed with one another and with UI114, which is susceptible to both races. Analysis of F1-F2 segregation data revealed that (1) resistance to race 44 is controlled by 2 dominant complementary genes, designated Ur(a) and Ur(c), (2) resistance to race 52 is controlled by a single dominant gene designated Ur(b), and (3) the genes show independent assortment without epistasis. (Plant Breeding Abstracts)

1125

26267 GRAFTON, K.F.; SCHNEITER, A.A.; BURKE, D.W.; WEISER, G.C. 1985. Registration of Nodak pinto bean. Crop Science 25(3):571. Engl. (North Dakota State Univ., Fargo, ND 58105, USA)

Phaseolus vulgaris; Cultivars; Yields; Resistance; Uromyces phaseoli; Bean common mosaic virus; USA.

Phaseolus vulgaris cv. Nodak is an F5 selection from a cross between 3R187-1 (2R39-1 pink (UI35 small red x (UI35 x PI203958)) x Royal Red red kidney) and Great Northern GN1140. Nodak outyielded UI114 and Olathe, 2 pinto bean cv. important in North Dakota (USA), by an av. of 24 and 9 percent, resp., at 5 sites in the state during 1981-83. In the National Cooperative Dry Bean Nursery (CDBN) trials in 1982, Nodak outyielded all pinto bean entries except Holberg. In the 1983 CDBN trials, Nodak outyielded the control cv. UI114 by an av. of 7 percent at 19 sites. When grown in North Dakota, Nodak has a type III growth habit with short stem and matures 2-4 days earlier than either UI114 or Olathe. Cooked beans of Nodak are comparable with those of UI111 for texture, flavor, and nutritional factors. Nodak is resistant to curly top virus and to the type and New York 15 strains of BCMV. It has effective resistance to the races of Uromyces appendiculatus var. appendiculatus prevalent in North Dakota. (Plant Breeding Abstracts)

1126

26547 GRAHAM, P.H.; TEMPLE, S.R. 1984. Selection for improved nitrogen fixation in Glycine max (L.) Merr. and Phaseolus vulgaris L. Plant and Soil 82(3):315-327. Engl., Sum. Engl., 59 Refs. (Dept. of Soil Science, Univ. of Minnesota, St. Paul, MN, USA)

Phaseolus vulgaris; Nitrogen fixation; Nodulation; Plant breeding; Germplasm; Cultivars; Selection; USA.

The evidence for genetic variation in traits affecting N2 fixation by Glycine max and Phaseolus vulgaris is reviewed, and the requirements for further evaluation of Glycine and Phaseolus germplasm are indicated. Plant breeding programs for the improvement of N2 fixation in these species are discussed. (Plant Breeding Abstracts)

1127

26977 GUHL, A.; SARTELLE, A.W.; ALAMI, M.A. 1980. A study of tolerance and sensitivity to crops in beans. Summary. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related sugar-beet research. East Lansing. 1980 Research Report. 11.72-73. Engl.

Phaseolus vulgaris; Cultivars; Crossbreeding; Ozone; Genes; Resistance; Inheritance; Stomata; USA.

To carry out studies on the genetic and physiological mechanisms of beans involved in the reaction to O3, the var. French Horticultural and NEP-2 (tolerant) and Pink Half Runner and #0669 (sensitive) were selected. Crosses were made among these var., and F1, F2, and F3 generations tested for O3 sensitivity in lab. and field tests. Most of the genetic results are consistent with the assumption that 2 major interacting dominant genes condition the tolerance response. Measurements of stomatal conductivity prior to and after 4 h of O3 fumigation indicated that the 2 tolerant var. showed significantly higher gas exchange rates at both upper and lower leaf surfaces. Ethylene production was greater in the O3-injured leaves of the sensitive var. (CIAT)

1128

26542 HOOVER, E.E.; BRENNER, M.L.; ASCHER, P.D. 1985. Comparison of development of two bean crosses. HortScience 20(5):884-886. Engl., Sum. Engl., 7 Refs., Illus. (Dept. of Horticultural Science & Landscape Architecture, Univ. of Minnesota, St. Paul, MN 55108, USA)

Phaseolus vulgaris; Phaseolus coccineus; Hybridizing; Embryo; Pods; USA.

A nondestructive measurement technique for predicting the developmental stage of young embryos was devised and used to study developmental patterns of 2 Phaseolus crosses. While selfed P. coccineus produced normal seeds, P. coccineus x P. vulgaris aborted embryos when the seeds reached 10 mm in length. Seed growth of the interspecific cross was reduced with respect to days after pollination. Other characteristics of the interspecific cross included reduced pod length, increased pod length:seeds/pod ratio, reduced embryo fresh wt., and increased vol. of liquid endosperm. Pod thickness did not differ between selfed P. coccineus and the cross, and can therefore be used to predict the developmental stage of young embryos. (AS)

1129

26986 HOSFIELD, G.L.; UEBERSAX, M.A.; ADAMS, M.W.; GHADERI, A.; TAYLOR, J.L. 1980. U.S.D.A., dry bean food value, processing quality and yield potential improvement program. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. pp.107-113. Engl.

Phaseolus vulgaris; Plant breeding; Nutritive value; Processing; Yields; Canned beans; Tannin content; Cooking; Planting; Timing; Soil compaction; USA.

The objectives of the bean improvement program of the U.S. Department of Agriculture are given. These consist in (1) developing new breeding lines and cv. that combine improved yield potentials with favored food quality factors, pest resistance, tolerance to environmental stresses, and adaptation to mechanized culture; (2) developing new and improved cultural and management practices. Preliminary results are included. (CIAT)

1130

26594 JOSHI, B.P.; MEHRA, K.L. 1984. Path analysis of productivity in French bean. Progressive Horticulture 16(1-2):78-84. Engl., Sum. Engl., 7 Refs. (National Bureau of Plant Genetic Resources Regional Station, Phagli, Chimla 171 021, India)

Phaseolus vulgaris; Snap beans; Statistical analysis; Cultivars; Selection; Yields; Yield components; Seed characters; India.

Fifty French bean var. were studied for correlation and path analysis for some productivity components. No. of pods, 100-seed wt., and days to maturity are the highest direct components for which selection can be effective. Except for 100-seed wt., these characters also have high and significant correlation with seed yield. Since late maturity beyond certain limits is not desirable, greater emphasis should be placed on no. of pods/plant in selection for yield. (AS)

1131

26970 KELLY, J.; GHADERI, A. 1980. Breeding of four Western bean classes for Michigan. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. pp.43-44. Engl.

Phaseolus vulgaris; Cultivars; Crossbreeding; Selection; USA.

The breeding work carried out with bean var. of the Great Northern, pinto, pink, and Red Mexican types in order to adapt them to the conditions of Michigan, USA, are briefly analyzed. Crosses involving var. Valley, NEP-2, Tuscola, and arquitecturally desirable breeding lines such as 61618, 62424, and 61379 have been made. (CIAT)

1132

26968 KELLY, J.; GHADERI, A. 1980. Early generation breeding populations. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. pp.40-41. Engl.

Phaseolus vulgaris, Plant breeding; Germplasm; USA.

The methods used and the bean materials identified in the breeding program of Michigan State U. (USA) are briefly described. There are 3 sources of these breeding populations, which represent 3 different gene pools: (1) the Michigan State U. populations, (2) Campbell Soup lines, and (3) Mayaguez Institute for Tropical Agriculture (Puerto Rico) populations. (CIAT)

1133

26969 KELLY, J. 1980. Winter nursery program. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. pp.42. Engl.

Phaseolus vulgaris; Plant breeding; Germplasm; Selection; USA.

The advantages of using Puerto Rico to evaluate the winter bean nursery in the breeding program of Michigan State U., USA, are briefly enumerated. All lines will be rated for reaction to the prevalent diseases during the season and the majority will be further selected for plant architecture prior to harvest. (CIAT)

1134

26951 LYIMO, H.F.; TERI, J.M.; ISHABAIRU, T.R. 1985. Summary report of the effect of bean cultivar mixtures on disease severity and yield--1983-1985. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.101-114. Engl., Sum. Engl., 12 Refs., Illus. (Dept. of Crop Science, Faculty of Agriculture, Sokoine Univ. of Agriculture, P.O. Box 3005, Morogoro, Tanzania)

Phaseolus vulgaris; Varietal mixtures; Resistance; Uromyces phaseoli; Isariopsis griseola; Yields; Yield components; Tanzania.

The effect of bean cv. mixtures on disease (rust and angular leaf spot)

severity and on yield and yield components was studied at the U. Farm (Morogoro, Tanzania) during the 1983, 1984, and 1985 cropping seasons. Common bean cv. were used in mixtures in different proportions; the local landrace Ex-Mgeta market was included. A randomized complete block design was used. Disease severity remained lower in the cv. mixtures than in cv. grown in pure stands. The mean yield of mixtures was higher than that of the individual components grown in pure stands. The results obtained are summarized. (AS)

1135

26532 MARSH, L.E.; DAVIS, D.W. 1985. Influence of high temperature on the performance of some Phaseolus species at different developmental stages. Euphytica 34(2):431-439. Engl., Sum. Engl., 16 Refs., Illus. (Dept. of Horticultural Science & Landscape Architecture, Univ. of Minnesota, St. Paul, MN 55108, USA)

Phaseolus vulgaris; Phaseolus coccineus; Phaseolus acutifolius; Phaseolus lunatus; Temperature; Cultivars; Genotypes; Plant breeding; Resistance; Yields; Growth; USA.

The effect of short-term high temp. exposure on the performance of 5 Phaseolus species and of long-term (continuous) exposure on the performance of P. vulgaris was studied at 3 growth stages. Phaseolus species subjected to 26.7, 32.2, or 37.3 degrees Celsius for 2 days showed small differences in the no. of pods produced and in visual leaf damage, but large differences in leaf heat killing time, as measured by conductivity. P. coccineus had the shortest heat killing time (20-60 min) and P. acutifolius and P. lunatus the longest times (180 and 153 min, resp.). The P. vulgaris genotypes were intermediate in killing times to P. acutifolius and P. coccineus. Species response was not consistent with temp. within developmental stage. On av., the no. of pods decreased as temp. increased from 32.2 to 37.3 degrees Celsius. Heat killing time and leaf damage also increased with temp. CO2 exchange rates of plants grown at prolonged high temp. (30-40 degrees Celsius/20-30 degrees Celsius, day/night) decreased with the age of the plant. Shoot length was decreased at high temp. P. vulgaris genotypes differed on the basis of either short-term exposure or continuous exposure. These results suggest that there may be useful germplasm in Phaseolus for improving heat tolerance. (AS)

1136

26945 MHINA, G.A.; MISANGU, R.N.; GILL, B.S. 1985. Preliminary bean yield trial. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.57-61. Engl., Sum. Engl., 5 Refs. (Dept. of Crop Science, Faculty of Agriculture, Sokoine Univ. of Agriculture, P.O. Box 3005, Morogoro, Tanzania)

Phaseolus vulgaris; Cultivars; Crossbreeding; Yields; Resistance; Isariopsis griseola; Bean common mosaic virus; Uromyces phaseoli; Tanzania.

Twenty bean crosses and 2 standard var. were tested in a preliminary yield trial to evaluate yield performance and disease reaction (angular leaf spot, BCMV, and rust) at the Sokoine U. of Agriculture (Morogoro, Tanzania). Yield data obtained were subjected to variance analysis. Despite the bad weather and disease attack, the bean crosses TMO 232, TMO 241, and TMO 242 showed promising yield performance, yielding higher than the standard var. Canadian Wonder. Disease symptoms were observed on all bean crosses except TMO 308, which did not show rust symptoms. (AS)

1137

22163 MIRANDA, P.; COSTA, A.F. IA 1977. Obtencao de geracoes avancadas de cruzamentos entre cult.varas de Phaseolus vulgaris L. (Obtainment of advanced generations of crosses between bean cultivars). In Instituto de Pesquisas Agronomicas. Projeto feijao. Relatorio Anual de Pesquisas 1976.

Recife-PE, Brasil. pp.36-38. Port., 1 Ref.

Phaseolus vulgaris; Cultivars; Crossbreeding; Hybridizing; Yields; Selection; Brazil.

Bean yield tests were started in the F8 progeny to detect the best genetic combinations using pedigree breeding after hybridization. The plants that presented yields equal to or greater than 20 g were selected. A total of 1410 lines with excellent agronomic and commercial characteristics were selected, corresponding to 913 F8 lines, 395 F6 lines, 37 F5 lines, and 65 F4 lines. (CIAT)

1138

26952 MMBAGA, M.T.; MWATEBA, R. 1985. Screening for multiple disease resistance in beans (Phaseolus vulgaris L.). In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.115-122. Engl., 7 Refs. (Botany Dept., Univ. of Dar es Salaam, P.O. Box 35065, Dar es Salaam, Tanzania)

Phaseolus vulgaris; Cultivars; Resistance; Colletotrichum lindemuthianum; Isariopsis griseola; Bacterioses; Uromyces phaseoli; Viroses; Selection; Tanzania.

Sixty-two local bean cv. and 100 IBRN (International Bean Rust Nursery) var. were evaluated for multiple disease resistance (Colletotrichum lindemuthianum, Phaeoisariopsis griseola, Pseudomonas syringae, viral infection, and Uromyces phaseoli) in Tanzania. TMO 62 was the only local var. showing resistance to all 5 diseases at all growth stages during the short and long rains in Uyole and the long rains in Morogoro. TMO 25, 33, 40, 59, and 64 showed resistance or intermediate reactions to all the diseases and none were susceptible in Mbeya or Morogoro. A large no. of IBRN var. were resistant to all 5 diseases in Morogoro and Mbeya. The disease reactions are presented for all the materials. (CIAT)

1139

26946 MUSHEBEZY, D.M.K.; KAREL, A.K. 1985. Resistance to beanfly (Ophiomyia phaseoli Tryon) in common beans. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.62-68. Engl., Sum. Engl., 7 Refs. (Dept. of Crop Science, Faculty of Agriculture, Sokoine Univ. of Agriculture, P.O. Box 3005, Morogoro, Tanzania)

Phaseolus vulgaris; Cultivars; Resistance; Ophiomyia phaseoli; Yields; Tanzania.

Twelve common bean cv. were evaluated for resistance to the beanfly (Ophiomyia phaseoli). Resistance was assessed based on the larval-pupal counts. Cv. BAC 90, BAT 1500, BAT 1505, Kabanima, TMO 117, Chipulupulu, and Kablanketi were rated as having low resistance. Low larval-pupal counts were associated with thin stems (narrow stem diameter). Larval-pupal counts were positively correlated with ovipuncture counts. Resistant cv. generally had lower ovipuncture counts. A negative correlation was found between ovipuncture counts and the no. of trichomes, indicating an interference in oviposition when trichome density was higher. Beanfly ovipuncture counts were positively correlated to leaf area. Cv. with low resistance to the beanfly had significantly higher seed yield compared with susceptible cv. (AS)

1140

26953 MWANDILA, N.J.K.; KESWANI, C.L. 1985. Studies on the resistance of eight bean (Phaseolus vulgaris L.) lines to Phaeoisariopsis griseola. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania,

4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.123-128. Engl., Sum. Engl., 15 Refs. (Dept. of Crop Science, Faculty of Agriculture, Sokoine Univ. of Agriculture, P.O. Box 3005, Morogoro, Tanzania)

Phaseolus vulgaris; Cultivars; Isariopsis griseola; Resistance; Tanzania.

Studies were conducted to assess the reaction of 8 different bean lines/accessions to the causal organism of angular leaf spot (Phaeoisariopsis griseola) under field and greenhouse conditions. Angular leaf spot-infected plant material was collected from farmers' fields in the Mgeta and Kilosa areas in the Morogoro region, Tanzania. The pathogen was successfully isolated on V-8 juice culture media. Cultures were incubated at temp. ranging from 20 to 24 degrees Celsius. Bean accessions TMO 324, TMO 333, TMO 334, TMO 338, TMO 341, TMO 354, TMO 357, and TMO 191 (Kabanima) were inoculated in the field and greenhouse. Eight lines/accessions were resistant to angular leaf spot. Inoculated plants did not show disease symptoms until 13 days after inoculation, and even when the disease symptoms appeared, they were mild. The nonappearance of the disease and the mildness in disease symptoms are not necessarily due to plant resistance but possibly to unfavorable environmental conditions. (AS)

1141

26954 MWATEBA, R.; MMBAGA, M.T. 1985. Variability of bean rust pathogen. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.129-134. Engl., 4 Refs. (Dept. of Botany, Univ. of Dar es Salaam, P.O. Box 35065, Dar es Salaam, Tanzania)

Phaseolus vulgaris; Cultivars; Uromyces phaseoli; Resistance; Flowering; Tanzania.

One hundred IBRN (International Bean Rust Nursery) bean var. were evaluated for their reaction to Uromyces phaseoli in Mbeya and Morogoro, Tanzania. Fifty-seven var. showed similar reactions at both sites and were resistant during the pod filling stage. The large similarity in disease reaction indicates that U. phaseoli perhaps does not differ much genetically and that there are probably few races in both areas. The characteristic of slow rusting was observed. The var. that showed resistance during both short and long rains in Mbeya can be used in breeding as sources of resistance genes. (CIAT)

1142

26528 NAGATA, R.T.; BASSETT, M.J. 1985. A dwarf outcrossing mutant in common bean. Crop Science 25(6):949-954. Engl., Sum. Engl., 23 Refs., Illus. (Vegetable Crops Dept., Univ. of Florida, Gainesville, FL 32611, USA)

Phaseolus vulgaris; Cross-pollination; Mutation; Dwarf beans; Outcrossing; USA.

A study was conducted to determine if a dwarf mutant in common bean could be used to facilitate outcrossing. In 1 M2 progeny line of common bean, 7 plants were discovered with a dwarf mutant phenotype. Tests of M3 progenies derived from field-grown M2 plants revealed outcrossing rates of 5-47 percent. Pollen staining tests using potassium iodide or acetocarmine indicated no unusual pollen abortion rates. Pod set from plants grown in insect-proof enclosures were comparable with unprotected dwarf plants. Open flowers of dwarf plants, manually crossed between 0630 and 1430 h with either Sprite or U. of Florida breeding line 7-1404 pollen, resulted in cross-pollinated progeny at the rate of 26-86 percent. The frequency of cross pollination declined with time of day. Evidence is presented supporting the hypothesis that delay of anther dehiscence is responsible for the elevated levels of cross pollination. The

exploitation of this mutant in a breeding program to increase rates of genetic recombination is discussed. The proposed name for this mutant is "dwarf outcrossing" (do). (AS)

1143

26911 NOBLE, A.D.; LEA, J.D.; FEY, M.V. 1985. Genotypic tolerance of selected dry bean (Phaseolus vulgaris L.) cultivars to soluble Al and to acid, low P soil conditions. South African Journal of Plant and Soil 2(3):115-119. Engl., Sum. Engl., Afr., 10 Refs., Illus. (Dept. of Crop Science, Univ. of Natal, P.O. Box 375, Pietermaritzburg 3200, Republic of South Africa)

Phaseolus vulgaris; Cultivars; Resistance; Al; Toxicity; pH; P; South Africa.

Twelve dry bean cv. were grown for 7 days on filter paper soaked with nutrient solution containing a range of up to 10 mmol Al/cubic decimeter. Differential response to Al toxicity, measured as taproot elongation, occurred at Al concn. of greater than or equal to 2 mmol/cubic decimeter. Fifteen cv. (including 4 cv. classified in terms of Al tolerance by the nutrient-solution method) were grown in pots containing an acid (64 percent acid saturation of cation exchange capacity), P-deficient clay loam subsoil (Plinthic Paleudult), differentially treated with Ca(OH)2 and CaHPO4.2H2O. After 35 days the plants were classified in terms of tolerance to acid, low P soil conditions, on the basis of relative top growth yields. Three of 4 cv. screened by both methods were classified identically: Iapar-Rai-54 and W126 as tolerant, and BAT331 as sensitive. (AS)

1144

20631 OCKENDON, D.J.; CURRAH, L.; ROBINSON, H.T. 1983. Bean. In National Vegetable Research Station. Annual Report 1982. Wellesbourne, Scotland. p.52. Engl. (Wellesbourne Warwick CV35 9EF, Scotland)

Phaseolus vulgaris; Snap beans; Phaseolus coccineus; Hybridizing; Pseudomonas phaseolicola; Resistance; United Kingdom.

The advances of work to transfer resistance to Pseudomonas phaseolicola from French beans to Phaseolus coccineus, and the 2 approaches that have been adopted to produce a dwarf P. coccineus with good growth habit are briefly reported. (CIAT)

1145

26924 PEREIRA, E.B.; PACOVA, B.E.V.; VENTURA, J.A.; FORNAZIER, M.J. 1985. Selecao preliminar de genótipos de feijao do grupo "preto" na Regiao Serrana do Estado do Espírito Santo. (Preliminary selection of black bean genotypes in the Serrana region, state of Espírito Santo). Cariacica-ES, Brasil, Empresa Capixaba de Pesquisa Agropecuária. Pesquisa em Andamento no.30. 3p. Port. (Empresa Capixaba de Pesquisa Agropecuária, Caixa Postal 125, 29.154 Campo Grande, Cariacica-ES, Brasil)

Phaseolus vulgaris; Genotypes; Cultivars; Yields; Resistance; Colletotrichum lindemuthianum; Isariopsis griseola; Uromyces phaseoli; Ascochyta; Selection; Plant breeding; Brazil.

Thirty-four black bean lines were evaluated for yield and disease reactions in Serrana (Espírito Santo, Brazil). Ten lines were selected for future regional trials, with yields ranging between 1550-2288 kg/ha; these were LM 00607-0, LM 00609-0, LM 10363-0, LM 20224-0, LM 20445-0, LM 20631-0, LM 20871-0, LM 20952-0, LM 21007-0, and LM 21019-0. Disease ratings at flowering and pod set for all genotypes are given for Colletotrichum lindemuthianum, Isariopsis griseola, Uromyces phaseoli, and Ascochyta sp. (CIAT)

1146

26096 RANALLI, P.; CERATO, C.; FACCIOLI, G. 1982. Introduzione nello stesso genotipo di fattori genetici per la resistenza alle principali visosi del fagiolo. (Introduction in the same genotype of genes resistant to the most important bean viruses). Informatore Fitopatologico 32(7-8):41-44. Ital., Sum. Ital., Engl., 19 Refs. (Istituto Sperimentale per le Colture Industriali di Bologna, Italy)

Phaseolus vulgaris; Genotypes; Resistance; Genes; Bean common mosaic virus; Bean yellow mosaic virus; Cucumber mosaic virus; Cultivars; Italy.

The activity carried out to introduce in the same bean genotype the resistance genes against the most important bean viruses is described. Phaseolus coccineus cv. Kelvedon Marvel, an accession resistant to BCMV strains I and IVa, BYMV, and cucumber mosaic virus strain gb, was used. This genotype had been backcrossed with P. vulgaris cv. Great Northern 1140 to obtain resistant bean lines having good bioagronomic characteristics. Research carried out to date provides some initial resistant material and some indications on inheritance of resistance to the cucumber mosaic virus. (AS)

1147

26976 SAETTLER, A.W. 1980. New sources of resistance to Xanthomonas bacterial blight. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. p.71. Engl.

Phaseolus vulgaris; Cultivars; Plant introduction; Resistance; Xanthomonas phaseoli; Xanthomonas phaseoli var. fuscans; Germplasm; USA.

Five commercial bean cv. (susceptible and tolerant) and 15 bean lines (resistant), obtained from CIAT and Mayaguez Institute for Tropical Agriculture (Puerto Rico), were evaluated for disease reaction to common (Xanthomonas phaseoli) and fuscous (X. phaseoli var. fuscans) blights and for O3 damage at Saginaw Valley Research Farm (Michigan, USA). Results obtained are given in table form. (CIAT)

1148

26575 SANTOS, J.B. DOS; VENCOVSKY, R. 1985. Controle genético do início do florescimento em feijoeiro. (Genetic control of flowering initiation in beans). Pesquisa Agropecuaria Brasileira 20(7):841-845. Port., Sum. Port., Engl., 16 Refs., Illus. (Escola Superior de Agricultura de Lavras, Depto. de Biologia, Caixa Postal 37, 37.200 Lavras-MG, Brasil)

Phaseolus vulgaris; Cultivars; Crossbreeding; Flowering; Genes; Inheritance; Brazil.

Eight bean cv. were crossed following a half-diallel model and data were obtained from the parents and F2 generation in order to determine the genetic control of no. of days to flowering. A randomized block design with 3 replications was used, and the data were analyzed according to the dominant-additive method. The data met the assumptions of the model and showed that the additive gene action was predominant in relation to dominance gene action. Consequently, narrow sense heritability was 92.5 percent and the mean degree of dominance was lower than 1.0. Due to the predominance of the additive gene action, the mean of the parents in relation to the no. of days to flowering should be considered in breeding programs. To obtain early cv., the dominance gene action is also important. Among the cv. studied, Goiano Precoce showed higher potential for earliness in relation to the 2 types of gene action. (AS)

1149

26041 SILBERNAGEL, M.J.; DUE, J.M.; NDUNGURU, B.J.; KESWANI, C.L.; TERI, J.M.; MBAGA, M.; DOTO, A.L.; MISANGU, R.; KAREL, A.K.; MPHURU, A.N.; QUENTIN, M.E.; SEENAPPA; SEMOKA, J.M.R.; JANA; CHOWDHURY, M.S.; ANANDAJAYASEKERAM, P. 1982. Breeding beans for disease and insect resistance and determination of economic impact on subsistence farm families. In Bean/Cowpea Collaborative Research Support Program. U.S.A. 1982 Annual Report. East Lansing, Michigan State University. pp.89-92. Engl.

Phaseolus vulgaris; Agricultural projects; Germplasm; Selection; Resistance; Bean common mosaic virus; Pseudomonas phaseolicola; Colletotrichum lindemuthianum; Isariopsis griseola; Injurious insects; Tanzania.

The objectives and achievements of the project to breed beans for disease and insect resistance and to determine its economic impact on subsistence farm families in Tanzania are presented. On-going research work, including germplasm screening for resistance to major disease (BCMV, Pseudomonas phaseolicola, Colletotrichum lindemuthianum, Isariopsis griseola) and isolation of strains, is briefly described. Fertility studies showed that var. Kabanima was more responsive to N and P than other var. Seven economically important insect pests were identified: bean fly, foliar beetle, bean aphid, thrips, pod borers, pod sucking bugs, and bean bruchids; a synthetic pyrethroid, Ripcord, gave best overall insecticidal control, and integrated control studies indicated that Bacillus thuringiensis + Y-HCH was effective and increased yields. No var. has been found resistant to all diseases (BCMV, C. lindemuthianum, I. griseola, and Xanthomonas phaseoli); a breeding program has begun to combine multiple disease resistance. Other agronomic practices are being studied in relation to disease control. (CIAT)

1150

26535 SILVA, G.H.; HARTMANN, R.W. 1979. Preliminary investigations on inheritance of resistance to Rhizoctonia solani in snap beans (Phaseolus vulgaris L.). Proceedings of the Tropical Region, American Society for Horticultural Science 23:228-233. Engl., Sum. Engl., 14 Refs.

Phaseolus vulgaris; Rhizoctonia solani; Cultivars; Inheritance; Resistance; Plant breeding; Snap beans; Crossbreeding; USA.

The inheritance of resistance to Rhizoctonia solani in snap beans was studied using crosses between 3 susceptible cv. (Harvester, Hawaiian Wonder, and Manoa Wonder) and 4 resistant lines (PI 165426, PI 226895, Cornell 2114-12, and B 4096). Disease ratings were made in the greenhouse in artificially infected beds. Disease infection was rated on a scale of 1 (resistant) to 5 (susceptible), based on the size and depth of lesions on 2-wk.-old seedlings. Ratings for the susceptible parents ranged from 3.93 to 4.88 and for resistant parents from 1.08 to 1.69. Av. disease infection ratings for the F1s were intermediate between the parents, while F2 progeny segregated into all 5 classes. Conclusions made so far are that the parent B 4096 is still segregating for resistance, the parent Manoa Wonder carries some resistance compared with Harvester and Hawaiian Wonder, and the resistance is quantitatively inherited, but the no. of pairs of genes involved is small, perhaps 3. (AC)

1151

26206 SINGH, S.P. 1985. Conceptos básicos para el mejoramiento del fríjol por hibridación. (Basic concepts for bean improvement through hybridization). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.109-126. Span., 4 Refs., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Plant breeding; Genetics; Genes; Hybrids; Selection;

Yields; Cultivars; Crossbreeding; Hybridizing; Colombia.

The basic concepts of the genetic improvement of beans through hybridization are described. In general, the breeding process involves the following phases: (1) development of exptl. lines, (2) evaluation of exptl. lines and identification of new cv., and (3) commercialization of new cv. The main aspects that should be considered in the development of exptl. lines as well as the most common breeding methods used in beans (modified pedigree, mass-pedigree, and backcrossing) are described. The evaluation of exptl. lines and the identification of new cv. are carried out in 3 or more steps: adaptation nurseries, preliminary yield trials, and regional yield trials. For the commercialization of new cv. the newly identified materials are registered, multiplied, and distributed. (CIAT)

1152

25362 SINGH, S.P.; GUTIERREZ, J.A. 1982. Sources of some architectural traits in dry bush beans, Phaseolus vulgaris L. Bean Improvement Cooperative. Annual Report 25:6-8. Engl. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Plant architecture; Plant breeding; Colombia.

A brief reference is made to new bean germplasm accessions and breeding lines identified at CIAT with specific architectural traits. Examples are given for type I bush beans with 10 or more nodes on the main stem, erect branching, suppressed branching, short foliage and internodes, lanceolate leaves, small pods and long pods. (CIAT)

1153

26518 TAY U., J.; PAREDES C., M.; KRAMM M., V. 1984. Blanco-INIA, variedad de poroto de consumo interno y exportación, resistente al mosaico común y mosaico amarillo. (Blanco-INIA, a bean variety for internal consumption and export, resistant to both common and yellow mosaic viruses). Agricultura Técnica 44(4):377. Span., Sum. Engl. (Estación Experimental Quilamapu, Inst. de Investigaciones Agropecuarias, Casilla 426, Chillán, Chile)

Phaseolus vulgaris; Germplasm; Bean common mosaic virus; Bean yellow mosaic virus; Canned beans; Cultivars; Resistance; Chile.

The new bean var. Blanco-INIA was classified as an early maturing var. (100 days or less); the plant is semierect and reaches 50 cm in height. It is resistant to all strains of BCMV found in Chile and also to both the mild and severe strains of BYMV. It yields 2-3 t/ha and shows excellent culinary characteristics. It is recommended for cultivation throughout the bean-growing regions of Chile for domestic consumption, canning, and export. (CIAT)

1154

26057 TEMPLE, S.R. 1985. Conceptos para la descentralización del mejoramiento genético del fríjol en América Latina. (Concepts for decentralizing bean breeding in Latin America). In Curso Internacional de Investigación sobre Producción de Frejol (Phaseolus vulgaris), Santiago, Chile, 1985. Trabajos presentados. Santiago, Instituto de Investigaciones Agropecuarias. Estación Experimental La Platina. 5p. Span. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Plant breeding; Adaptation; Colombia.

The reasons why the CIAT bean improvement program is decentralizing its activities of evaluating nurseries prior to preliminary trials to other Latin American countries are briefly explained. In general, the preselection of materials from the adaptation nursery at the country level insures that bean

accessions included in advanced nurseries will have specific local adaptation, residual variability for their genetic adjustment to heterogeneous and demanding environments, and resistance components to specific problems (e.g., BGMV, Apion godmani, Thanatephorus cucumeris). Likewise, it assures that all the efforts placed on the bean evaluation nursery, the preliminary trials, and IBYAN nurseries are directed towards materials of local interest. (CIAT)

1155

26220 THUNG, M.; ORTEGA, J.; ERAZO, O. 1985. Tamizado para identificar fríjoles adaptados a suelos ácidos. (Screening to identify beans adapted to acid soils). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.313-346. Span., 37 Refs., Illus.

Phaseolus vulgaris; Cultivars; Selection; pH; P; Al; Toxicity; Mn; Yields; Resistance; Colombia.

General information on the nature of P, Al, and Mn and their interrelationship in the bean plant is presented. The methodology of screening to identify beans adapted to acid soils is indicated. This methodology includes site selection, determination of stress for Al, Mn, and P, simultaneous screening (on the basis of the former parameter), land preparation for planting and large-scale selection, modification of the screening methodology, and data collection and evaluation. Curves of response of some cv. to different P levels and to P as affected by N levels, yield curves, and lists of cv. efficient at low P and high Al and Mn levels are presented. (CIAT)

1156

26930 TORRES, D.B. 1984. Introducao e avaliacao de cultivares de feijao (Phaseolus vulgaris L.). (Introduction and evaluation of bean cultivars). Campo Grande-MS, Brasil, Empresa de Pesquisa, Assistencia Tecnica e Extensao Rural de Mato Grosso do Sul. Pesquisa em Andamento no.11. 12p. Port. (Empresa de Pesquisa, Assistencia Técnica e Extensao Rural de Mato Grosso do Sul, Caixa Postal 472, 79.100 Campo Grande-MS, Brasil)

Phaseolus vulgaris; Cultivars; Selection; Yields; Yield components; Adaptation; Brazil.

Sixty-four bean lines/cv. were evaluated in Bodoquena and Coxim (Mato Grosso do Sul, Brazil) during the 1982 dry season to select promising germplasm. In Bodoquena, the outstanding lines were CNF 0016, CNF 0166, CNF 0056, CNF 0101, CNF 0203, CNF 0098, and CNF 0105, which outyielded the control Carioca (1347 kg/ha). Large variations were not observed between materials regarding plant emergence, final stand, days to harvest, and plant height, but some variation was observed in yield components (pods/plant, seeds/pod, and 100-seed wt.). In Coxim, the outstanding lines were CNF 0155, CNF 0218, CNF 0157, CNF 0162, CNF 0145, CNF 0160, and CNF 0158, which outyielded the control Carioca (492.3 kg/ha). Large variations were not observed between materials regarding plant emergence, final stand, and days to harvest, but variations were observed in plant height and yield components. The 100-seed wt. yield component was very low for all materials due to water stress during the seed formation stage. Data are given for all cv. and for each parameter. (CIAT)

1157

26205 VOYSEST, O. 1985. Mejoramiento del fríjol por introducción y selección. (Bean breeding through introduction and selection). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y produccion. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.89-107. Span., 5 Refs., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Plant breeding; Germplasm; Adaptation; Yields; Selection; Plant introduction; Plant habit; Maturation; Lodging; Colombia.

The most important steps in the introduction and selection of bean genetic material are described. The 1st step involves the identification of the existing sources of germplasm (germplasm banks, national and international nurseries, lines obtained through hybridization, and local materials) and the selection and introduction of those materials that fulfill the breeding objectives and that, in general terms, respond to marketing conditions and farmers' demands. The 2nd step involves the establishment of discriminatory trials to discard deficient materials and to select the best. These trials can be of 4 types: observation or preliminary trials, yield trials, adaptation or regional trials, and on-farm trials. During the last step promising lines are multiplied and registered. (CIAT)

1158

26038 WEBSTER, B.D.; WAINES, J.G.; FOSTER, K.W.; HALL, A.E.; MUKUNYA, D.M.; GATHURU, E.M.; ITULYA, F.; COULSON, C. 1982. Improvement of drought and heat tolerance of disease resistant beans in the semi arid regions of Kenya. (Mejoramiento de la tolerancia del fríjol, resistente a enfermedades, a la sequía y al calor en las regiones semiáridas de Kenia). In Bean/Cowpea Collaborative Research Support Program. U.S.A. 1982 Annual Report. East Lansing, Michigan State University. pp.64-69. Engl.

Phaseolus vulgaris; Germplasm; Plant breeding; Drought; Phaseolus acutifolius; Crossbreeding; Irrigation; Abscission; Growth; Intercropping; Zea mays; Kenya.

The objectives, achievements in 1982, and plans for 1983 of the project to improve drought and heat tolerance of disease-resistant beans in the semiarid regions of Kenya are presented. On-going research work is summarized for activities conducted at the U. of California in Davis and Riverside (USA) and at the U. of Nairobi in Kabete (Kenya). (CIAT)

1159

26580 WYATT, J.E. 1984. Inheritance of an indehiscent anther character in the common bean. HortScience 19(5):670-671. Engl., Sum. Engl., 9 Refs. (United State Vegetable Laboratory, Agricultural Research Service, United State Dept. of Agriculture, 2875 Savannah Highway, Charleston, SC 29407, USA)

Phaseolus vulgaris; Inheritance; Mutation; Anthers; Backcrossing; Genes; USA.

Inheritance of an indehiscent anther (ia) mutant in common bean was studied. Dehiscence was incompletely dominant in heterozygotes making classification difficult in backcross and F2 populations. Progeny tests were necessary to determine that the character was conditioned by a single recessive gene. The symbol "ia" is proposed to denote the indehiscent anther gene. (AS) See also 0895 0915 0926 0927 0940 1000 1012 1013 1032 1075 1094 1186 1215

1160

26095 LEE, J.S.; VERMA, D.P.S. 1984. Structure and chromosomal arrangement of leghemoglobin genes in kidney bean suggest divergence in soybean leghemoglobin gene loci following tetraploidization. European Molecular Biology Organization Journal 3(12):2745-2752. Engl., Sum. Engl., 45 Refs., Illus. (Plant Molecular Biology Laboratory, Dept. of Biology, McGill Univ., 1205 Docteur Penfield Avenue, Montreal, Quebec, Canada H3A 1B1)

Phaseolus vulgaris; Genes; Chromosomes; DNA; Canada.

The structure of 1 of the leghemoglobin (Lb) genes of kidney bean was determined and the chromosomal arrangement of Lb genes was deduced by genomic hybridizations with Lb and 2 other sequences, each specific to the 5' or 3' region of the soybean Lb loci. By comparing this organization with 2 other species of legumes, Glycine max and G. soja, a phylogeny of Lb gene loci was traced. The intragenic structure of the kidney bean Lb gene shows the same intron/exon arrangement as that of soybean Lb genes and extensive sequence homologies in both coding as well as 5' and 3' noncoding regions. The presence in the kidney bean genome of 4 Lb genes suggests that tandem duplications of a single primordial plant globin gene had occurred to generate 4 Lb genes in an "Lb-locus" before Glycine and Phaseolus species diverged. Chromosome duplication by tetraploidization in Glycine generated 2 loci containing 4 genes each. A large deletion in 1 of the 4-gene loci in soybean resulted in the generation of the Lbc2 locus containing 2 Lb genes, one functional and another pseudo. This pseudogene, unlike that present on the main locus, is represented by only 2.5 exons and appears to be truncated. The 2 other truncated genes (LbT1 and LbT2) were probably generated similarly in the genome of Glycine spp. following tetraploidization before the divergence of G. max. and G. soja. (AS)

1161

25617 BANWELL, J.G.; HOWARD, R.; COOPER, D.; COSTERTON, J.W. 1985. Intestinal microbial flora after feeding phytohemagglutinin lectins (Phaseolus vulgaris) to rats. Applied and Environmental Microbiology 50(1):68-80. Engl., Sum. Engl., 41 Refs., Illus. (Division of Gastroenterology, Dept. of Medicine, Case Western Reserve School of Medecine, Cleveland, OH 44106, USA)

Phaseolus vulgaris; Dietary value; Phytohemagglutinins; USA.

In all rats treated with phytohemagglutinin lectins derived from red kidney beans, bacteria formed adherent monospecific or mixed adherent microcolonies on the tissue surface. Tissue damage was observed in phytohemagglutinin-exposed jejunal tissue. On the ileal surfaces of controls, there was a thick mucous layer within which small no. of bacteria and protozoa were seen. Segmented filamentous bacteria were anchored in the tissue surface. In phytohemagglutinin-treated rats, the ileal surface was only incompletely covered by a mucous layer, and the overlying mucosal surface was extensively covered by large no. of protozoan cells (predominantly Hexamitta muris). (AS (extract))

1162

26259 FIGUEROA, M.O.R.; MANCINI FILHO, J.; LAJOLO, F.M. 1984. Acao anti-nutricional das fito-hemaglutininas de Phaseolus vulgaris L. (Antinutritional effect of phytohemagglutinins of beans). Archivos Latinoamericanos de Nutrición 34(3):488-499. Port., Sum. Port., Engl., Span., 24 Refs. (Depto. de Alimentos e Nutricao Exptl., Faculdade de Ciencias Farmaceuticas, Univ. Sao Paulo, Caixa Postal 30.786, 05508-SP, Brasil)

Phaseolus vulgaris; Phytohemagglutinins; Antinutritional factors; Animal physiology; Diets; Brazil.

Weanling male Wistar rats were given diets with 5 to 20 percent casein and 1 percent lectins from kidney bean var. Rico 23 or Jalo. When the lectins were injected intraperitoneally, those of Jalo were lethal and those of Rico 23 were not. Rats given 1 percent lectins from Jalo showed a decrease in growth rate, food efficiency ratio, serum glucose, and activity of maltase and invertase in the intestinal mucosa. All those effects occurred with 5 or 10 percent casein in the diet but with 20 percent casein the only effect was a decrease in maltase activity. Lectins of Rico 23 produced similar effects but only when they were 5 percent of the diet. (Nutritional Abstracts and Reviews)

1163

26592 GREER, F.; BREWER, A.C.; PUSZTAI, A. 1985. Effect of kidney bean (Phaseolus vulgaris) toxin on tissue weight and composition and some metabolic functions of rats. British Journal of Nutrition 54(1):95-103. Engl., Sum. Engl., 52 Refs. (Rowett Research Inst., Bucksburn, Aberdeen AB2 9SB, England)

Phaseolus vulgaris; Toxins; Proteins; Diets; Animal physiology; United Kigdom.

Inclusion of raw kidney bean proteins in the diet for rats was shown to affect the wt. of some internal organs. Of these, in addition to the well-known hypertrophy of the pancreas attributable to dietary trypsin inhibitors, the observed atrophy of the thymus and the doubling in wt. of the small intestine are related to the protein or lectin content of the bean diet, or both. Changes in tissue composition of the small intestine were also recorded. Its protein content increased by about 40-50 percent and

carbohydrate content doubled, suggesting the occurrence of increased mucinous glycoprotein secretion. Increased DNA content (by about 30-40 percent), however, also indicated mucosal hyperplasia. Changes were also observed in mineral content, urea concn., and some enzyme activities in serum and urine, possibly as a result of disturbances in systemic metabolism or hormone concn., or both. Results gave further support to previous suggestions that the oral toxicity of kidney bean lectins involves local reactions in the small intestine in combination with their effects on the systemic immune system and general metabolism. (AS)

1164

26948 MAEDA, E.E.; ROCKE, S. 1985. Cookability of bean cultivars. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.78-86. Engl., Sum. Engl., 11 Refs., Illus. (Dept. of Food Science & Technology, Sokoine Univ. of Agriculture, Morogoro, Tanzania)

Phaseolus vulgaris; Cultivars; Cooking; Timing; Tanzania.

Thirty bean cv. of outstanding agronomic characteristics were evaluated for their cookability using the Mattson-type exptl. cooker. A high degree of variability was observed. Multiple correlation analysis revealed that the variation in cookability was largely due to differences in moisture imbibition ability among the bean cv. (r = -0.52). The percentage seed coat and the relative seed size were not significantly correlated with cookability. Determination of moisture imbibed/100 g of seed is proposed as a rational criterium for establishing the relative cookability of a large collection of bean cv. instead of carrying out actual cooking studies. The cooking time in min can then be predicted with a reasonable degree of accuracy by substituting the determined moisture in simple regression equations. (AS)

1165

26081 NAKATA, S.; KIMURA, T. 1985. Effect of ingested toxic bean lectins on the gastrointestinal tract in the rat. Journal of Nutrition 115(12):1621-1629. Engl., Sum. Engl., 31 Refs., Illus. (Laboratory of Food & Nutrition, Dept. of Home Economics, Osaka Kyoiku Univ., Ikeda, Osaka 563, Japan)

Phaseolus vulgaris; Laboratory animals; Diets; Lectins; Enzymes; Animal physiology.

A study was undertaken to provide further evidence for the mechanisms proposed for the toxicity of ingested bean lectins in animals: (1) to show the stability of concanavalin A (Con A) in the gastrointestinal tract so that it has enough time to interact with some enzymes localized in the intestinal membrane and (2) to find its effect on the activities of those enzymes that have been adopted as criteria for adaptive changes in response to altered diets, namely intestinal sucrase, alkaline phosphatase, and leucine aminopeptidase. Significant amounts of ingested Con A were recovered unaltered (as seen from affinity chromatography and electrophoresis) from the cecal content of rats 4 h after its oral administration and from feces (90 percent recovery) 4 days later. This indicated that Con A is quite stable during its passage through the gastrointestinal tract. Con A, given at a level of 0.3 or 0.5 percent in the diet, completely prevented adaptive changes in the activities of those enzymes. These results substantiate the mechanisms proposed earlier by other investigators that the toxicity of ingested bean lectins involves their binding to the luminal surface of the small intestine, where they disturb the function of the brush-border membrane. (AS)

1166

26088 PUSZTAI,A.; GREER, F. 1984. Effects of dietary legume proteins on the morphology and secretory responses of the rat small intestine. Protides of the Biological Fluid: Proceedings of the Colloquium 32:347-350. Engl., Sum. Engl., 19 Refs. (Rowett Research Inst., Bucksburn, Aberdeen, Scotland, UK)

Phaseolus vulgaris; Proteins; Diets; Laboratory animals; Animal physiology; Lectins; United Kingdom.

The dry wt. of the small intestine of rats fed on a diet containing kidney bean proteins doubles in 10 days, while the wt. of all other organs and total body mass decreases. The effect is reversible initially. Both secretion of mucin (protein and carbohydrate content increases by nearly 100 percent) and increases in cell no. (DNA up by nearly 40 percent) are stimulated by these proteins. The increased secretion into the lumen is partly the result of a lectin-related local anaphylaxis and partly of a direct stimulatory effect of phaseolin (Glycoprotein II) on the secretory response of small intestinal cells including goblet cells. Small intestinal cell proliferation is probably due to a stimulation by the lectins of beans (perhaps mitogenic effect) on cellular processes. A combination of all these results in large losses of endogenous N for the animal and leads to an apparent poor utilization of legume proteins. (AS)

1167

26084 SATHE, S.K.; SALUNKHE, D.K. 1984. Technology of removal of unwanted components of dry beans. CRC Critical Reviews in Food Science and Nutrition 21(3):263-287. Engl., 169 Refs. (Dept. of Nutrition & Food Science, Univ. of Arizona, Tucson, AZ 85721, USA)

Phaseolus vulgaris; Inhibitors; Lectins; Phytoalexins; Human nutrition; Analysis; USA.

The effects of the following unwanted components of beans are discussed: enzyme inhibitors, lectins, phytates, raffinose, oligosaccharides, polyphenolics, off-flavors, goitrogens, lathyrism, favism, phytoalexins, allergens, saponins, estrogens, antivitamins, lysinoalanine, and amino acid racemization. The technologies used to remove these components are reviewed, namely soaking, cooking, germination, fermentation, extraction, enzymatic methods, irradiation, and membrane filtration. (Food Science and Technology Abstracts) See also 0894 1107

1168

26540 BRAHAM, J.E.; BRESSANI, R. 1985. Effect of bean broth on the nutritive value and digestibility of beans. Journal of the Science of Food and Agriculture 36(10):1028-1034. Engl., Sum. Engl., 15 Refs. (Division of Agricultural Sciences, Inst. of Nutrition of Central America & Panama, P.O. Box 1188, Guatemala, Guatemala)

Phaseolus vulgaris; Digestibility; Methionine; Cooking; Guatemala.

Black, red, and white beans were cooked (1:3, water:beans) at 120 degrees Celsius and 1.12 kg/square centimeter for 20 min. Chemical analysis of the broth showed that it contained low levels of protein, ether extract, and carbohydrates, and high levels of ash and polyphenols. The effect of the addition of bean broth on the PER and digestibility of beans was studied in rats. PER values and protein digestibility decreased as the amount of bean broth increased in the diet. White beans showed highest values of PER, wt. gain, and protein digestibility; the latter was lower in the groups supplemented with met. than in those not supplemented. There was no interaction between level of met. and amount of bean broth in the diet on digestibility. The effect of met. was not related to either metabolic N in feces or amount of food consumed. A high proportion of the feces N was soluble in NaOH. When rats from the different groups were fed diets containing 18 percent bean protein and killed at 6 wk. of age they showed no difference in pancreas wt. that could be related to the amount of broth in the diet, nor were the levels of trypsin in the pancreas or the amount of p-aminobenzoic acid excreted upon ingestion of N-benzoyl-L-tyrosine-p-aminobenzoic acid related to the amount of broth in the diet. (AC)

1169

26251 BRESSANI, R.; HERNANDEZ, E.; NAVARRETE, D.; BRAHAM, J.E. 1984. Protein digestibility of methionine supplemented common beans (Phaseolus vulgaris) in adult human subjects. Archivos Latinoamericanos de Nutrición 34(4):640-653. Engl., Sum. Engl., Span., 17 Refs. (Inst. of Nutrition of Central America & Panama, Guatemala, Guatemala)

Phaseolus vulgaris; Cultivars; Digestibility; Proteins; Methionine; Human nutrition; Guatemala.

Protein digestibility of 5 common bean cv. of different color was tested in young adults, as the only dietary protein source. Cheese protein was used as reference protein. The cooked beans provided 0.65 g protein/kg daily, and energy intake was adjusted to 45 kcal/kg daily. Met. was added at 0.5 percent of ingested protein. Results indicated apparent protein digestibility to vary from 49.6 to 62.1 percent. White-colored beans had the highest value; black beans gave the lowest. Cheese protein showed an apparent protein digestibility of 76.2 percent. The true protein digestibility was calculated using the endogenous N excretion values obtained in the study, as well as literature values. Digestibility increased as expected, but was still low compared with other protein sources. A high correlation was found between digestibility of DM and protein digestibility. Fecal N was fractionated between soluble and insoluble N in a 0.02 N NaOH solution. The soluble N fraction was highly correlated with protein digestibility, with a correlation coefficient of -0.94. This fraction, still to be identified, could very well be responsible for the low digestibility values found for common beans in man. (Nutrition Abstracts and Reviews)

1170

26091 FLEMING, S.E.; O'DONNELL, A.U.; TERMAN, J.A. 1985. Influence of frequent and long-term bean consumption on colonic function and fermentation. American Journal of Clinical Nutrition 41(5):909-918.

Engl., Sum. Engl., 31 Refs., Illus. (Dept. of Nutritional Sciences, Univ. of California, Berkeley, CA, USA)

Phaseolus vulgaris; Diets; Dietary value; Fatty acids; USA.

The influence of frequent and long-term consumption of legume seeds on colonic function was investigated. Two groups of subjects were studied: 1 group habitually consumed legume seeds as part of their normal diet and the 2nd group seldom consumed legumes. No differences between these groups could be detected for fecal output and frequency, intestinal transit time, VFA excretion, or fecal pH during 23-day study periods in which subjects consumed either their usual diet or 100 g red kidney beans, daily. The addition of beans to the diets of both groups provided significantly more dietary fiber and produced greater fecal output and a higher concn. of VFA in feces. Fecal output was determined by 2 independent parameters, dietary fiber intake and VFA excretion. Beans provided a physiologically useful source of dietary fiber and favorably influenced colonic function. (AS)

1171

26910 HOOVER, R.; SOSULSKI, F. 1985. Studies on the functional characteristics and digestibility of starches from Phaseolus vulgaris biotypes. Starch Staerke 37(6):181-191. Engl., Sum. Engl., Germ., 43 Refs., Illus. (Dept. of Crop Science & Plant Ecology, Univ. of Saskatchewan, Saskatoon, Saskatchewan S7N 0W0, Canada)

Phaseolus vulgaris; Starch content; Digestibility; Cultivars; Canada.

The functional properties of starches from black, kidney, navy, northern, and pinto beans, all biotypes of Phaseolus vulgaris, were examined. Starch granule sizes ranged from 22-39 microns (length) to 19-28 microns (width) and shapes varied from elliptical to oval. Amylose content ranged from 30.2 to 37.3 percent. A highly ordered crystalline structure of granules (Ca) was suggested by restricted swelling power and solubility, resistance to alpha-amylase attack, high gelatinization temp., and stable amylographic viscosities. The existence of a crystalline structure of the highest and lowest order of stability among the Phaseolus starches was indicated for pinto and black beans, resp., which were substantially different than those of kidney, northern, and navy bean. The higher stability of pinto bean starch indicated a higher degree of associative bonding forces, namely, hydrogen and covalent, between oxygen and hydrogen atoms of closely packed parallel amylose chains. The wide range in amylographic viscosities was a reflection of crystalline stability, amylose exudation, granule swelling, and pH of slurry. Gels exhibited a higher degree of retrogradation at +4 degrees Celsius than at -15 degrees Celsius. Scanning electron microscopy showed that alpha-amylase-treated maize starch granules were degraded from the inside out by the formation of large circular holes; those of kidney bean were less extensively degraded and showed only scaling and roughening of the surface as evidence of granule deterioration. (AS)

1172

26596 LEE, K.; GARCIA L., J.S. 1985. Iron, zinc, copper and magnesium binding by cooked pinto bean (Phaseolus vulgaris) neutral and acid detergent fiber. Journal of Food Science 50(3):651-653,673. Engl., Sum. Engl., 21 Refs., Illus. (Dept. of Food Science, Univ. of Wisconsin-Madison, 1605 Linden Dr., Madison, WI 53706, USA)

Phaseolus vulgaris; Cooking; Fibre content; Nutritive value; USA.

Fe, Cu, and Zn but not Mg were bound by neutral (NDF) and acid (ADF) detergent fiber obtained from cooked pinto beans. Fe binding increased with higher pH, higher Fe concn., higher fiber concn., and smaller fiber particle size. Max. binding of Fe was at pH 6.5 and min. at pH 4.0 for both NDF and ADF. A 50 percent decrease in particle size increased Fe binding by 8

percent. Binding of Cu and Zn increased with higher Cu and Zn concn. Both NDF and ADF had a greater affinity for Cu than for either Fe or Zn. Scatchard plots indicated the presence of 2 types of binding sites for Zn, one for Fe and one for Cu. (AS)

1173

25958 LIEBMAN, B. 1983. Fear of bloating: beans needn't be bland or embarrassing. Nutrition Action 10(1):12-14. Engl., Illus.

Phaseolus vulgaris; Human nutrition; Cooking; USA.

The reason why many North Americans do not consume beans--bloating (also called indigestion or flatulence)--is discussed. Flatulence is caused by the indigestible sugar raffinose and by stachyose and verbacose, which are acted upon by intestinal bacteria causing fermentation and gas production. A method for leaching out some of these sugars from beans by soaking in water is given, although valuable vitamins and minerals can be lost in the process. (CIAT)

1174

26908 MENDEZ, M.E.M.; POURCHET C., M.A. 1984. Estudo analítico dos integrantes da fracao fitra de alimentos vegetais. (Constituents of dietary fiber of vegetables. Studies on pulses). Ciencia e Tecnologia de Alimentos 4(1):95-103. Port., Sum. Port., Engl., 35 Refs. (Depto. de Farmacia da Univ. Federal Fluminense Rua Dr. Mario Viana, 523, 24.000 Niteroi-RJ, Brasil)

Phaseolus vulgaris; Fibre content; Nutritive value; Brazil.

Studies were conducted on composition of dietary fiber, isolated from 4 kidney bean cv. (Canilac, 51051, Costa Rica, and Carioca), and from cowpeas or chickpeas. Data are given for moisture, ether extract, protein, soluble and insoluble ash, cellulose, lignin, hemicelluloses, total and reducing sugars, soluble pectin, and protopectin in dietary fiber isolated from raw or cooked samples. (Food Science and Technology Abstracts)

1175

26370 NAVARRETE, D.A.; GUTIERREZ, O.M.; BRESSANI, R. 1984. Digestibilidad, valor proteínico y necesidades de proteína de dietas a base de plátano/frijol y de yuca/frijol en jóvenes adultos. (Digestibility, protein value, and protein requirements of plantain-bean and cassava-bean diets in young men). Archivos Latinoamericanos de Nutrición 34(4):594-605. Span., Sum. Span., Engl., 17 Refs. (Inst. de Nutrición de Centro América y Panamá, Guatemala, Guatemala)

Phaseolus vulgaris; Diets; Digestibility; Human nutrition; Nutritive value; Proteins; Guatemala.

The short-term N balance method with multiple intakes was used with groups of 10 men on av. 24.8 yr old given a diet based on cassava or plantain without or with beans so that protein intake was 0, 0.2, 0.4, and 0.6 g/kg daily. Even with intakes of N of 105.7 and 117.4 mg/kg daily, the men did not reach positive balance. Protein digestibility was 55.7 percent for the cassava-bean diet and 50.4 percent for the plantain-bean diet. Mean N intake required to reach N equilibrium for the cassava-bean diet was 114.2 mg/kg daily, varying from 81.3 to 172.4 mg/kg, and for the plantain-bean diet 111.9 mg/kg daily, varying from 83.6 to 219.2 mg/kg. In 4 of 5 men who took part in both studies, the N intake required to reach N equilibrium was greater with the plantain-bean than with the cassava-bean diet. (AS (extract))

1176

26086 REDDY, N.R.; PIERSON, M.D.; SATHE, S.K.; SALUNKHE, D.K. 1985. Dry bean tannins: a review of nutritional implications. Journal of the

American Oil Chemists' Society 62(3):541-549. Engl., Sum. Engl., 91 Refs. (Dept. of Food Science & Technology, Virginia Polytechnic Inst. & State Univ., Blacksburg, VA 24061, USA)

Phaseolus vulgaris; Tannin content; Nutritive value; Antinutritional factors; Digestibility; Cooking; USA.

Recent research on legumes tannins and their possible influence on nutritional quality of legumes as human food is reviewed and summarized. The tannin content of dry beans ranges from 0.0 to 2.0 percent, depending on the bean species and color of the seed coat. Many high tannin bean var. are of lower nutritional quality than low tannin bean var. Naturally occurring food legume tannins are reported to interact with proteins (both enzyme and nonenzyme proteins) to form tannin-protein complexes resulting in inactivation of digestive enzymes and protein insolubility. Both in vitro and in vivo studies indicate that bean tannins decrease protein digestibility, either by inactivating digestive enzymes or by reducing the susceptibility of the substrate proteins after forming complexes with tannins and absorbed ionizable Fe. Other deleterious effects of tannins include a lowered feed efficiency and growth depression in exptl. animals. The antinutritional activity of bean tannins can be reduced by processing (1 or a combination of 2 or more methods), for example dehulling, soaking, cooking, and germination. Genetic selection also may help in breeding var. low in tannins. Potential chemical treatments such as use of tannin complexing agents are discussed. (AS)

1177

26511 SODIPO, O.A.; ARINZE, H.U. 1985. Saponin content of some Nigerian foods. Journal of the Science of Food and Agriculture 36(5):407-408. Engl., Sum. Engl., 6 Refs. (Dept. of Biochemistry, College of Medical Sciences, Univ. of Maiduguri, P.M.B. 1069, Maiduguri, Nigeria)

Phaseolus vulgaris; Dietary value; Nutritive value; Nigeria.

Saponins were extracted and purified from millet, beans, Sorghum vulgare, and groundnut. Beans were found to contain a considerable amount of saponin (245.0 mg/kg), while millet, S. vulgare, and groundnut contained 194.7, 72.7, and 48.8 mg/kg dry wt. basis, resp. (AS)

1178

26576 STEINSAPIR, A.; AGUILERA, J.M.; YAÑEZ, E. 1984. Effect of roasting on the nutritional value of dry beans (Phaseolus vulgaris). Nutrition Reports International 30(3):581-585. Engl., Sum. Engl., 8 Refs. (Univ. of California, Berkeley, CA 94720, USA)

Phaseolus vulgaris; Seed; Roasting; Storage; Protein content; Cooking; Water content; Fat content; Ash content; Fibre content; Nutritive value; USA.

Dry beans of cv. Tortola Diana slightly roasted by solid-to-solid heat transfer to 105 degrees Celsius in 3 min were stored at 20 degrees Celsius for 10 mo. After soaking and cooking in boiling water, roasted beans achieved eating texture 30 min before untreated controls. There was no major difference in proximate composition. Roasted and unroasted samples prepared at 3 cooking times (for proper texture and plus and minus 30 min) showed no significant difference in NPR when given to rats. NPR values ranged from 3.46 to 3.60 for the 6 samples. (AS)

1179

26571 VARGAS, F.; BRESSANI, R.; NAVARRETE, D.; BRAHAM, J.E.; ELIAS, L.G. 1984. Digestibilidad de la proteína y energía de dietas elaboradas a base de arroz y frijoles en humanos adultos. (Digestibility of protein and energy in diets based on rice and beans for adult persons). Archivos Latinoamericanos de Nutrición 34(1):109-129. Span., Sum. Span., Engl., 15

Refs., Illus. (Inst. Costarricense de Investigación y Enseñanza en Nutrición y Salud, Apartado 4, Tres Ríos, Costa Rica)

Phaseolus vulgaris; Diets; Digestibility; Proteins; Guatemala.

For periods of 10 days 10 men were given diets based on rice and beans to supply 46, 72, or 103 mg . /kg daily. When the basal diet (rice provided 60 and beans 40 percent of the protein) was given at 103 mg N/kg and gross energy 50 kcal/kg daily, apparent and true digestibility of N was 59.1 and 70.8 percent, resp., digestibility of energy was 93.8 and of ME 92.5 percent. When 10 percent of the plant protein was replaced by milk protein, corresponding values were 65.3, 76.8, 93.5, and 92.1 percent. When gross energy of the diet was increased from 45 to 50 kcal/kg daily there was no effect on N or energy absorption. Apparent digestibility of N increased significantly when the amount of N in the diet was increased and stabilized when N intake exceeded 100 mg/kg daily. (Nutrition Abstracts and Reviews)

1180

26561 VARGAS, J.E.; BRESSANI, R.; NAVARRETE, D.A.; BRAHAM, J.E.; ELIAS, L.G. 1984. Efecto de la suplementación de proteína animal y energía en la calidad proteínica de dietas a base de arroz y fríjol en hombres adultos. (Effect of animal protein and energy supplementation on protein quality of diets based on rice and beans in adult men). Archivos Latinoamericanos de Nutrición 34(1):46-68. Span., Sum. Span., Engl., 23 Refs. (Inst. Costarricense de Investigación y Enseñanza en Nutrición y Salud, Apartado 4, Tres Ríos, Costa Rica)

Phaseolus vulgaris; Human nutrition; Diets; Protein content; Guatemala.

For 10 days 10 men were given a diet in which rice and beans supplied 60 and 40 percent of protein, resp., and 46 kcal ME/kg daily. Regression coefficient between ingested N and N balance was 0.76 plus or minus 0.11, and N for maintenance was 96.2 plus or minus 13.7 mg/kg daily. When the same diet was given at 51.2 kcal ME/kg daily, the regression coefficient was 0.80 plus or minus 0.13 and N for maintenance 90.1 plus or minus 8.7 mg/kg daily. Differences between the 2 expt. were not significant. When 10 percent of the protein in the diet was replaced by milk protein and given at 45.2 kcal ME/kg daily, the regression coefficient was 0.96 plus or minus 0.08 and N for maintenance 78.6 plus or minus 10.2 mg/kg daily. These values were significantly different from the previous ones. When the same was given at 48.9 kcal ME/kg daily, regression coefficient was 0.86 plus or minus 0.7 and N for maintenance 82.4 plus or minus 10.2 mg/kg daily. (Nutrition Abstracts and Reviews) See also 0891 0912 1112 1221 1222

1181

26070 MAHMOUD, S.A.Z.; THABET, F.M.; RAMADAN, E.M.; KHATER, T. 1984. Microbial and biochemical changes in soil and rhizosphere of tomato and common bean plants. Zentralblatt fuer Mikrobiologie 139(4):219-225. Engl., Sum. Engl., Germ., 15 Refs., Illus. (Dept. of Agricultural Microbiology, Faculty of Agriculture, Ain Shams Univ., Shoubra El-Khaima, Egypt)

Phaseolus vulgaris; Rhizosphere; Roots; Microbiology; Bacteriology; Soils; Egypt.

Total microbial flora, as well as some of the important microbial groups, were determined in soil and rhizosphere of both common bean and tomato plants at different stages of growth. The accumulation of some important biological substances in root zone was also interpreted. The total microbial flora in general decreased slightly during the growth season in both soil and rhizosphere region. The rhizosphere/soil ratios were positive and ranged from 5 to 20 depending on plant species and age. There was a distinct relation between the stages of plant development and the densities of total microbial flora, actinomycetes, N fixing clostridia, sporeformers, aerobic and anaerobic cellulose decomposers. Densities of aerobic N fixers (Azotobacter) and fungi seemed to be constant in their low count in the rhizosphere regions during the growth season. (AS)

1182

24182 FERRERA-CERRATO, R.; NUÑEZ E., R.; LOPEZ-ALCOCER, E.; ETCHEVERS, J.; GARDEZI, A.K. 1983. Research coordinated program (FAO/IAEO-C.P.) on the use of isotopes in nitrogen biological fixation studies (contract 2332/R3/SD), Mexico. Final report. Chapingo, México, Colegio de Postgraduados. Centro de Edafología. Sección de Microbiología y Bioquímica de Suelos. 43p. Engl., 6 Refs., Illus.

Phaseolus vulgaris; Cultivars; Nitrogen fixation; Rhizobium phaseoli; Strains; Yields; Dry matter; Fertilizers; N; Nodulation; Mexico.

Bean cv. Criolla regional (type IV), Bayomex (type I), and Ojo de Cabra (type II) were evaluated for N fixation with Rhizobium phaseoli strains EL 114, EL 71, and a native strain using (15)N-labeled (NH4)2SO4, in San Miguel, Mexico. Statistically significant differences for total DM yield were only observed as affected by bean cv.; Criolla regional was superior to the other cv. (9.96 kg DM/ha vs. 6.25 and 5.99 for Ojo de Cabra and Bayomex, resp.). Grain yield and total N yield did not vary significantly among cv. The percentage N derived from the fertilizer was higher for Bayomex and Ojo de Cabra (3.76 and 3.75, resp., vs. 2.18 for Criolla); a similar pattern was observed for percentage N derived from the soil (91.37, 88.11, and 53.15, resp.). However, percentage N derived from symbiotic fixation was the contrary; i.e., 4.87, 8.12, and 44.64, resp. All Rhizobium strains showed the same N fixation capacity. In terms of nodulation, the descending order for bean cv. was Criolla, Ojo de Cabra, and Bayomex. Symbiotic N fixation is higher for indeterminate cv. with a long vegetative cycle. Ojo de Cabra and Bayomex have a low N fixation capacity. While N fixation was higher in Criolla, grain yield was not significantly increased. (CIAT)

1183

26570 HUNTINGTON, T.G. 1984. The influence of tillage, inoculation and the regulation of symbiotic nitrogen fixation on the production of field beans, and the mineralization of nitrogen from winter annual cover crops. Ph.D. Thesis. Lexington, University of Kentucky. 173p. Engl., Sum. Engl., 196 Refs., Illus.

Phaseolus vulgaris; Nitrogen fixation; Nitrogen-fixing bacteria; Rhizobium phaseoli; Inoculation; Land preparation; N; Fertilizers; Yields; Dominican Republic.

Field expt. were established at several locations in the Dominican Republic in 1982 and 1983. Initial expt. evaluated the no-tillage cropping system and subsequent expt. examined the response of beans to inoculation with improved strains of Rhizobium phaseoli and determined the influence of tillage and P fertilization on the inoculation response. The effectiveness of indigenous strains of R. phaseoli was compared with commercial inoculant and N fertilizer by evaluating the growth response of beans in the greenhouse. Further investigations were designed to probe the limitations to N fixation inherent in this association. The age-nitrogenase enzyme activity profiles of different host/endophyte combinations were characterized to distinguish whether temporal regulation or fixation rate was the primary limiting factor. The adaptability of the no-tillage system to various soil and climatic conditions was demonstrated. Grain yields of red beans were not influenced by inoculation with Rhizobium. The response to inoculation was not influenced by tillage or P. A wide range in fixation effectiveness between indigenous strains of R. phaseoli was observed. The most effective strains were significantly less effective than N fertilizer in supplying plant N requirements. Comparisons between effective and ineffective strains indicated that fixation rate was the most important factor controlling effectiveness between strains. (AS (extract))

1184

26548 JOSEPHSON, K.L.; PEPPER, I.L. 1984. Competitiveness and effectiveness of strains of Rhizobium phaseoli isolated from the Sonoran desert. Soil Biology and Biochemistry 16(6):651-655. Engl., Sum. Engl., 16 Refs. (Dept. of Soils, Water & Engineering, Univ. of Arizona, Tucson, AZ 85721, USA)

Phaseolus vulgaris; Strains; Rhizobium phaseoli; Nitrogen fixation; Nodulation; USA.

Four strains of Rhizobium phaseoli were examined for N2 fixation effectiveness and for competitiveness for nodule occupancy, using strain-specific fluorescent antibodies. Competition studies in Leonard jars in a growth chamber showed that strain KIM-5, a cool season isolate from Kimberly (Idaho, USA), consistently occupied the majority of nodules on beans cv. Kentucky Wonder, when applied as a mixed inoculant with desert strains (K-1, 36 or 90). Competitiveness of KIM-5 was independent of cell no., as shown by the high recovery of KIM-5 from nodules even when extensively outnumbered in the inoculant. KIM-5 performed better than the desert strains, regardless of whether they were ineffective (strains 36 and 90) or highly effective (K-1). Although KIM-5 was more competitive than K-1, no difference in infectiveness (as shown by nodule mass) or effectiveness (as shown by percentage N, total plant N, C2H2 reduction and total plant wt.) was observed. In YEM broth, strain K-1 showed increasing growth rates when the temp. was increased from 27 to 35 degrees Celsius, and was viable at 40 degrees Celsius. These data indicate K-1 to be an unusually heat-tolerant strain. Growth rates of KIM-5 were constant from 27 to 35 degrees Celsius and the organism was not viable at 40 degrees Celsius. Both strains produced acid in a defined broth medium. The effectiveness of KIM-5 and K-1 was also evaluated under field conditions using single strain inoculants with 2 pinto bean cv., Mexicali 80 and Delicias 71. Inoculation with K-1 resulted in yield increases with both cv. over uninoculated plants, whereas there was little difference between plants inoculated and or not with KIM-5. (AS)

1185

26284 MARTINEZ, E.; PARDO, M.A.; PALACIOS, R.; CEVALLOS, M.A. 1985. Reiteration of nitrogen fixation gene sequences and specificity of Rhizobium in nodulation and nitrogen fixation in Phaseolus vulgaris. Journal of General Microbiology 131(7):1779-1786. Engl., Sum. Engl., 29 Refs., Illus. (Centro de Investigación sobre Fijación de Nitrógeno, Univ. Nacional Autónoma de México, Apartado Postal 565 A, Cuernavaca, Morelos, México)

Phaseolus vulgaris; Rhizobium; Rhizobium phaseoli; Strains; Isolation; Nodulation; Mexico.

The symbiotic properties of a broad range of Rhizobium phaseoli strains and other rhizobia isolated from different legumes are described and their nitrogenase reductase coding sequences (nifH) are analyzed. Results indicate that most R. phaseoli strains have reiterated nifH sequences. Reiterations are also found in rhizobia from nodules of other Phaseolus species and from the close relative of Phaseolus, Pachyrhizus. However, nifH gene reiteration is not always found in the rhizobia able to nodulate and fix N in Phaseolus, since some strains isolated from nodules of Phaseolus vulgaris as well as from other legumes are able to establish an effective symbiosis with P. vulgaris and do not show reiterations. The existence of different evolutionary lines of R. phaseoli is proposed. The reiteration of nif genes may be considered a marker for the most abundant and specialized of these evolutionary lines. (AS)

1186

27526 PEREIRA, P.A.A.; ARAUJO, R.S.; ROCHA, R.E.M. DA; STEINMETZ, S. 1984. Capacidade de genótipos de feijoeiro de fixar N2 atmosférico. (Ability of

bean genotypes to fix atmospheric N2). Pesquisa Agropecuária Brasileira 19(7):811-815. Port., Sum. Port., Engl., 14 Refs., Illus. (Empresa Brasileira de Pesquisa Agropecuária, Centro Nacional de Pesquisa de Arroz e Feijao, Caixa Postal 179, 74.000 Goiania-GO, Brasil)

Phaseolus vulgaris; Nodulation; Cultivars; Nitrogen fixation; Rhizobium; Genotypes; Brazil.

A field screening program was conducted at the Centro Nacional de Pesquisa de Arroz e Feijao (Goiania, Brazil) to evaluate the ability of several bean genotypes to fix N biologically. Dry wt. of nodules and nitrogenase activity were highly variable. They were higher at the flowering stage than at the middle pod filling stage of bean plants. A senescence of the nodules occurred at this physiological phase. More than 40 percent of the genotypes studied showed nodule masses over 92.5 mg/plant. Some genotypes showed as high as 200 mg/plant, which in turn can be compared with nodule masses obtained from other leguminous plants that are known to have efficient symbioses with bacteria of the genus Rhizobium. CNF 1855, CNF 1882, and Valle 18 were the best nodulating genotypes while CNF 1454, Lustroso Claro, Mulatinho, and CNF 402 were some of the worst ones. (AS)

1187

26558 VOSS, M.; FREIRE, J.R.J.; SELBACK, P.A. 1984. Efeito de níveis de calcário no solo e na capacidade de competicao de estirpes de Rhizobium phaseoli por sítio de nodulacao. (Effect of lime rates on soil and on the competitive ability of Rhizobium phaseoli strains for nodule sites). Pesquisa Agropecuária Brasileira 19(4):433-439. Port., Sum. Port., Engl., 26 Refs., Illus. (Inst. Agronomico do Paraná, Caixa Postal 1331, 86.100 Londrina-PR, Brasil)

Phaseolus vulgaris; Inoculation; Strains; Rhizobium phaseoli; Agricultural lime; pH; Nodulation; Brazil.

Seedlings of bean cv. Turrialba-4 were inoculated with strains of Rhizobium to evaluate their competitive ability for nodule sites in soil treated with different rates of lime and presenting low initial population of R. phaseoli and low Al(3+) and Mn(2+) contents. The Rhizobium strains Car 04, Car 37, and Car 43 were evaluated at 5 lime rates. Car 43 was the best competitor at pH 5.1 and 5.4, while Car 04 was better at pH 5.9, 6.2, and 6.7. The competitive ability of Car 37 was similar at the 1st 4 lime rates, but decreased at the highest lime rate. For a pH range of 5.1-6.2, a single linear relationship was observed between the competitive ability for nodule sites of the Car 04 and Car 43 strains and the soil pH. The Rhizobium strains Semia 487, Semia 492, Car 04, Car 37, and Car 43 were evaluated at 2 lime rates. Semia 48 occurred in more than 80 percent of the nodules at pH 5.2 and 6. The effect of lime rates on the competitive ability for nodule sites varied with R. phaseoli strains. (AS)

1188

26529 WEISER, G.C.; GRAFTON, K.F.; BERRYHILL, D.L. 1985. Nodulation of dry beans by commercial and indigenous strains of Rhizobium phaseoli. Agronomy Journal 77(6):856-859. Engl., Sum. Engl., 21 Refs., Illus.

Phaseolus vulgaris; Rhizobium phaseoli; Nodulation; Strains; Yields; Cultivars; USA.

A 2-yr field study was conducted in Fargo (North Dakota, USA) to assess nodulation by indigenous soil strains and commercial strains 127K12b, 127K44, and 127K81-3 of Rhizobium phaseoli in the dry bean cv. Fleetwood, Pindak, UI-114, and Upland. Inoculation with the commercial strains, compared with uninoculated controls, did not increase seed yield; however, nodule no. and fresh wt. were influenced. Strain 127K12b produced more nodules, more total nodule tissue, and larger nodules than other commercial or indigenous

strains. Cv. UI-114 had more nodules, total nodule tissue, and larger nodules regardless of inoculum source. The effect of individual inoculum strains did not vary between years, but was cv.-specific for nodule characteristics. Inoculation with commercial strains resulted in significantly greater nodule no. and tissue, and larger nodules relative to indigenous soil strains. (AS)

1189

26554 WONG, P.P.; SHANTHARAM, S. 1984. Binding between pole bean (Phaseolus vulgaris L.) lectin and rhizobia that do or do not nodulate the pole bean. Canadian Journal of Microbiology 30(11):1349-1356. Engl., Sum. Engl., Fr., 34 Refs., Illus.

Phaseolus vulgaris; Rhizobium phaseoli; Strains; Nodulation; Rhizobium leguminosarum; Lectins; Nitrogen fixation; USA.

Phaseolus vulgaris cv. Kentucky Wonder was nodulated not only by Rhizobium phaseoli 127K14 but also by Rhizobium sp. 127E15, R. leguminosarum 92A3, and R. trifolii 0403. It was not, however, nodulated by R. trifolii ATCC 14481 and R. japonicum 61A118. The binding between the bean lectin and various strains of Rhizobium that can or cannot nodulate the bean was tested. Results suggest that the sugar specificity of bean lectin for binding rhizobia may be different than that for the interaction with erythrocytes. Since the sugar specificities of bean lectin and soybean lectin for binding R. japonicum are different, rhizobia such as R. japonicum 61A118 may have multiple independent binding sites, each having different sugar specificity, for lectins of various legumes. (AS (extract))

1190

26550 YOUNG, J.P.W. 1985. Rhizobium population genetics: enzyme polymorphism in isolates from peas, clover, beans and lucerne grown at the same site. Journal of General Microbiology 131(9):2399-2408. Engl., Sum. Engl., 52 Refs., Illus. (John Innes Inst., Colney Lane, Norwich NR4 7UH, England)

Phaseolus vulgaris; Rhizobium meliloti; Rhizobium leguminosarum; Nodulation; Enzymes; United Kingdom.

Isolates of Rhizobium meliloti and of R. leguminosarum biovars viceae, trifolii, and phaseoli were obtained from a single site in Norfolk, England, and examined by enzyme electrophoresis of glucose-6-phosphate dehydrogenase, superoxide dismutase, beta-galactosidase, and esterases. All the enzymes had mobility variants, but the variation of the different enzymes was highly correlated, so that only a restricted no. of combinations (electrophoretic types) were found. Some electrophoretic types were confined to a single biovar, but others were shared among R. leguminosarum biovars viceae, trifolii, and phaseoli. Most R. meliloti isolates were quite distinct from those of R. leguminosarum. Electrophoresis of total soluble protein in the presence of SDS revealed variation that correlated with the electrophoretic type rather than with the host range. It is suggested that the Rhizobium isolates from this site comprise a no. of genetically distinct lineages, some of which may carry any of several different host-range determinants, and which therefore appear in more than 1 biovar. (AS) See also 0867 0911 0913 0918 0969 0984 1007 1100 1126

1191

26922 ARBULU, D., P.; RUIZ DE LONDOÑO, N.; PACHICO, D. 1986. Diagnóstico de la producción de fríjol en la Provincia de Chota, Departamento de Cajamarca, Perú, 1985. (Diagnosis of bean production in the province of Chota, department of Cajamarca, Peru, 1985). Cali, Colombia, Centro Internacional de Agricultura Tropical. Documento de trabajo no.12. 61p. Span., 7 Refs.

Phaseolus vulgaris; Cultivation; Socioeconomic aspects; Production; Marketing; Transfer of technology; Technology evaluation; Peru.

The results of a survey conducted among 140 small bean producers in the province of Chota (Cajamarca, Peru) to characterize regional bean production and to provide technical recommendations are presented. Data were collected on crop rotations, planting dates and methods, soil preparation, seed sources, var., cultural practices, marketing, labor, and other resources. The av. bean yield in the region is only 180 kg/ha. Farmers believe that drought, diseases, and the lack of capital are the main factors limiting bean production, while researchers point at plant density, diseases, and soil fertility. The technical solutions proposed for bean production improvement include the use of improved var., changes in planting systems, and the use of chemical inputs. Socioeconomic studies parallel to on-farm agronomic trials are recommended. (CIAT)

1192

25756 ASCENCIO, J. 1985. Determinación del área foliar en plantas de caraota (Phaseolus vulgaris L.), yuca (Manihot esculenta Crantz) y batata (Ipomoea batatas (L.) Poir.) utilizando dimensiones lineales y de peso seco de las hojas. (Determination of leaf area in bean, cassava, and sweet potato plants using linear measurements and leaf dry weight). Turrialba 35(1):55-64. Span., Sum. Engl., Span., 13 Refs., Illus. (Univ. Central de Venezuela, Facultad de Agronomía, Depto. de Botánica, Maracay, Venezuela)

Phaseolus vulgaris; Leaf area; Leaves; Statistical analysis; Venezuela.

Correlation and simple regression analyses were used to estimate leaf area in bean, cassava, and sweet potato plants using linear measurements and leaf dry wt. Selection criteria of the best equations were the goodness of fit, comparison of observed and calculated values, and the standard error of estimate. In the case of bean cv. Tacarigua, the data obtained in the estimation of leaf area/plant were also compared using the selected regression equation and the gravimetric method of area:wt. ratio to determine 2 growth indices: NAR and leaf area ratio. (AS-CIAT)

1193

26590 BARCELO, R.; MARTNER, R.; RIVAS E., M. 1984. Le système alimentaire mexicain a la lumière de la crise agricole de l'Amérique latine. (The Mexican food system in the light of agricultural crisis in Latin America). Etudes Rurales no.95-96:331-337. Fr.

Phaseolus vulgaris; Agricultural projects; Economics; Prices; Development; Mexico.

Rural development efforts in Mexico are analyzed, within the general framework of recent economic trends in Latin America. In particular, the Mexican food system, a rural development project created in 1979 to promote maize and bean production among small farmers in Mexico, is discussed. The product pricing and credit policies adopted by the project are discussed, as well as the results obtained. It is argued, however, that the project's performance is highly hampered by a no. of obstacles, including inappropriate

agricultural policies, poor extension services, excessive state intervention, and a high incidence of poverty among small farmers. Some policy recommendations are outlined. (World Agricultural Economics and Rural Sociology Abstracts)

1194

26232 CORDEU, J.L. 1985. Comercio exterior de productos básicos: el caso del frejol en América Latina y el Caribe. (Foreign trade of basic products: the case of beans in Latin America and the Caribbean). Santiago, Chile, Organización de las Naciones Unidas para la Agricultura y la Alimentación. 110p. Paper presented at Curso Internacional de Investigación sobre Producción del Frejol, Santiago, Chile, 1985. Span.

Phaseolus vulgaris; Trade; Production; Yields; Latin America; Caribbean.

Difficulties in the exportation of basic products, particularly beans, in Latin America and the Caribbean are analyzed. Tables with data on production, yields, exports, and imports between 1967-84 for this region are included. Perspectives for an increase of regional commerce are analyzed. (CIAT)

1195

26956 DUE, J.M. 1985. Summary of farming systems bean research in Tanzania, 1982-85. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.146-151. Engl., Sum. Engl., 6 Refs. (Univ. of Illinois at Urbana-Champaign, 305 Mumford Hall, 1301 West Gregory Drive, Urbana, IL 61801, USA)

Phaseolus vulgaris; Socioeconomic aspects; Tanzania.

One of the objectives of the Bean/Cowpea Collaborative Research Support Program in Tanzania was the development of high yielding Phaseolus vulgaris var. which would be drought, insect, and disease resistant and acceptable to consumers. If new bean var. are developed and adopted by small farm families, they must fit viably into the present farming system as well as being accepted by consumers. To provide information to the bean breeders, data were gathered on the present farming systems in major bean growing areas of Tanzania regarding the present preferred var., the importance of beans for consumption and income, the importance of beans relative to other crops, labor and other inputs utilized, and socioeconomic characteristics of the families. Data from the farming systems studies undertaken from 1982 to 1985 are summarized. (AS (extract))

1196

21738 GUTIERREZ G., J.; ZULUAGA L., H. 1975. Análisis de precios al por mayor para seis productos agrícolas (arroz, azúcar, café, fríjol, maíz y panela) en la ciudad de Manizales. (Analysis of wholesale prices for six agricultural products (rice, sugar, coffee, beans, maize, and panela (brown sugar loaf)) in Manizales). Tesis Ing.Agr. Manizales, Colombia, Universidad de Caldas. 169p. Span., Sum. Span., 24 Refs., Illus.

Phaseolus vulgaris; Prices; Colombia.

Price trends, level of significance, seasonal price movements, changes in the monthly prices, and their percentage representation in Manizales, Colombia, were analyzed to make a production program for each one of the following agricultural products: rice, sugar, coffee, beans, maize, and panela (brown sugar loaf). The products studied show a great price instability throughout the year as well as during the study period. (AS (extract)-CIAT)

1197

26957 KWINBERE, D.J.; MBIHA, E.R. 1985. A case study of bean marketing at the producer level in Mgeta Division, Morogoro region. In Minjas, A.N.;

Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.152-154. Engl., Sum. Engl., 1 Ref. (Dept. of Rural Economy, Sokoine Univ. of Agriculture, Morogoro, Tanzania)

Phaseolus vulgaris; Marketing; Prices; Tanzania.

The economics of bean marketing in Mgeta (Morogoro, Tanzania) is examined. There is much concern over the price spread between farmer and urban consumer. Under current conditions, marketing margins can be expected to be wide. The study has revealed that the main problems farmers face are lack of farm inputs, low product prices, poor marketing services, and inadequate transport facilities. This situation makes the marketing system full of risks and uncertainties. As a result, rural-urban traders take advantage by charging low prices for produce while farmers have to pay high prices for other consumer goods and farm inputs. (AS)

1198

26958 MAGAYANE, F.T.T.M. 1985. Opinions of the participants of the first farmer and extension worker short course on improved bean production held at Sokoine University of Agriculture from 26-30 August, 1985. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.155-158. Engl., Sum. Engl., 1 Ref.

Phaseolus vulgaris; Transfer of technology; Tanzania.

A 4-day course for farmers and extension workers from Mgeta and Magole Division (Morogoro region, Tanzania) was held at Sokoine U. of Agriculture, to equip the participants with improved bean production techniques. Course participants evaluated the course as moderately to highly useful, therefore it is recommended that such courses be held from time to time. (AS (extract))

1199

26959 MBIHA, E.R. 1985. Preliminary report on the 1984/85 socio-economic investigation of small scale bean farmers in Mgeta Division, Morogoro District. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.159-161. Engl., Sum. Engl., 2 Refs. (Dept. of Rural Economy, Sokoine Univ. of Agriculture, P.O. Box 3007, Morogoro, Tanzania)

Phaseolus vulgaris; Socioeconomic aspects; Tanzania.

Additional socioeconomic information was gathered for the Bean/Cowpea Collaborative Research Support Program during 1984-85. High yielding bean var. Kabanima and TMO 101 were introduced into Mgeta and Magole Divisions, resp., in the Morogoro region (Tanzania). Substantial socioeconomic information useful to plant scientists and data on the performance of var. Kabanima will be available after complete data analysis. However, preliminary results indicate that this var. is superior to the local bean cv. in many respects (yields, drought tolerance, desirable standing characteristics, and seed color). (AS)

1200

22563 MORALES C., J. 1984. Identificación y cuantificación de factores que limitan la productividad de fríjol a nivel de campo de agricultores. (Identification and quantification of factors limiting on-farm bean productivity). In Curso Intensivo Postgrado de Investigación para la Producción de Fríjol en el Perú, 2o., Chincha, Perú, 1984. Trabajos presentados. Lima, Instituto Nacional de Investigación y Promoción Agropecuaria. Programa Nacional de Leguminosas de Grano. Guía Didáctica no.6. pp.109-111. Span.

Phaseolus vulgaris; Production; Peru.

Information is presented on the status of beans in Peru during 1970-80. The factors limiting its production are briefly discussed, among them pests, poor technology, lack of improved seed, lack of credit, consumption habits, and commercialization. (CIAT)

1201

26960 MSUYA, J.M.; MBIHA, E.R. 1985. Resource use efficiency of smallholder bean producers in Mgeta and Magole Divisions, Morogoro region. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.162-165. Engl., Sum. Engl., 2 Refs. (Dept. of Rural Economy, Sokoine Univ. of Agriculture, P.O. Box 3007, Morogoro, Tanzania)

Phaseolus vulgaris; Socioeconomic aspects; Labour; Tanzania.

The resource use efficiency of smallholder bean producers in Mgeta and Magole Divisions (Morogoro region, Tanzania) was studied during the 1984-85 cropping season. Data will be analyzed using the Cobb-Douglas types of production function and calculation of simple statistics. The marginal value product criterion will be used to determine efficiency and inefficiency of the resources used. (AS)

1202

26961 NGETTI, M.M.S.; MBIHA, E.R. 1985. The social and economic roles of women in the farming systems: a case study of some selected villages in Morogoro rural and Kilosa districts. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.166-168. Engl., Sum. Engl., 2 Refs. (Dept. of Rural Economy, Sokoine Univ. of Agriculture, P.O. Box 3007, Morogoro, Tanzania)

Phaseolus vulgaris; Socioeconomic aspects; Tanzania.

Current social and economic roles of Tanzanian women in both economic and household duties were studied. Factors that affect their participation in farming systems are also analyzed. Study areas were the Mgeta and Magole Divisions, which both include maize and beans in their farming systems and their diets. Since the data are still being analyzed only general statements can be drawn from the research findings. (1) Women are more involved in the decision-making process in Mgeta than in Magole. (2) In Mgeta women are more involved in the marketing of vegetables and fruits, whereas in Magole, women rarely participate in the marketing of farm products. (3) Most husbands in Magole have more than 1 wife. (4) Whereas in Mgeta the task of fetching firewood is shared between wives and husbands, in Magole the task rests solely on women's shoulders. (CIAT)

1203

26962 NJEBELE, C.W.; MBIHA, E.R. 1985. Study of the economic viability of improved bean cultivars for small scale farmers in Mgeta and Magole Divisions, Morogoro region. In Minjas, A.N.; Salema, M.P., eds. Workshop on Bean Research in Tanzania, 4th., Morogoro, Tanzania, 1985. Proceedings. Tanzania, Sokoine University of Agriculture. pp.169-172. Engl., Sum. Engl., 1 Ref. (Dept. of Rural Economy, Sokoine Univ. of Agriculture, P.O. Box 3007, Morogoro, Tanzania)

Phaseolus vulgaris; Socioeconomic aspects; Tanzania.

Socioeconomic factors affecting bean production in Tanzania and the economic impact of high yielding var. such as Kabanima and TMO101 in the selected bean growing areas in Morogoro region were studied in order to provide background

information for research. Educational level, resource endowment, pests and diseases, drought, inputs, and performance of both local and high yielding var. were assessed. Institutional constraints and other related problems like extension services and village leadership are also discussed. The success of the project will enable small-scale farmers to produce higher yields through the use of high yielding var. and hence increase incomes as well as provide a good and inexpensive source of protein, especially for poor families who cannot afford animal protein. (AS)

1204

26222 RUIZ DE LONDOÑO, N.; PACHICO, D. 1985. Metodología del diagnóstico de la producción de fríjol. (Methodology of diagnosis of bean production). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.371-382. Span. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Production; Transfer of technology; Development; Colombia.

The objectives of the diagnosis of bean production are to (1) contribute criteria for the design and completion of on-farm trials of the new bean technology and (2) to take information to research centers that helps define bean research priorities. A summary is presented of the methodology suggested and practiced in national and international courses on on-farm research carried out by CIAT's bean program. (CIAT)

1205

24237 SCHOONHOVEN, A. VAN 1985. Strategies, achievements and challanges in bean research; the CIAT perspective. Cali, Colombia, Centro Internacional de Agricultura Tropical. 19p. Engl., 8 Refs., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Developmental research; Development; Colombia.

Strategies, achievements, and challenges in bean research at CIAT are analyzed and discussed. Research strategy emphasis has been to reduce losses caused by diseases and pests. This strategy has, in general, not lead to yield increases. A change in research emphasis is, therefore, proposed. This future research should be increased in 3 main areas: (1) breeding for increased yield potential; (2) study of the photoperiod-temp. adaptation of beans, particularly at higher lat. to widen available genetic variability; (3) increasing consumer acceptability of beans by improving bean nutrition. (CIAT)

1206

26034 WALLACE, D.H.; GARRETT, P.; SANDSTED, R.F.; CHRIS W., H.; CHIRIBOGA, C.; ESPINOSA, P.; DIENER, H.; VALENCIA, J.; ZAMBRANO, E. 1982. Agronomic, sociological and genetic aspects of bean yield and adaptation. In Bean/Cowpea Collaborative Research Support Program. U.S.A. 1982 Annual Report. East Lansing, Michigan State University. pp.42-47. Engl.

Phaseolus vulgaris; Agricultural projects; Socioeconomic aspects; Ecuador.

The objectives, methodology, achievements reached in 1982, and plans for 1983 of the project on agronomic, sociological, and genetic aspects of bean yield and adaptation in Ecuador are presented. In 1982 the project concentrated on the farming systems component and on how beans integrate into the overall agricultural production system. Field research on these aspects were conducted in 4 counties of the Imbabura province: Pimampiro (irrigated monocropped bush beans with heavy inputs of labor and chemicals), San Francisco de Natabuela, Cotochachi, and Otavalo. (CIAT) See also 0895 0956 0979 0985 1007 1104

1207

26223 ESCOBAR G., J.A. 1985. Planeación de los experimentos. (Planning of experiments). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.401-408. Span., Illus.

Phaseolus vulgaris; Experiment design; Research; Colombia.

A detailed discussion is presented on the general concepts concerning the planning of expt., with emphasis on the exptl. approach, the basic elements of the expt., and information analysis. (CIAT)

1208

26224 VOYSEST, O. 1985. Tamaño de parcela. (Plot size). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.409-417. Span., 10 Refs., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Research; Experiment design; Colombia.

The factors influencing the size and shape of exptl. field plots (area of exptl. lot, soil types, trial objective, no. of replicates, and degree of accuracy and homogeneity of the exptl. material) for the execution of field expt. are discussed. The basic principles of the following different methods to determine plot size are described: max. curve method, method of Koch and Rigney, Hatheway's method, and the max. curve method using the multiple linear regression model. Some considerations are presented on the border effect and on plot size in bush and climbing bean trials. (CIAT) See also 1104

1209

26564 GARRUTI, R. DOS S.; BOURNE, M.C. 1985. Effect of storage conditions of dry bean seeds (Phaseolus vulgaris L.) on texture profile parameters after cooking. Journal of Food Science 50(4):1067-1071. Engl., Sum. Engl., 26 Refs., Illus. (Univ. Estadual de Campinas, 13.100 Campinas-SP, Brasil)

Phaseolus vulgaris; Seed; Storage; Organoleptic properties; Seed characters; Cooking; Temperature; Relative humidity; USA.

Red kidney beans were stored at constant moisture and high and low temp. for 6 mo. Instrumentally measured parameters of hardness, fracturability, gumminess, chewiness, springiness, and cohesiveness were higher in samples stored at elevated temp. than the control (2 degrees Celsius). The sensory panel found the stored beans had higher hardness, fracturability, lumpiness, chewiness, and skin toughness and less starchiness, gumminess, pastiness, and moisture absorption than the control. Puncture forces followed approx. a normal distribution curve, and there was always some overlap between stored and control beans even when the stored beans had a much higher mean puncture force than the control. All textural parameters of cooked bean cotyledons changed substantially during storage of the seeds at elevated temp. and high RH. (AS)

1210

26919 MORA, M.A. 1983. Tiempo de cocción del fríjol (Phaseolus vulgaris L.) almacenado durante un año a 13 y 16 por ciento de humedad y 25 grados centígrados. (Cooking time of beans stored for one year at 13 and 16 percent moisture and 25 degrees Celsius). Tecnología en Marcha 6(2):37-38. Span., Sum. Span., 4 Refs.

Phaseolus vulgaris; Seed; Storage; Cooking; Timing; Water content; Temperature; Costa Rica.

Recently harvested beans were stored at 25 degrees Celsius with 13 and 16 percent moisture for 1 yr, in plastic, air-tight containers. Part of the beans were initially exposed to air at 125 degrees Celsius for 0, 2, 4, and 6 min to evaluate the effect of this treatment on changes in cooking time during storage. This heat treatment was carried out at 13 and 16 percent MC. In all treatments, cooking time changed very little during storage; therefore, it was not possible to evaluate the effects of the different MC or the heat treatment. Results, however, demonstrate that a combination of factors, not yet known, allow beans to be stored at high MC and temp. (16 percent and 25 degrees Celsius) without significatively affecting cooking time. (AS-CIAT)

L01 STORED GRAIN PESTS

1211

22556 CHICOMA P., F. 1984. Insectos que atacan a los granos de fríjol almacenado y su control. (Insects attacking stored beans and their control). In Curso Intensivo Postgrado de Investigación para la Producción de Fríjol en el Perú, 2o., Chincha, Perú, 1984. Trabajos presentados. Lima, Instituto Nacional de Investigación y Promoción Agropecuaria, Programa Nacional de Leguminosas de Grano. Guía Didáctica no.6. pp.42-46. Span.

Phaseolus vulgaris; Acanthoscelides obtectus; Zabrotes subfasciatus; Stored grain pests; Insect control; Chemical control; Cultural control; Peru.

The biology of the 2 main pests of stored beans, Acanthoscelides obtectus and Zabrotes subfasciatus, is described. In addition, information is presented on the cultural and chemical control methods both for the small farmer as well as for commercial-scale production. (CIAT)

1212

26577 COSTA, E.C.; LINK, D.; MENGARDA, I.P.; TATCH, J.M. 1984. Preferencia varietal e efeito do ataque de Acanthoscelides obtectus (Say, 1831) sobre a germinacao do feijao (Phaseolus vulgaris L.). (Varietal preference and effects of Acanthoscelides obtectus attack on bean germination). Revista do Centro de Ciencias Rurais 14(2):87-92. Port., Sum. Port., Engl., 7 Refs. (Depto. de Defesa Fitossanitária, Centro de Ciencias Rurais da Univ. Federal de Santa Maria, 97.100 Santa Maria-RS, Brasil)

Phaseolus vulgaris; Cultivars; Acanthoscelides obtectus; Germination; Storage; Seed; Seed vigour; Brazil.

The preference of Acanthoscelides obtectus for different bean var. under storage conditions was studied. The percentage of damaged seeds was assessed after 6 and 12 mo. of storage as well as the effects on seed quality. There was a clear preference for var. Mouro Grosso and Mourinho. Var. Rio Tibagi and Preto Comum were the least damaged. Seed germinating power and seed vigor were drastically reduced, regardless of the var. (AS)

1213

26060 DELL'ORTO T., H. 1985. Plagas de frejoles almacenados. (Pests of stored beans). In Curso Internacional de Investigación sobre Producción de Frejol (Phaseolus vulgaris), Santiago, Chile, 1985. Trabajos presentados. Santiago, Instituto de Investigaciones Agropecuarias. Estación Experimental La Platina. 15p. Span.

Phaseolus vulgaris; Acanthoscelides obtectus; Zabrotes subfasciatus; Storage; Stored grain pests; Insect biology; Plant injuries; Insect control; Chile.

The damage, biology, and control of stored bean insect pests are described, especially regarding Acanthoscelides obtectus in Chile and Zabrotes subfasciatus in more tropical regions. Quantitative and qualitative losses caused by A. obtectus are briefly discussed, as well as its major hosts. Beans can become infested either in the field or in storage. The conditions necessary for bean grain infestation and var. resistance are discussed. Three control measures are recommended: (1) reduce infestation levels in the field by quick harvesting and careful threshing, (2) control the pest in harvested beans by fumigation or application of oil or ash, and (3) avoid reinfestations. (CIAT)

1214

26600 LAMBERT, J.D.H.; CALE, J.; ARNASON, J.T.; PHILOGENE, B.J.R. 1985. Bruchid control with traditionally used insecticidal plants Hyptis spicigera and Cassia nigricans. Insect Science and its Application

6(2):167-170. Engl., Sum. Engl., Fr., 9 Refs., Illus. (Dept. of Biology, Carleton Univ., Ottawa K1S 5B6, Canada)

Phaseolus vulgaris; Acanthoscelides obtectus; Stored grain pests; Insect control; Canada.

The effectiveness of the plants Hyptis spicigera and Cassia nigricans (from Burkina Faso) used by farmers to control insect infestation in stored cowpeas was studied in the lab. The oviposition and hatching of Acanthoscelides obtectus in beans were reduced when extracts of the plants (1 g plant material to 1 ml ethanol) were applied at low rates; the EC50 varied from 0.3 to 14.0 microliters extract/g bean. (Review of Applied Entomology)

1215

21090 MADRIGAL C., J.A.; MORALES S., G. 1978. Gorgojos del fríjol, variedades susceptibles y distribución en Antioquia. (Bean bruchids, susceptible varieties, and distribution in Antioquia). Medellín, Colombia, Universidad Nacional. 38p. Span., Sum. Span., 8 Refs., Illus.

Phaseolus vulgaris; Acanthoscelides obtectus; Zabrotes subfasciatus; Cultivars; Resistance; Colombia.

A total of 257 bean samples (49 var. from 53 localities) were collected and analyzed to determine the distribution of the bruchids Acanthoscelides obtectus and Zabrotes subfasciatus among the var. and their regions of origin. Also, 29 different mixtures were collected which included 25 var. The var. most severely affected by A. obtectus were Guifaro and Estrada Blanco, and by Z. subfasciatus, Cargamanto, Rojo Cundinamarca 82, and ICA-Quirama. Var. ICA-Gualí, Estrada Blanco, Blanquillo, Aguilillo, Algarrobo, and Cargamanto were simultaneously attacked by both species. A. obtectus was distributed mainly in the var. from very humid premontane forest vegetation, whereas Z. subfasciatus was found in var. from lowland dry montane forest and lowland humid montane forest. (AS (extract)-CIAT)

1216

26525 PEREZ, G.; BONET, A. 1984. Himenópteros parasitoides de Acanthoscelides obtectus (Say) (Coleoptera: Bruchidae) en Tepoztlán, Morelos. (Hymenopterous parasites of Acanthoscelides obtectus (Coleoptera:Bruchidae) in Tepoztlán, Morelos). Folia Entomológica Mexicana no.59:71-78. Span., Sum. Span., Engl., 14 Refs. (Inst. de Ecología, Apartado Postal 18-845, México 11800, D.F. México)

Phaseolus vulgaris; Acanthoscelides obtectus; Predators and parasites; Stored grain pests; Mexico.

Ripe pods of Phaseolus vulgaris and of wild P. coccineus plants were collected between Nov. 1981-March 1982 in Tepoztlán (Morelos, Mexico); the dry seeds were kept in the lab. for the emergence of parasites of Acanthoscelides obtectus. Five species were reared, none of which had previously been recorded in Mexico or on this host. (CIAT)

1217

26533 PIMBERT, M.P. 1985. Reproduction and oviposition preferences of Zabrotes subfasciatus stocks reared from two host plant species. Entomologia Experimentalis et Applicata 38:273-276. Engl., Sum. Engl., Fr., 7 Refs. (Inst. de Biocénotique Expérimentale des Agrosystemes, Université F. Rabelais, UA CNRS 340, Avenue Monge, Parc Grandmont, 37200 Tours, France)

Phaseolus vulgaris; Phaseolus lunatus; Zabrotes subfasciatus; Entomology; Stored grain pests; Costa Rica.

The reproductive activity of the bruchid Zabrotes subfasciatus was studied in

2 beetle stocks obtained from the same area (Bajo Caliente, Costa Rica). The 1st was harvested on the insect's wild host plant, Phaseolus lunatus, and the 2nd was collected on a cultivated host plant, P. vulgaris. Within each of the 2 insect stocks, fecundities and ovarian productions were similar whether females were offered seeds of the host plant on which they completed their larval development or an alternative host. When given the choice of host plants, females of both stocks oviposited preferentially on P. vulgaris. The substrate used for larval development did not influence the choice of subsequent oviposition sites. There appears to be no behavioral or physiological barriers preventing a single population of Z. subfasciatus from reproducing on both wild and cultivated host plants where they grow together. (AS)

1218

26218 SCHOONHOVEN, A. VAN 1985. Plagas que atacan granos de fríjol almacenados. (Stored bean pests). In López, M.; Fernández, F.; Schoonhoven, A. van, eds. Fríjol: investigación y producción. Cali, Colombia, Centro Internacional de Agricultura Tropical. pp.279-283. Span., 33 Refs., Illus. (CIAT, Apartado Aéreo 6713, Cali, Colombia)

Phaseolus vulgaris; Acanthoscelides obtectus; Zabrotes subfasciatus; Stored grain pests; Insect biology; Insect control; Chemical control; Cultural control; Colombia.

The biology of the insects Acanthoscelides obtectus and Zabrotes subfasciatus attacking stored beans is briefly described. Cultural and chemical control measures are indicated. (CIAT)

1219

26581 THIERY, D. 1984. Hardness of some fabaceous seed coats in relation to larval penetration by Acanthoscelides obtectus (Say) (Coleoptera:Bruchidae). Journal of Stored Products Research 20(4):177-181. Engl., Sum. Engl., 22 Refs., Illus. (Institut de Biocénotique Expérimentale des Agrosystemes, Université de Pau et des pays de l'adour, Avenue Phillipon, 64000 Pau, France)

Phaseolus vulgaris; Seed coat; Acanthoscelides obtectus; France.

A simple device is described for the measurement of seed coat hardness of Phaseolus vulgaris, P. lunatus, P. coccineus, and Lablab purpureus. The ability of larvae of Acanthoscelides obtectus to penetrate P. vulgaris seeds was strongly affected by seed coat hardness. Comparisons between the 4 species suggested differences in the chemical properties of the seed coat of P. lunatus seeds. Some hypotheses are suggested for the relationship between A. obtectus larvae and their host plant. (AS) See also 0940 1081 1104

1220

26980 AGBO, N.G.; UEBERSAX, M.A.; HOSFIELD, G.L. 1980. Genetic and physico-chemical parameters affecting texture of processed dry beans. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. pp.85-90. Engl.

Phaseolus vulgaris; Processing; Cultivars; Seed; Embryo; Seed coat; Water content; Protein content; Fat content; Ash content; Starch content; Water absorption; USA.

The genetic and physicochemical parameters affecting texture were evaluated on 3 bean cv. (Sani ac, NEP-2, and San Fernando). Mean values for proximate analysis and starch, water absorption, processing evaluations, and flour pasting characteristics for the 3 cv. are included. The mean MC for the 3 cv. was 8.7 percent and the protein content ranged from 24.0 to 25.4 percent. Pasting curves and texture showed perfect correlation, indicating that gelatinization properties of seeds are different in the 3 cv. (CIAT)

1221

26063 BRESSANI, R.; BRAHAM, J.E.; ELIAS, L.G. 1983. Effects on nutritional quality of food legumes from chemical changes through processing and storage. In Shemilt, L.W., ed. International Conference on Chemistry and World Food Supplies, Manila, Philippines, 1982. Chemistry and world food supplies: the new frontiers: papers presented. Oxford, England, Pergamon Press. pp.491-503. Engl., Sum Engl., 38 Refs., Illus. (Inst. of Nutrition of Central America and Panama, P.O. Box 1188, Guatemala City, Guatemala)

Phaseolus vulgaris; Storage; Processing; Nutritive value; Cooking; Guatemala.

To demonstrate the effect on nutritive value arising from chemical changes induced by storage and processing of food, legumes were chosen because of their importance in human diets. Chemical components, most of them nutrients, found in foods as produced are affected by production, storage, processing, and consumption conditions. Improper storage will increase the hard-to-cook condition in common beans already initiated during postharvest processing. Dry or wet processing techniques, if properly carried out, will inactivate antiphysiological substances and increase nutritive value. Improper processing will result in low digestibility of the protein. Germination and fermentation result in higher levels of vitamins and increased availability of nutrients, but germination effects have given contradictory results. Inadequate storage of processed food legumes reduce their nutritional value and thus the nutritional quality of diets. Recommendations for research include the understanding of the hard-to-cook problem, the chemical nature of low protein digestibility, and resistance to insect attack. (AS)

1222

26598 DESHPANDE, S.S.; CHERYAN, M. 1985. Evaluation of vanillin assay for tannin analysis of dry beans. Journal of Food Science 50(4):905-910. Engl., Sum. Engl., 23 Refs., Illus. (Dept. of Food Science, 382-D, Ag. Eng. Sci. Bldg., Univ. of Illinois, Urbana, IL 61801, USA)

Phaseolus vulgaris; Tannin content; Bean flour; Processing; Storage; Cultivars; USA.

Several parameters that might influence the vanillin assay for tannin analysis of dry bean var. were investigated. The assayable tannin content decreased with decreasing particle size of the bean flours. Time elapsed after grinding as well as storage under high humidity conditions markedly influenced tannin assays. The solubility of tannins depended on the type of

solvent used, with methanolic extraction requiring shorter periods as compared with extraction with acidified methanol. Color differences within the bean samples appeared to be the prime cause of variation in tannin analysis of beans. Extractions on seed coats alone increased the assayable tannin by 1.1-2.5 times compared with extractions of bean flours. (AS)

1223

26231 GULLETT, E.A.; ROWE, D.L.; HINES, R.J. 1984. Effect of microwave blanching on the quality of frozen green beans. Canadian Institute of Food Science and Technology Journal 17(4):247-252. Engl., Sum. Engl., Fr., 5 Refs. (Dept. of Consumer Studies, Univ. of Guelph, Ontario N1G 2W1, Canada)

Phaseolus vulgaris; Snap beans; Cooking; Storage; Timing; Enzymes; Canned beans; Processing; Canada.

Microwave-blanched green beans were compared with a 2 min water blanch. Color, texture, flavor, odor, and overall acceptability were assessed by a trained sensory panel after 3 and 6 mo. frozen storage. Ascorbic acid content, color (Hunterlab Colorimeter), and peak height were determined and the peroxidase test was conducted after 0, 3, and 6 mo. frozen storage. Lots of green beans of 450 g were blanched (5, 6, and 7 min in a microwave oven and 2 min in boiling water). Microwave-treated samples were scored firmer and less green than water-blanch samples. This was supported by color and peak height measurements. Microwave treatments of 5 min and some of those of 6 min resulted in positive peroxidase tests. However, these treatments did not score as having more off-flavor and off-odor than the 7 min treatments. All microwave treatments were scored as having less typical bean flavor and more off-flavor and off-odor and lower overall acceptability than the water blanch. (AS)

1224

26978 HOSFIELD, G.L.; GHADERI, A.; UEBERSAX, M.A. 1980. Interrelationships among yield and food quality characters: a factor analysis approach. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1980 Research Report. pp.75-80. Engl.

Phaseolus vulgaris; Yields; Proteins; Cooking; Seed; Water content; Nutritive value; Analysis; Seed color; USA.

An expt. was carried out to evaluate the application of factor analysis in bean breeding research and to examine interrelationships between bean yield, protein, and 16 sensory and cooking quality traits. Soaking, thermal, moisture, cooked and dry bean color, and protein factors were considered. The soaking and thermal factors accounted for nearly half (45.7 percent) of the total variation in the original data and were the most important factors. These 2 characteristics of dry bean cooking quality are separate and independent processes. Although dry beans are generally soaked prior to cooking, results indicate that the degree of hydration of beans is not related to cooking properties. (CIAT)

1225

26565 LOPEZ, A.; WILLIAMS, H.L. 1985. Essential elements and cadmium and lead in fresh, canned, and frozen green beans (Phaseolus vulgaris L.). Journal of Food Science 50(4):1152-1157. Engl., Sum. Engl., 22 Refs. (Dept. of Food Science & Technology, Virginia Polytechnic Inst. & State Univ., Blacksburg, VA 24061, USA)

Phaseolus vulgaris; Processing; Canned beans; Snap beans; USA.

Sixteen essential elements, Cd, and Pb were determined in fresh, canned, and frozen green beans. Samples were taken during processing to determine where

changes in element content occurred. Canned green beans contained lower concn. of Ca, Cu, Fe, Mg, Mn, P, K, and Zn, but had higher amounts of chloride, Ni, and Na than fresh beans No change in Si concn. was observed. Fe, P, and K concn. were lower in frozen than in fresh green beans, but Ca, Na, and Zn were higher. There was no change in chloride, Cu, Mg, Mn, and Si due to freezing. Element retention ranged from 51 to 100 percent for canned and from 73 to 171 percent for frozen green beans. (AS)

1226

26071 OTTEN, L.; BROWN, R.; REID, W.S. 1984. Drying of white beans--effect of temperature and relative humidity on seed coat damage. Canadian Agricultural Engineering 26(2):101-104. Engl., Sum. Engl., 13 Refs., Illus. (School of Engineering, Univ. of Guelph, Ontario N1G 2W1, Canada)

Phaseolus vulgaris; Seeds; Seed coat; Drying; Mechanization; Relative humidity; Canada.

Drying damage was assessed for white beans dried with commercial grain dryers and also with a lab.-scale, thin-layer drying apparatus. At moderate drying temp. (40-45 degrees Celsius) there was a significant increase in damage level in only 2 of 8 tests with the commercial grain dryers. Consequently, the amount of damage attributable to artificial drying was minor compared with that which had occurred prior to drying. The thin-layer drying expt. demonstrated that humidity of the drying air was the key factor in controlling seed coat cracks. Seed coat damage was negligible if RH of the drying air was 30 percent or greater. A simple and rapid chemical staining technique, the Indoxyl Acetate Test, was investigated as a tool to speed up the determination of seed coat damage in white beans. The test was useful and showed a positive correlation with the visual damage results. (AS)

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22511 RODRIGUEZ-SOSA, E.J.; CALONI, I.B. DE; CRUZ C., J.R.; BADILLO F., J. 1984. Hydration and cooking properties of dry beans. Journal of Agriculture of the University of Puerto Rico 68(3):259-267. Engl., Sum. Engl., Span., 15 Refs., Illus.

Phaseolus vulgaris; Cultivars; Processing; Cooking; Puerto Rico.

The hydration times of 22 dry bean selections of red kidney, white, and striped var. were determined. The Lajas red kidney selection duplicates its wt. in 7 h, whereas the striped Calima and Rosita Lajas selections duplicate their wt. in 10 h. All other selections duplicate their wt. in about 12-18 h. All bean selections were accepted when they were sensory evaluated for appearance, flavor, and overall acceptability. The red kidney selections Lajas and 1973 (28), the white selections White 117 and White 142, and the striped selections Dominicana #5, Naranjito, Pompadour Dominicana, and Galana scored poorly regarding texture because they were somewhat hard. Texture was the sensory attribute that contributed most to the overall acceptability (r = 0.92). (AS)

1228

26506 SASTRY, S.K.; McCAFFERTY, F.D.; MURAKAMI, E.G.; KUHN, G.D. 1985. Effects of vacuum hydration on the incidence of splits in canned kidney beans (Phaseolus vulgaris). Journal of Food Science 50(5):1501-1502. Engl., Sum. Engl., 9 Refs. (111 Borland Laboratory, Univ. Park, PA 16802, USA)

Phaseolus vulgaris; Canned beans; Processing; USA.

Dry red kidney beans were canned using 2 different pretreatments: (1) soaking for 12 h at 20 degrees Celsius and (2) vacuum hydration for 5 min followed by soaking for 2 h at temp. from 45.0 to 59.1 degrees Celsius. Samples were then packed, processed to commercial sterility, and tested for percentage of split

beans after processing. Vacuum hydration pretreatments greatly decreased the incidence and severity of splitting in the canned product and accelerated water uptake while retaining the same MC after soaking as the conventional soak treatment. Vacuum-hydrated beans gained less moisture during retorting than conventionally treated samples. (AS) See also 0912 1178

ABBREVIATIONS AND ACRONYMS

A	Angstrom(s)
ABA	Abscisic acid
ac	Acre(s)
Afr.	Afrikaans
a.i.	Active ingredient
alt.	Altitude
AMV	Alfalfa mosaic virus
approx.	Approximate(ly)
atm.	Atmosphere
ATP	Adenosine 5'-triphosphate
av.	Average
BAP	6-Benzylaminopurine
BBMV	Broad bean mosaic virus
BCMV	Bean common mosaic virus
BGMV	Bean golden mosaic virus
BGYMV	Bean golden yellow mosaic virus
BOD	Biochemical oxigen demand
BPMV	Bean pod mottle virus
BRMV	Bean rugose mosaic virus
BSMV	Bean southern mosaic virus
BV	Biological value
BYMV	Bean yellow mosaic virus
°C	Degrees Celsius (centigrade)
ca.	About (circa)
CAMD	Cassava African mosaic disease
CMV	Cassava African mosaic virus
CBB	Cassava bacterial blight
CBSD	Cassava brown streak disease
CEC	Cation exchange capacity
CER	CO2 exchange rate
CF	Cassava flour
CGR	Crop growth rate
CLM	Cassava leaf meal
CLV	Cassava latent virus
CM	Cassava meal
cm	Centimeter(s)
COD	Chemical oxigen demand
concn.	Concentration
CP	Crude protein
CSL	Calcium stearyl lactylate
CSW	Cassava starch wastes
C.V.	Coefficient of variation
cv.	Cultivar(s)
2,4-D	2,4-dichlorophenoxyacetic acid
DM	Dry matter
DNA	Deoxyribonucleic acid
EC	Emulsifiable concentrate
EDTA	Ethylenediaminetetraacetic acid
EEC	European Economic Community
e.g.	For example
ELISA	Enzyme-linked immunosorbent assays
EMS	Ethyl methane sulfonate
Engl.	English
EP	Preliminary Trials, CIAT
expt.	Experiment(s)
exptl.	Experimental
°F	Degrees Fahrenheit
Fr.	French
ft-ca	Foot candles (10.76 lux)
FYM	Farmyard manure
g	Gram(s)
G	Giga (109)
GA	Gibberellic acid
gal	Gallon(s)
GE	Gross energy
Germ.	German
GERs	Glucose entry rates
GLC	Gas-liquid chromatography
h	Hour(s)
ha	Hectare(s)
HCN	Hydrocyanic acid
HDP	Hydroxypropyl distarch phosphate (modified cassava starch)
HI	Harvest index
hp	Horsepower
IAA	Indoleacetic acid
IBA	Indolebutyric acid
IBYAN	International Bean Yield and Adaptation Nursery, CIAT
Illus.	Illustrated
in.	Inches
Ital.	Italian
IU	International unit
J	Joule
Jap.	Japanese
kat	Katal (amount of enzymatic activity that converts 1 mole of substrate/s)
kcal	Kilocalorie(s)
kg	Kilogram(s)
kJ	Kilojoule
km	Kilometer(s)
KNap	Potassium naphthenate
kR	Kiloroentgen(s)
l	Liter(s)
LAD	Leaf area duration
LAI	Leaf area index
lat.	Latitude
lb	Pound(s)
LD50	Mean lethal dose
LER	Land efficiency ratio

LPC	Leaf protein concentrate
lx	Lux
M	Mega
M	Molar
m	Meter(s)
Mal.	Malay
max.	Maximum
MC	Moisture content
ME	Metabolizable energy
meq	Milliequivalent(s)
met.	Methionine
mg	Milligram(s)
mho	Reciprocal ohm
min.	Minimum
min	Minute(s)
ml	Milliliter(s)
mm	Millimeter(s)
mo.	Month
mol. wt.	Molecular weight
m.p.	Melting point
NAA	Alpha-naphthalene acetic acid
NAD	Nicotinamide adenine dinucleotide
NADH	Nicotinamide adenine dinucleotide, reduced form
NAR	Net assimilation rate
NCE	Net CO_2 exchange
NE	Northeast
NER	Net energy ratio
nm	Nanometer(s) (10-9 m)
no.	Number(s)
NPFs	Negative production factors
NPR	Net protein ratio
NPU	Net protein utilization
NW	Northwest
OM	Organic matter
oz	Ounce(s)
p.	Page
P	Probability
Pa	Pascal(s)
PAN	Peroxyacetic nitrate
PCNB	Pentachloronitrobenzene
PDA	Potato dextrose agar
PER	Protein efficiency ratio
pH	Hydrogen ion concentration
pp.	Pages
pphm	Parts per hundred million
PPI	Pre planting incorporation
ppm	Parts per million
PSA	Potato sucrose agar
pv.	Pathovar
Ref(s).	Reference(s)
resp.	Respective(ly)
Rf	Retardation factor-chromatography
RGR	Relative growth rate
RH	Relative humidity
RNA	Ribonucleic acid
Rom.	Romanian
rpm	Revolutions per minute
Russ.	Russian
s	Second
SBM	Soybean meal
SCN	Thiocyanate
SCP	Single cell protein
SDS	Sodium dodecyl sulfate
Sk.	Slovak
sp.	Species
Span.	Spanish
spp.	Species
SSL	Sodium stearyl-2-lactylate
Sum.	Summary
t	Ton(s)
TDN	Total digestible nutrients
temp.	Temperature
TIA	Trypsin inhibitor activity
TIBA	2,3,5-Triiodobenzoic acid compound with N-methylmethanamine
TLC	Thin-layer chromatography
TMV	Tobacco mosaic virus
TSH	Thyroid-stimulating hormone
UDPG	Uridine diphosphate glucose
UMS	Unmodified cassava starch
UV	Ultraviolet
var.	Variety(ies), varietal
VEF	Bean Team Nursery, CIAT
VFA	Volatile fatty acids
vol.	Volume
VPD	Vapor pressure deficit
vpm	Volume per million
vs.	Versus
W	West, watt
wk.	Week
WP	Wettable powder
wt.	Weight
yr	Year(s)
/	Per
%	Percent(age)
>	More than, greater than
<	Less than
≤	Equal to or less than
≥	Equal to or greater than
±	Plus or minus

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0940

CURSO NACIONAL DE FREJOLES, 1o., TALCA, CHILE
0505

CURSO SOBRE EL CULTIVO DE FREJOL USANDO LA METODOLOGIA APRENDER HACIENDO, 1o., PINAMPIRO, ECUADOR
0492

CUTCLIFFE, J.A.
0055

D'AURIA, J.M.D.
0701

DAGBA, E.
0869

DAMINATI, M.G.
0844

DANTAS, J.L.L.
0143

DARBY, J.F.
0943

DARVILL, A.G.
0441

DATTA, S.C.
0453 0453

DAVIES, J.C.
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DAVIS, D.D.
0520

DAVIS, D.W.
0733 0762 1135

DAVIS, J.
0364

DAWSON, P.W.
0273

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0664 0665

DE GREEF, J.A.
0842

DE LA CRUZ, P.
1067

DE LA I. DE BAUER, M. DE L.
1029

DE LA PAZ, G.S.
0126 0281 0282

DE LA TORRE A., R.
1029

DE LAJONQUIERE, Y.
0537

DEAKIN, J.R.
0381

DEAN, L.L.
0100

DEBOUCK, D.G.
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DEBROT, E.
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DEELEN, W. VAN
0834

DEHANEY, J.
1009

DEL RIO, L.
1032

DELEPIERRE G., M.
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DELL'ORTO T., H.
1213

DELLA LUCIA, T.M.C.
1083

DEMOL, J.
0164

DESHPANDE, S.S.
0829 0893 1222

DESSAUNE FILHO, N.
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DESSERT, M.
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0165 1001

DHANVANTARI, B.N.
0772

DHINGRA, O.D.
1028

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0127

DIAZ C., H.
0325 0331

DIAZ C., T.G.
1119

DIAZ F., A.
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DIAZ M., J.
0091

DIAZ, J.M.
0770

DICKSON, M.H.
0326 0746 0747 0748 0749

DIENER, H.
1206

DINESEN, G.
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0465

DOERING, H.W.
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DOERSCH, R.E.
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DOIJODE, S.D.
0466

DOMINGUES, J.B.
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DOMINY, P.J.
0271

DOSSA, D.
0404

DOTO, A.L.
1149

DOYLE, D.A.
0273

DOYLE, J.J.
0039

DRAETTA, I.S.
0883

DRAKE, S.R.
0368 0506 0830

DRIJFHOUT, E.
0750

DUE, J.M.
1149 1195

DUQUE, F.F.
0799

DURANTI, A.
0092

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0506

EATON, G.W.
0468 0838

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0507 0751 0756 1121

ECHAVEZ-BADEL, R.
1032

ECKENRODE, C.J.
0287

ECOCHARD, R.
1110

EDJE, O.T.
0128 0129 0363 0448 0508 0538 0539
0540 0578 0752 0765 0800 0831 1096

EHRET, D.L.
0845 0872 1070

EL-HASSAN, S.
1061

EL-NAHAL, A.K.M.
0283

EL-SAID, H.M.
0219

EL-SHARKAWY, M.A.
0442 0846

ELAD, Y.
0682

ELIAS, L.
0894

ELIAS, L.G.
0387 0388 1179 1180 1221

ELLIOTT, A.P.
0267 1065

ELTOUM, E.M.A.
1084

EMMERT, F.H.
0443

EMPRESA BRASILEIRA DE PESQUISA
AGROPECUARIA
0327 0616

ENAMORADO, E.
0713

ENGLEMAN, E.M.
0230

ENRIQUEZ C., J.A.
0166

EPSTEIN, L.
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ERASMUS, D.J.
0541

ERAZO, O.
1155

ERCOLANI, G.L.
0220

ERICKSON, A.E.
0941

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0460

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0847

ESCAMILLA H., L.G.
0130

ESCOBAR G., J.A.
0929 1207

ESCOVAR R., M.
0232

ESPINDOLA, E.A.
0965 0966 0967

ESPINOSA V., D.
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ESPINOSA, P.
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ESQUIVEL A., C.
0131

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VENEZUELA
1030

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0763

ESTRADA A., P. DE J.
0956

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0753

ETCHEVERS, J.
1182

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0667

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0038

EVRARD, P.
0656

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0754 1146

FADL, F.A.M.
0236

FAIGUENBAUM M., H.
0040

FARRON, I.J.
0832

FASTULIOTIS, G.
0381

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0764 1002

FAZIO, G. DE
1055

FEDERACION NACIONAL DE CAFETEROS DE COLOMBIA. PROGRAMA DE DESARROLLO Y DIVERSIFICACION DE ZONAS CAFETERAS
0405 0406

FELIX, J.F.
0454 0454

FELIX, R.
0510

FENNINORE, S.A.
0542

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FERNANDEZ, F.
0029 0870 1104

FERRAZ, S.
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FERRERA-CERRATO, R.
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FISHER, G.
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0579 0580

FLECE, N.G.
0581 0591 0976

FLEMING, S.E.
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FLESCH, R.D.
0328 0965 0966 0967

FLOCH, E.
0329

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FLOR, C.A.
0755

FLORES G., C.
0205

FLORES-LUI, L.F.
0052

FLORES, F.A.T.
1003

FLOREZ, G.
0582 0583 0584 0585 0586

FOLCH, J.
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FONC, F.
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FONSECA, J.R.
0115

FONTANA NETTO, F.
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FORNAZIER, M.J.
1145

FORSEE JUNIOR, W.T.
0943

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FOUILLOUX, G.
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FRANCIS, C.A.
0759 0963 0964

FRANCO, A.A.
0799 0969

FRAZIER, W.A.
0316

FREIRE, F.M.
0970

FREIRE, J.R.J.
0517 1187

FREIRE,J.A.M.
1083

FRELS, J.M.
0480

FREYTAG, G.F.
0507 0647 0648 0699 0751 0756 0783
1032 1099 1121

FRITZ, J.
0512

FUENTES P., J.R.
0543 0544

FUENTES S., D.E.
0132

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0330

FUNDACAO GETULIO VARGAS, INSTITUTO
BRASILEIRO DE ECONOMIA, CENTRO DE
ESTUDOS AGRICOLAS
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FURBANK, R.T.
0848

FYE, R.E.
0284

GABRIEL, E.
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GALE, J.
1214

GALLAGHER, E.C.
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GALLEGOS, P.
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GALOMO R., T.
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GALVEZ, G.E.
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GAMBOA M., R.
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GARCIA E., R.
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GARCIA G., F. DE J.
0133

GARCIA L., J.S.
1172

GARCIA M., J.C.
0333

GARCIA, C.M.
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GARCIA, J.
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GARCIA, P.M.
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GARCIA, S.
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GARNEZI,A.F.
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GARDNER, F.P.
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GARRETT, P.
0931 1206

GARRUTI, W. DOS S.
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GATHURU, E.M.
1158

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0396

GBAJA, I.S.
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GEBHARDT, C.
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0029 0481 0870

GERALDI, A.O.
0134

GERDING P., M.
1014

GERLAGH, M.
0763

GEWAILY, E.M.
0079 0219

GHADERI, A.
0053 0306 0760 0926 1101 1122 1129
1131 1132 1224

GIACOMELLI, W.J.
0245

GIBSON, P.P.
0695

GIFFORD, C.
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GIL, F.
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GILL, B.S.
1004 1006 1136

GILLESPIE, T.J.
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GNUDI B., C.
0905

GODINEZ A., J.G.
0135

GODWARD, M.B.E.
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GOEPFERT, C.F.
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GOMES, M.M.
0730

GOMEZ D., D.M.
0285 0286

GOMEZ S., R.
0977

GOMEZ T., J.
0268

GOMEZ-PRENES, R.
0894

GOMEZ, M.
0015

GONINHO, M.S.F.
1008

GONDWE, B.
1123

GONZALEZ M., W.
0496 0587 0588

GONZALEZ R., C.
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GONZALEZ V., E.
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GONZALEZ V., E.M.
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GONZALEZ, A.R.
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GONZALEZ, M.
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GOODMAN, R.M.
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GOVINDARASU, P.
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GRAFTON, K.F.
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GRAHAM, P.
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1126

GRAJALES A., W.
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GRANT, G.
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GRAU, C.R.
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GREER, F.
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GRIFFIS, W.L.
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GROSS, D.
1047

GROTH, J.V.
1027

GUADRON, O.B.
0054

GUAZZELLI, R.J.
0372

GUERRA L., L.
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GUERRA, D.
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GUERREIRO, P.M. DA S.
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1014

GUIMARAES, C.M.
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GULLETT, E.A.
1223

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GUNSE, B.
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GURI, A.
1127

GUTIERREZ G., J.
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GUTIERREZ M., W.
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GUTIERREZ, J.A.
0370 0736 0757 1152

GUTIERREZ, O.M.
1175

HABTU ASSEFA.
0221

HABYARIMANA, J.N.
0551

HAGEDORN, D.J.
0313 0334 0335 0336 0337 0702

HAGHIGHI, K.
0758

HAILE, A.
0409

HAKIZIMANA, A.
0798

HALL, A.E.
1158

HALL, M.A.
0449

HALL, R.
0235 0652

HALL, T.C.
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HALLMAN, G.
1076 1086

HALLMAN, G.J.
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HALVORSON, A.D.
0513

HAMILTON, R.I.
0489

HAMIS, S.
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HAMOUDA, F.M.
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HAMPTON, R.O.
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HANKANGA, M.D.
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HANSEN, M.K.
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HARDIMAN, R.T.
0019 0455 0465 0466

HARMAN, G.E.
0287

HARRIS, G.C.
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HARTMANN, R.W.
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HASEGAWA, F.M.
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HASSOUNA, S.
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HAYES, P.H.
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HAYTOWITZ, D.B.
0794

HEATH, M.C.
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HELD K., A.A.
0442

HELFGOTT L., S.
0942

HEMANTARANJAN, A.
0467

HENNESSEY JUNIOR, J.P.
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HERATH, H.M.E.
0468 0514

HERMAN-MCKENTLY, A.
0020

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HERNANDEZ, A. DEL P.
0846

HERNANDEZ, E.
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HERRERA D., G.E.
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HERRERA D., O.
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HERRERA G., G.
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HERRERA, M.
0056 0095 0096 0097 0169 0170 0171

HESS, K.A.
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HILLS, W.A.
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HOFF, R.
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HOFFMAN, J.C.
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HOGABOAM, G.J.
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HOGSETT, W.E.
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HOKSBERGEN, K.A.
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HOLMES, H.G.
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HOLT, D.L.
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HOOSE, W.A.
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HOOVER, E.E.
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HOOVER, R.
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HORNER, H.T.
0935

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HOSFIELD, G.L.
0366 0483 0484 0760 0888 1112 1129 1220 1224

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0057 0907

HOUGH-GOLDSTEIN, J.A.
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HOWARD, R.
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HOWARTH, A.J.
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HOWLAND, A.F.
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HRUSKA, A.J.
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HSU, C.H.
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HUBERMAN, M.
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HUBERT DE FRAISSE, C.
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HUNTINGTON, T.G.
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HUU HAI, V.
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1100

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INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA
0058 0059 0137 0138 0172 0173 0174 0175 0176 0177 0178 0179 0180 0181 0241 0339 0340 0341 0398 0546 0617 1005

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AGRONOMIQUE DU CONGO BELGE
0182 0183 0184 0185 0186 0187 0188
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0346

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IRANGA, G.M.
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ISMAIL, S.I.
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ISSA, E.
0242 0663

IYULYA, F.
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JACOBSEN, B.J.
0266 0702

JACOBY, B.
0019 0456

JAFFE, M.J.
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JAKOBSEN, H.
0547 0548

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JONAS, J.
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JONES JUNIOR, J.B.
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1184

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JOUBERT, M.S.
0688

JUNQUEIRA NETO, A.
0060

KAPENGELE, A.
1001

KAHN, B.A.
0469

KANINSKYJ, S.G.W.
0664 0665

KANENASU, E.T.
0909

KANNAN, S.
0021

KAIUYA, J.A.
0908

KAREL, A.K.
0288 0716 0980 1139 1149

KARHADKAR, A.D.
0021

KARTHA, K.K.
0474

KAGS, D.L.
0973

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0273

KAYUKU, V.
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0260

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1131 1132 1133

KILLY, J.D.
0386 0760 1121

KEMP, G.A.
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KENG, J.
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KENNARD, W.C.
1105

KENYA, MINISTRY OF AGRICULTURE
1007

KERR, E.D.
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KERR, H.W.
0892

KESWANI, C.L.
1118 1140 1149

KFULS, M.
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KEYA, S.O.
0081

KHATER, T.
1181

KIIURA, T.
1165

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0410

KINMAN, B.K.
0830

KIRKHAM, M.B.
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KISTLER, H.C.
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KITAJIMA, F.W.
1063

KLEIN, W.H.
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KOHASHI SHIBATA, J.
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KOINANGE, E.M.K.
0945 0974 0978

KOSTOV, P.
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0261 1153

KUBWALO, F.X.F.
0975

KUENEMAN, E.
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KUGIZAKI, Y.
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KULKARNI, H.Y.
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KUMMERT, J.
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KUNWAR, R.
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KUSHAD, M.M.
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KUSHALAPPA, A.C.
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KWINBERE, D.J.
1197

KYANDO, P.H.M.
0951

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LABRADA, R.
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0655 1048

LAING, D.
0498 0499

LAJOLO, F.M.
0791 0851 1162

LAMBERT, J.D.H.
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0873

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LARA, M.
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LARIOS R., J.
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0257 0692

LASZTITY, R.
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LAZZARI, F.A.
0429

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0194 0195 0347 0761

LE PAGE-DEGIVRY, M.T.
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LEA, J.D.
1143

LEAKEY, C.L.A.
0668

LEAL A., O.
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LEAL, J.A.
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LEAL, M.R.
0730

LEAVITT, R.A.
0267

LEBARON, M.
0100

LEDESMA G., L.A.
0101 0140 0196 0348 0349

LEE, C.W.
0710

LEE, E.H.
1071

LEE, J.P.
0484

LEE, J.S.
1160

LEE, K.
1172

LEEP, R.H.
0504

LEIVA R., O.R.
0814

LEMOS, B.C.C.
0030

LEMUS C., R.A.
0985

LEON G., J.P.
0325 0331

LEON M., D.
0430

LEPIZ I., R.
0001 0002 0004 0197 0198 0199 0200
0366 0590

LEPOIVRE, P.
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LESTER, G.
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LEYNA, H.K.
0639

LI, P.H.
0733 0762

LIBARDI, P.L.
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LIBONATI, V.F.
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LIFRMAN, B.
1173

LIETH, J.H.
0445 0470

LIGERO, F.
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LIMA, A.L.
0791

LIMA, G.R. DE A.
1008

LIMA, P.R. DE A.
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LIN, M.T.
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LINARES N., R.R.
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LINDEMANN, J.
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LINDGREN, D.T.
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LINSKENS, H.F.
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0222 0350 0351 0352 0618 0619

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LOAIZA V., J.M.
0104

LOGSDON, S.
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0833

LOPEZ G., A.
0104

LOPEZ L., J.M.
0063

LOPEZ P., M.C.G.
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LOPEZ R., J.
1121

LOPEZ R., J.H.
0648

LOPEZ-ALCOCER, E.
1182

LOPEZ-ROSA, J.H.
1032

LOPEZ, A.
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LOPEZ, M.
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LOURES, E.G.
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LOYA R., J.G.
0433

LOZANO V., C.
0314

LUDWIG, A.
0667

LUGO-MERCADO, H.M.
0947

LUSAS, E.W.
0484

LYBECKER, D.W.
0410

LYIMO, H.F.
1134

MACEDO, A.A.
0321

MACHADO NETO, J.G.
0948

MACHADO, C.M.N.
0581 0591 0976

MACHADO, J.R.
0898

MACHADO, P.F.R.
0308

MACK, H.J.
0062

MACK, T.P.
0297

MACLEOD, K.C.
0457

MADRIGAL C., J.A.
1215

MAEDA, E.E.
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MAFRA, R.C.
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MAGAYANE, F.T.T.M.
1198

MAGID, A.H.A.
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MAHMOUD, S.A.Z.
1181

MAINES, G.
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MAINI, R.
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MALDONADO A., M.A.
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MALDONADO M., S.I.
0592

MALIN, E.M.
1019

MANCINI FILHO, J.
0791 1162

MANEN, J.F.
0005 0889

MANEN,D.
0889

MANGAT, B.S.
0033

MANJARREZ S., J.R.
0063

MANRIQUE E., R.
0977

MANSHARDT, R.M.
0353 0376

MANSOUR, M.A.
0473

MARCUCCI R., J.S.
0244

MAREK, N.
0035

MARIN C., E.J.
0985

MARRONE, P.G.
0289

MARSH, L.
0733

MARSH, L.E.
0762 1135

MARTAKIS, G.F.P.
0099

MARTINEZ A., R.S.
0064

MARTINEZ H., J.H.
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MARTINEZ O., R.
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MARTINEZ R., E.R.
0389

MARTINEZ R., J.L.
0202 0354 0355 0356 0357

MARTINEZ R., M.
0290

MARTINEZ T., E.A.
0592

MARTINEZ, E.
1185

MARTINEZ, M.
1067

MARTINEZ, N.
0635

MARTINOTTO, V.
0518

MARTINOTTO,A.
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MARTNER, R.
1193

MARX, D.B.
0093

MASASHUA, P.S.M.
0949

MASAYA S., P.
0612 0770

MASAYA, P.N.
0931

MASYANGA, B.S.K.
0579

MATA V., H.
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MATEO, M. DE J.
0626

MATHIEU, P.
0901

MATTHEWS, R.H.
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MATTOS, P.L.P. DE
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MATTUSCH, P.
0763

MATZENAUER, R.
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MAY M., G.
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MAZZA, L.A.
0395

MBAGA, M.
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MBIHA, E.R.
1197 1199 1201 1202 1203

MBUYA, O.S.
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MCBURNEY, S.
0925 0991

MCCAFFERTY, F.D.
1228

MCGILL JUNIOR, J.A.
0141

MCKENZIE, N.H.
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MCLAUGHLIN, M.R.
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MCSORLEY, R.
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MEHRA, K.L.
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MEHTA, A.R.
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MEINERS, J.P.
0358

MELAKEBERHAN, H.
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MELENDEZ, P.L.
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MELHOANCA, A.L.
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MELHORANCA, A.L.
0561 0630 0631

MELTON, T.A.
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MENDES, A.N.G.
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MENDES, M.C.
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MENDEZ S., H.
1086

MENDEZ, M.H.M.
1174

MENDGEN, K.
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MENDOZA M., A.
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MENDOZA M., C.
0621

MENDOZA R., J.
0065

MENEZES, J.R. DE
0215

MENGARDA, I.P.
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MENNITI, A.M.
0836

MENTEN, J.O.M.
0214 0245

MERINO, G.
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MERKLE, M.G.
0770

MESLAND-MUL, N.T.
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MESSIAEN, C.M.
0454 0454

METZGER, J.D.
0853

MHINA, G.A.
1136

MICHELLON, R.
0622

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0912

MIEGE, M.N.
0005

MIER C., R.
0066 0144 0623

MIFLIN, B.J.
1100

MILA, J.A.
0764 1002

MILLER, D.E.
0670 0671

MILLER, J.
1096

MILLS, D.
1023

MILLS, H.A.
0860

MINJAS, A.N.
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MINNAAR, J.J.
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MIRANDA N., O.
0515

MIRANDA, E.
0204

MIRANDA, P.
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MISANGU, R.
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1004 1006 1136

MISRA, S.H.
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MITCHELL, R.E.
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MITICH, L.W.
0542

MMBAGA, M.E.T.
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MMBAGA, M.T.
1138 1141

MOCK, N.
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MOHAMED, A.H.
0980

MOHAN, S.K.
0215 0359

MOHAN, S.T.
0359 0360

MOHANDAS, S.
0472

MOLINA, M.
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MOMA M., C.A.
0105

MONSALVE U., O.
0574 0593 0594

MONTAGNE A., A.
0303

MONTAGUE-GORDON, E.
1009

MONTENEGRO B., J.
0262

MONTES R., R.
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MONTES Y MONTES, L.E.
0203

MOORE, R.
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MORA B., J.E.
0672

MORA, L.E.
0673

MORA, M.A.
1210

MORAES, S.O.
0928

MORAGHAN, J.T.
0459

MORALES C., J.
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MORALES G., V.H.
0390

MORALES R., C.
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MORALES S., G.
1215

MORALES S., R.
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MORALES, F.J.
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MORALES, R.
0946

MORFLOCK, T.E.
0093

MORENO D., L.
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MORENO, R.A.
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MORENO, R.A.
0982

MORETA, D.
1067

MORGAN, M.R.
0889

MORGAN, W.L.
0717 0718

MORRIS, D.A.
0840 0875

MORUA L., J.G.
0104

MOSCOSO, W.
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MOSQUERA C., O.A.
0205

MOSQUERA V., O.
0913

MOSTADE, J.M.
0246

MOURA, P.A.M. DE
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MOURSI, M.A.
0473

MOYA, J.
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MPABANZI, A.
0551 0625 0768

MTHURU,A.N.
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MSUKU, W.A.B.
0363

MSUMALI, G.P.
0803

MSUYA, J.M.
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MUGHOGHO, L.K.
0129 0363 0538 0540 0578 0752 0765

MUIGAI, S.G.S.
0264

MUKHOPADHYAY, T.P.
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MUKUNYA, D.M.
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MULLINS, C.A.
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MUÑOZ P., G.
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MUÑOZ, R.
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MURAKAMI, E.G.
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MURRAY, M.G.
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MUSHEBEZY, D.M.K.
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MUTITU, E.W.
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MUTSCHLER, M.A.
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MWANDILA, N.J.K.
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NAGANT, D.
0206

NAGATA, R.T.
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NAKATA, S.
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NASCIMENTO, F.J.L. DO
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NASSIB, A.M.
0306

NAVA, T.
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NAVARRETE, D.
1169 1179

NAVARRETE, D.A.
0387 1175 1180

NAVARRO S., F.J.
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NDUNGURU, B.J.
0740 1149

NELSON, B.M.
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NELSON, W.R.
0541

NEUMANN, I.F.
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NEVES, M.C.P.
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NG, H.
0932

NGETTI, M.M.S.
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NGOLI, G.P.
0914

NICOLAS A., A.
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NIENHUIS, J.
0361 0767

NIEUWOUDT, C.J.L.
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NITSCHE M., J.
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NJEBELE, C.W.
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NOBLE, A.D.
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NOEL, G.R.
0702

NORWIG, J.
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NOUR-EL-DIN, N.A.
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NUEZ E., R.
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NUEZ R., R.
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NYABYENDA, P.
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NYIIRA, Z.M.
0291

O'CONNELL, R.J.
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O'DEEN, W.A.
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O'DONNELL, A.U.
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OAKS, J.
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OBANDO G., L.
0596 0597 0598

OBATON, M.
0454 0454

OBRADOR R., J.
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OCCON P., I.
0222

OCKENDON, D.J.
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OFFLER, C.E.
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OKONKWO, C.A.
0447 1106

OLARTE M., D.E.
0676

OLIVA, M.A.
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OLIVEIRA, D.A.
0242 0711

OLIVEIRA, I.P. DE
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OLIVEIRA, M.A.S.
0292

OLIVEIRA, S.A. DE
0022

OMUNYIN, M.E.
0263

OPAZO A., J.D.
0068

ORDAZ S., L.
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OREJUELA M., L.M.
0069

ORMEO N., J.
0553 1014

ORMROD, D.P.
0457 0461 0838

OROZCO, S.H.
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ORTEGA M., P.F.
0104

ORTEGA, J.
0915 1155

ORTEGA, J.E.
0929

ORTEGA, S.
0937

ORTIZ L., J.C.
1086

ORTIZ-ALVARADO, F.H.
0947

OSBORN, T.C.
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OSORIO O., G DE J.
0676

OSORIO, C.A.S.
0517 0518 0521 0522

OTTEN, L.
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OWUOR, J.O.
0579

PACHICO, D.H.
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PACOVA, B.E.V.
0207 0771 1041 1145

PADILLA B., F.G.
0636

PADILLA, J.
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PADILLA, W.
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PAISANO, M.F.S.
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PALA, M.
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PALACIOS, R.
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PALENCIA, A.
0981

PALMER, M.V.
0855

PALUMBO, D.R.
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PANDEY, N.D.
0275

PANIAGUA G., C.V.
0626

PANIAGUA, C.V.
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PANKAJA, S.
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PARDO, M.A.
1185

PAREDES C., M.
0414 1153

PAREDES, E.
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PAREDES, H.
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PARK, P.O.
0710

PARK, S.J.
0772 0773

PARK, Y.K.
0883

PARODI A., P.E.
0068

PASTOR C., M.A.
1015 1021 1036 1037

PATRICK, J.W.
0437 0871

PATTON, N.M.
0391

PAUL, K.B.
0868

PAULS, K.P.
0487

PAZ, P.E.
1032

PEÑA P., J.C.
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PEÑALOZA C., J.
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PEARSON, R.C.
0662

PECHAN, P.M.
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PEDERZOLLI, R.C.
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PEDERZOLLI, R.C.D.
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PELAEZ, D.
0247 0618 0619

PENDAS, F.
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PENNER, D.
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PEPPER, I.L.
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PERALTA J., F.
0293

PEREIRA FILHO, I.A.
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PEREIRA, E.B.
0916 1145

PEREIRA, E.C.
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PEREIRA, J.C.V.N.A.
0256

PEREIRA, P.A.A.
0984 1186

PEREZ A., A.
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PEREZ T., H.
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PEREZ T., S.
0034

PEREZ, G.
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PEREZ, L.
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PERMAN, J.A.
1170

PESSANHA, G.G.
0969

PETERSEN JUNIOR, A.C.
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PETERSON, L.
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PETZHOLD, R.B.
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PHILOGENE, B.J.R.
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PIERCE, M.L.
0013

PIERSON, M.D.
1176

PIMBERT, M.P.
1217

PIMENTEL, M. DE L.
0431

PIMIENTA B., E.
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PINEDA L., L.
0985

PIVOVAROV, V.F.
0331

PIZZORNO, P.
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PLADYS, D.
0802

POHRONEZNY, K.
0700

PONCE, M.
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PONS, A.L.
0518 0521 0522 0812

POOVAIAH, B.W.
0444

PORIAZOV, I.
0008 0383 0555

PORTA, H.
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PORTER, L.K.
0462

PORTMAN, R.
0100

PORYAZOV, I.
0440

POSCHENRIEDER, C.
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POSENATTO, R.E.
0614

POURCHET C., M.A.
1174

POUZAR, J.
0434

POWER, A.G.
0603

PRAKASH, H.S.
1038

PRATI V., L.F.
0502

PRATT, R.C.
0362 0774

PREVOST, I.
0876 0877

PRIMAVESI, O.M.A.S.P.R.B
0023

PROVVIDENTI, R.
0697

PUSZTAI, A.
0790 1163 1166

QUENTIN, M.E.
1149

QUINTANA B., O.
0072

QUINTANA, J.O.
0071

QUINTERO M., A.M.
0805

QUIROGA Z., R.
0415

QUIROZ E., C.
0216 0723 1087

RAAFAT, A.
0035

RACINES S., L.E.
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RADOSEVICH, S.R.
0542

RAMADAN, E.M.
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RAMALHO, M.A.P.
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RAMIREZ DE VALLEJO, A.
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RAMIREZ G., D.
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RAMIREZ, E.E.
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RAMIREZ, G.
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RAMOS L., A.
0248

RAMZAN, M.
0249

RANALLI, P.
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RAND, R.E.
0334 0335 0336 0337

RANSOM, J.S.
0439 0878

RAO, B.M.
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RAO, D.G.
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RAO, N.S.S.
0396

RAO, Y.P.
0129 0363 0578 0752 0765

RATHERT, G.
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RAVA, C.A.
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REDDEN, R.J.
0776

REDDY, N.R.
1176

REDELFS, M.S.
0909

REICHARDT, K.
0928

REICOSKY, D.
0904 1113

REID, W.S.
1226

REIS, O.V. DOS
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REIS, W.P.
0601

REISEN, J.
0899 0900 0962

RENNIE, R.J.
0918

REUNIAO TECNICA ANUAL DO FEIJAO, 13., PORTO ALEGRE-RS, BRASIL
0556

REUNION ANUAL DEL PROGRAMA COOPERATIVO CENTROAMERICANO PARA EL MEJORAMIENTO DE CULTIVOS ALIMENTICIOS, 29a., PANAMA
0777

REYES G., J.
0628

REYES S., J.M.
0074

REYNOLDS, J.F.
0470

RHEENEN, H.A. VAN
0264 0309

RIBEIRO, C.A.G.
0677

RICHMOND, D.V.
1035

RIGAUD, J.
0802

RIOS B., M.J.
0127

RIPA S., R.
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RIPOLL N., R.A.
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RIVAS E., M.
1193

RIVERA G., J.C.
0524

RIVERA, J.A.
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RIVERA, J.J.
0602

RIZK, A.M.
1039

RIZO, M. DEL P.
0295 0296

ROBERTS, M.H.F.
0735

ROBINSON, H.T.
1020 1144

ROBINSON, R.A.
0642

ROCHA Q., J.
0111

ROCHA, R.E.M. DA
0984 1186

ROCKE, S.
1164

RODRIGUES NETO, S.M.
0711

RODRIGUES, A.L.
0820

RODRIGUEZ C., F.G.
0112

RODRIGUEZ DE MORA, D.
0891

RODRIGUEZ R., J.R.
0382

RODRIGUEZ R., R.
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RODRIGUEZ-SOSA, E.J.
1227

RODRIGUEZ, E.
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RODRIGUEZ, F.
0713 0724

RODRIGUEZ, M.T.
0910

ROELFS, A.P.
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ROHLFS III, W.M.
0297

ROMAN V., A.
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ROMANI, V.L.M.
0488

ROMO R., C.
0104

RONDON, A.
0937

RONZELLI JUNIOR, P.
0256 0525

ROOS, E.E.
1108

ROSADO M., F.J.
0678 1040

ROSALES, F.E.
0987

ROSE, J.L.
0776

ROSE, L.M.
0267

ROSIELLE, A.A.
0737 0789

ROSINGER, C.H.
0892

ROSOLEM, C.A.
0898

ROSSET, P.M.
0603

ROTH, D.
1019

ROWE, D.L.
1223

RUBAIHAYO, P.R.
0557

RUBIN, B.
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RUBLUO, A.
0474

RUCKHEIM FILHO, O.
0558

RUCKS, P.
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RUIZ B., F.
0224 0365

RUIZ B., J.F.
0217

RUIZ DE LONDOÑO, N.
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RUMNOW, J.H.
0480

RUPPEL, R.F.
0298 0299

RWEYEMAMU, C.
0288

SAARELAINEN, R.
1100

SABATIE, M.
1010

SAETTLER, A.W.
0703 0760 1022 1122 1127 1147

SAINI, S.S.
0249 0369

SALADIN G., F.
0076 0113

SALAZAR L., S.
1109

SALEM, S.H.
0079 0219

SALEMA, M.P.
0979

SALEZ, P.
0988

SALGAIO D., D.
0208

SALGADO, V.
0522

SALIN, O.
0518 0522

SALINAS G., G.E.
0149

SALINAS P., R.A.
0366 0559

SALMERON E., J.
0629

SALSAL, L.
0454 0454

SALUNKHE, D.K.
0893 1167 1176

SAMPATH, V.
0307

SANCHEZ G., J.
0003

SANCHEZ G., M.A.
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SANCHEZ P., S.
0300

SANCHEZ, A.
0325

SANCHEZ, F.
0886

SANCHEZ, R.
0056 0095 0114

SANCHEZ, W.K.
0391

SANDERS, J.H.
0416

SANDSTED, R.F.
0373 0469 0931 1206

SANTA CECILIA, L.V.C.
1088

SANTACRUZ, D.
0635

SANTOS V., J.C.
0036

SANTOS, A.F.
0250

SANTOS, A.F. DOS
0207 1041

SANTOS, D.P.
0667

SANTOS, J.B. DOS
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SARRAFI, A.
1110

SARTORATO, A.
0690

SASSEVILLE, D.
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SASTRY, S.K.
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SATHE, S.K.
0392 0893 1167 1176

SAVILE, A.H.
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SAVON, R.
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SAWANT, D.M.
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SAXENA, N.C.
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SCALA, F.
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SCHERER, E.E.
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SCHMIDT, G.
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SCHMIDT, M.G.
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SCHMITT, H.A.
0864

SCHNEITER, A.A.
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SCHOONHOVEN, A. VAN
0779 0823 0971 1089 1090 1091 1104
1205 1218

SCHRAVENDIJK, H.W.
0879

SCHROLER, V.N.
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SCHULER, M.A.
0039

SCHUSTER, M.L.
0225 0226 0639 0645

SCHWARTZ, H.F.
0228 0367 0643

SCHWEIZER, E.E.
0577

SCHWEIZER, P.
0460

SCOLES, G.J.
1103

SEBASIGARI, K.
0856

SEDIYAMA, C.S.
0824

SEDO L., J.L.
0679

SEEM, R.C.
0662

SEEMANN, J.R.
0475

SEENAPPA
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SEGOVIA S., R.
0604

SEHGAL, O.P.
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SEIB, P.
0894

SEINCE, J.L.
1010

SELBACK, P.A.
1187

SELMER-OLSEN, A.R.
0880

SEMOKA, J.M.R.
1149

SENO, E.
0803 0880

SENGOOBA, T.N.
1043

SEPULVEDA R., P.
0216 0680 1014

SERPA, J.E.S.
0151 0152 0153

SERRANO, M.S.
0722 0823

SEYANI, J.H.
0448

SHAIK, M.
1044

SHANTHARAM, S.
1189

SHAO, F.M.
0681

SHEPPARD, J.W.
0227 0999

SHETTY, H.S.
1038

SHIBATA, J.K.
0464

SHUKLA, P.D.
0920

SIADAT, H.
0077

SIEGERIST, M.
0017

SIJMONS, P.C.
0865

SILBERNAGEL, M.J.
0368 0506 0697 0733 0780 0932 1149

SILVA, A.F. DA
0600

SILVA, C.C. DA
0634 0970

SILVA, E.A.M. DA
0272 0881

SILVA, G.H.
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SILVA, J. DE S.E.
0824

SILVA, J.F. DA
0543 0544 0989

SILVA, J.G. DA
0115

SILVA, J.J.S.E.
0116

SILVA, N.G. DA
0989

SILVA, R.F. DA
0824

SILVA, W.R. DA
0833

SILVEIRA, A.J. DA
0958

SILVEIRA, P.H. DA
0921

SILVERA, G.
0990

SINDHAN, G.S.
1045

SINGH, A.K.
0369

SINGH, B.R.
0880

SINGH, D.V.
0078 0922

SINGH, R.
0078 0885 0922

SINGH, R.N.
0265

SINGH, S.P.
036 0370 0736 0757 0767 1151 1152

SINHA, M.M.
0885

SINIGAGLIA, C.
0242

SIPOS, M.
0035

SIQUEIRA, P.R.
0923

SIRRY, A.R.
0079

SISTRUNK, W.A.
0093

SIVAN, A.
0682

SIVIERO, M.E.
0561 0630 0631 0632

SLIGHTOM, J.L.
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SMARTT, J.
0371

SMIT, J.J.
0417 0418 0419

SMITH, A.R.
0449

SMITH, C.
0226

SMITH, C.A.
0662

SMITH, C.B.
0451

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PHOTOSYNTHESIS
0845 0852

CARIBBEAN
0034 0043 0076 0113 0325 0331 0454
0454 0497 0507 0545 0555 0809 0821
0912 0917 0946 0947 0972 1002 1009
1067 1099 1183 1227
DISEASES AND PATHOGENS
0257 0258 0637 0647 0648 0692 0699
0742 0756 0764 1121
GERMPLASM
0635 0637 0648 0742 0756 0777 0783
0808 0884 1121
INJURIOUS INSECTS
0719 0720 0721 0722 1082
MARKETING
1194

PRODUCTION
1194
SEED PRODUCTION
0611

CELL STRUCTURE
0005 0251 0437 0439 0477 0487 1018

CELL WALLS
0251 0477 1018

CENTRAL AMERICA
0044 0056 0065 0071 0072 0086 0089
0095 0096 0097 0106 0107 0114 0117
0123 0132 0136 0142 0146 0150 0156
0169 0170 0171 0201 0204 0213 0217
0222 0224 0244 0247 0255 0274 0285
0286 0295 0296 0332 0350 0351 0352
0365 0374 0379 0384 0385 0387 0399
0430 0485 0493 0496 0523 0524 0528
0529 0530 0549 0567 0587 0588 0592
0612 0613 0618 0619 0626 0672 0673
0679 0713 0724 0751 0770 0777 0785
0793 0795 0807 0808 0809 0814 0866
0891 0894 0930 0931 0956 0961 0973
0981 0982 0985 0987 0998 1032 1034
1056 1109 1168 1169 1175 1179 1180
1217 1221

CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL
0054 0097 0156 0164 0165 0172 0194
0197 0200 0202 0203 0225 0323 0332
0349 0350 0352 0355 0356 0358 0360
0365 0372 0378 0415 0417 0426 0502
0612 0618 0619 0629 0634 0722 0740
0742 0751 0808 0931 0993 1000 1003
1006 1013 1024 1129 1141 1147 1158
1191

CERCOSPORA VANDERYSTI
0636 1041

CEROTOMA
0971

CEROTOMA FACIALIS
1089

CEROTOMA TRIFURCATA
0289

CEUTHOPHILUS
0712

CHAETOSEPTORIA WELLMANII
DISEASE CONTROL
0213
EPIDEMIOLOGY
0213
ETIOLOGY
0213
RESISTANCE
0354
SYMPTOMATOLOGY
0213

CHILE
0068 0108 0109 0110 0208 0498 0499
0511 0515 0531 0544 0553 0854 0905
0938 0950 0993 1117
DISEASES AND PATHOGENS
0216 0261 0320 0490 0505 0680 0694
1014 1153
INJURIOUS INSECTS
0040 0723 0940 1014 1087 1213
MARKETING
0811
PRODUCTION
0414 0532 0940

CHLOROPHYLL
0035 0848 0853 0863 1068

CHLOROPLASTS
0035

CHLOROSIS
0457 0644 0858

CHROMIUM
0858 0864 0933

CHROMOSOMES
1160

CLIMATIC REQUIREMENTS
0041 0042 0058 0080 0173 0203 0208
0413 0477 0504 0526 0556 0845
PHOTOPERIOD
0931
TEMPERATURE
0026 0033 0062 0071 0110 0419 0465
0494 0502 0857 0931 1135

CLIMBING BEANS
0064 0098 0125 0127 0132 0140 0149
0162 0167 0168 0172 0174 0176 0177
0178 0180 0184 0186 0190 0194 0196
0199 0205 0206 0323 0343 0344 0348
0349 0546 0594 0595 0604 0617 0625
0869 0885 0963

COBALT
0060 0882

COFFEE ARABIGA
0957 0981
COLEOPTERA
0161 0277 0278 0289 0290 0292 0298
0300 0303 0353 0432 0433 0434 0435
0526 0706 0712 0714 0716 0721 0723
0724 0726 0823 097' 1014 1075 1077
1081 1083 1089 1090 1211 1213 1214
1215 1216 1217 1218 1219
SEED
1212

COLLETOTRICHUM LINDEMUTHIANUM
0145 0161 0547 0760 1035 1041 1045
1068
DISEASE CONTROL
0211 0212 0213 0252 0504 0526 0636
0638 0642 0680 0740 0813
CHEMICAL CONTROL
0215 0242 0246 0663 0668 0676 0681
1036
DISEASE TRANSMISSION
0215 0232
EPIDEMIOLOGY
0213 0215 0230 0243
ETIOLOGY
0213 0231 0232 0638 1036
INOCULATION
0230 0651 1037
RESISTANCE
0165 0200 0207 0217 0230 0312 0315
0317 0318 0323 0324 0327 0344 0349
0354 0356 0357 0363 0364 0504 0578
0594 0632 0651 0681 0752 0773 0813
1028 1036 1102 1122 1136 1145 1149
SYMPTOMATOLOGY
0213 0243 0246 0526 0636 0638 0642
0680 1036

COLOMBIA
0029 0054 0069 0075 0127 0268 0332
0361 0415 0416 0426 0442 0494 0502
0530 0568 0569 0570 0571 0572 0573
0574 0575 0582 0583 0584 0585 0586
0593 0595 0596 0598 0604 0605 0606
0607 0608 0609 0627 0633 0736 0755
0757 0767 0792 0816 0839 0846 0857
0870 0902 0903 0913 0915 0929 0954
0977 1003 1151 1152 1154 1155 1196
1205 1207 1208
DISEASES AND PATHOGENS
0228 0232 0233 0345 0364 0367 0594
0676 0696 0786 1013 1015 1021 1036
1037 1060 1102 1104
GERMPLASM
0210 0370 0731 0777 0823 0884 1013
1075 1102 1157
INJURIOUS INSECTS
0779 0823 0971 1075 1076 1077 1086
1089 1090 1091 1215 1218
MARKETING
0405 0406
PRODUCTION
0597 0805 1204

COMPOSITION
0277 0478 0479 0484 0486 0794 0861
0904 0910 1112 1129
ASH CONTENT
1176 1220
CARBOHYDRATE CONTENT
0079 0270 0392 0482 0483 0856 0888
0893
DRY MATTER
0014 0030 0036 0052 0054 0057 0069
0076 0111 0399 0462 0464 0472 0499
0800 0857 0888 0905 0914 0922 0928
0986 1162
FAT CONTENT
0893 0946 1178 1220
FIBRE CONTENT
0893 1172 1174 1178
MINERAL CONTENT
0016 0022 0045 0055 0068 0070 0078
0079 0394 0451 0456 0457 0475 0481
0488 0495 0516 0793 0821 0858 0860
0862 0864 0866 0885 0889 0893 0899
0909 0933 1016
PHENOLIC CONTENT
0884 0891 0894 1029 1176 1222
PROTEIN CONTENT
0033 0037 0166 0236 0369 0392 0398
0485 0488 0745 0768 0829 0863 0884
0885 0892 0897 0920 0946 1109 1178
1180 1220
VITAMIN CONTENT
0893
WATER CONTENT
0427 0430 0527 0820 0821 0824 0826
0830 1178 1210 1220 1224

CONODERUS
0712

CONSUMPTION
0402 0404 0407 0414 0421 0805 0814
0817

COOKING
0384 0385 0430 0479 0821 0837 1164
1168 1173 1209 1210 1223 1227
NUTRITIVE VALUE
0389 0793 0794 1112 1129 1172 1176
1178 1221 1224

COPPER
0455 0455

LEAVES
0021 0456
MINERAL DEFICIENCIES
0452 0452
STEMS
0456

CORYNEBACTERIUM FLACCUMFACIENS
1018
DISEASE CONTROL
0638 0642
CHEMICAL CONTROL
0100
DISEASE TRANSMISSION
0227
EPIDEMIOLOGY
0100
ETIOLOGY
0638
SYMPTOMATOLOGY
0100 0638 0642

COSTA RICA
0136 0142 0496 0523 0524 0530 0549
0567 0587 0588 0603 0612 0961 0981
0982 1210
DISEASES AND PATHOGENS
0255 0529 0613 0672 0673 0679 1056
GERMPLASM
0777
INJURIOUS INSECTS
1217

COSTS
0086 0408 0492 0555 0587 0597 0604
0606 0810 0811 0956

COTYLEDONS
0009 0449 0467 0476 0487 0844 0876

COWPEA MOSAIC VIRUS
0692

CROP LOSSES
0256
PLANT INJURIES
0145 0211 0212 0231 0269 0270 0275
0284 0294 0692 0703 0713 0715 0726
0779 0936 0971 0998 1014 1068 1070
1071 1072 1073 1084 1087 1213

CROSS-POLLINATION
0447
PLANT BREEDING
0728 0734 1142

CUBA
0034 0043 0325 0331 0497 0545 0555
0946 1002
DISEASES AND PATHOGENS
0257 0258 0692 0764
INJURIOUS INSECTS
0714 0719 0720 0721 0722
SEED PRODUCTION
0611

CUCUMBER MOSAIC VIRUS
RESISTANCE
0745 0775 1146

CULTIVARS
0024 0026 0030 0034 0037 0040 0042
0044 0046 0053 0054 0058 0062 0064
0065 0072 0075 0081 0088 0092 0095
0098 0100 0101 0103 0104 0106 0107
0109 0110 0118 0137 0138 0149 0150
0156 0166 0170 0171 0196 0201 0204
0205 0214 0217 0220 0222 0224 0225
0226 0228 0236 0238 0239 0244 0255
0256 0259 0261 0262 0271 0277 0285
0288 0290 0295 0304 0305 0306 0308
0309 0310 0313 0314 0315 0316 0317
0318 0319 0320 0321 0325 0326 0329
0330 0331 0334 0335 0337 0345 0346
0351 0352 0353 0358 0359 0361 0363
0365 0366 0367 0368 0369 0373 0375
0377 0381 0382 0383 0384 0385 0386
0390 0392 0416 0438 0447 0450 0454
0454 0459 0462 0463 0464 0468 0469
0471 0478 0483 0485 0486 0488 0490
0491 0498 0499 0502 0504 0507 0509
0518 0520 0524 0525 0526 0527 0530
0540 0544 0545 0546 0547 0548 0552
0559 0561 0562 0563 0567 0573 0576
0582 0584 0586 0587 0588 0593 0596
0605 0606 0622 0632 0633 0634 0639
0646 0647 0649 0653 0671 0672 0677
0679 0681 0684 0686 0690 0692 0694
0697 0699 0702 0713 0721 0728 0732
0733 0734 0736 0737 0738 0739 0741
0743 0744 0746 0747 0754 0755 0757
0758 0760 0761 0762 0763 0764 0768
0770 0772 0773 0774 0775 0778 0780
0781 0782 0786 0788 0789 0791 0796
0797 0799 0801 0813 0818 0819 0828
0829 0830 0836 0839 0843 0847 0862
0867 0885 0893 0895 0899 0902 0904
0908 0910 0914 0915 0918 0925 0927
0929 0930 0936 0943 0944 0949 0958
0959 0961 0963 0964 0967 0971 0974
0977 0978 0984 0992 0993 1000 1001
1002 1009 1010 1017 1021 1022 1024
1026 1027 1028 1032 1034 1035 1036
1043 1044 1049 1054 1055 1057 1059
1060 1063 1065 1068 1071 1086 1088
1094 1097 1101 1103 1107 1109 1110
1111 1114 1115 1118 1123 1124 1125
1127 1130 1131 1135 1136 1137 1138

1139 1140 1141 1143 1145 1146 1148
1150 1151 1155 1164 1169 1171 1182
1186 1188 1212 1215 1220 1222 1227
ADAPTATION
0082 0096 0097 0157 0158 0159 0161
0163 0164 0165 0168 0169 0173 0174
0175 0176 0177 0179 0180 0181 0183
0185 0186 0187 0188 0189 0190 0192
0193 0195 0197 0198 0202 0203 0206
0207 0208 0209 0210 0253 0324 0327
0328 0332 0339 0342 0349 0350 0355
0356 0374 0379 0566 0594 0612 0613
0614 0615 0616 0618 0619 0620 0621
0623 0624 0625 0626 0627 0628 0630
0631 0635 0724 0742 0752 0931 0960
1003 1004 1005 1007 1008 1011 1012
1013 1102 1156
GERMPLASM
0004 0006 0105 0125 0140 0157 0158
0159 0160 0163 0164 0165 0167 0172
0173 0174 0175 0176 0177 0178 0179
0180 0181 0182 0183 0184 0185 0186
0187 0189 0190 0191 0192 0193 0194
0195 0197 0198 0202 0206 0210 0233
0234 0240 0323 0327 0333 0336 0339
0341 0342 0343 0344 0349 0354 0355
0356 0357 0360 0364 0372 0578 0616
0617 0619 0631 0635 0637 0645 0648
0683 0742 0745 0748 0751 0765 0823
0926 0931 1012 1013 1075 1098 1102
1108 1121 1122 1126 1147 1153
PLANT INTRODUCTIONS
0164 0168 0172 0174 0179 0180 0206
0234 0323 0328 0341 0342 0372 0400
0557 0626 0635 0748 0776 1117 1147

CULTURAL CONTROL
0215 0221 0244 0246 0250 0432 1021
1025 1034 1036 1060 1211 1218

CULTURE MEDIA
0032 0476

CURLY TOP VIRUS
0780
RESISTANCE
0778

CYTOGENETICS
1103

CYTOKININS
0467 0474 0855 0871

CYTOLOGY
0005 0008 0251 0437 0439 0440 0477
0840 0842 1018

DEFICIENCIES
0018 0020 0022 0452 0452
DEFOLIATION
0448 0540 0853 0975
DISEASES AND PATHOGENS
0765

DELIA PLATURA
0287
INSECT CONTROL
0040 0526 1090
INTEGRATED CONTROL
1087
PLANT INJURIES
0715 1087

DETERIORATION
0429 0854 0940
MECHANICAL DAMAGE
0108

DETERMINATE CULTIVARS
0008 0029 0064 0149 0361 0540

DEVELOPMENT
0409 0415 0417 0423 0792 0806 0807
0809 0816 1104 1193 1204 1205

DEVELOPMENTAL RESEARCH
0806 0807 0809 1205

DEVELOPMENTAL STAGES
0002 0027 0029 0033 0050 0270 0290
0469 0502 0563 0941 1083 1086
BRANCHING
0936
FLOWERING
0006 0030 0052 0054 0062 0084 0102
0165 0471 0473 0635 0838 0847 0856
0860 0862 0870 0897 0907 0923 0930
0931 1141 1148
GERMINATION
0024 0028 0046 0426 0427 0430 0431
0466 0820 0854 0866 0874 0877 0880
0882 1108 1212
MATURATION
0028 0431 0856 0862 0870
PODDING
0030 0052 0062 0102 0471 0473 0870

DIABROTICA
0971

DIABROTICA BALTEATA
0714
INSECT CONTROL
0278 1089

RESISTANCE
0721
DIABROTICA SPECIOSA
PLANT INJURIES
0712

DIABROTICA UNDECIMPUNCTATA
0727

DIETARY VALUE
0129 0183 0388 0392 0891 0893 0894
1161 1168 1170 1171 1175 1176 1177
1179

DIETS
0387 0389 0390 0391 0790 0795 1162
1163 1165 1166 1170 1175 1179 1180

DIGESTIBILITY
0388 0891 0893 0894 1168 1169 1171
1175 1176 1179

DIPTERA
0192 0193 0195 0211 0212 0246 0275
0287 0705 0715 0716 0726 0979 0998
1093 1094 1139
INSECT CONTROL
0040 0276 0278 0283 0293 0301 0526
0711 0717 0718 0723 1012 1014 1087
1089 1090 1092 1095

DISEASE CONTROL
0104 0216 0280 0505 0582 0633 1015
BACTERIOSES
0079 0100 0211 0212 0213 0215 0219
0221 0224 0504 0636 0638 0642 0646
0680 0740 0999 1014 1021
MYCOSES
0211 0212 0213 0215 0241 0242 0244
0246 0248 0250 0252 0253 0254 0255
0261 0264 0504 0526 0529 0636 0638
0642 0650 0656 0658 0662 0663 0668
0669 0672 0674 0675 0676 0680 0681
0682 0687 0727 0740 0761 0813 1014
1025 1030 1034 1036 1043
VIROSES
0100 0213 0215 0248 0261 0263 0264
0504 0636 0638 0642 0694 0740 1014
1055 1056 1060

DISEASE PHYSIOLOGY AND BIOCHEMISTRY
0652 0659 1018 1031 1033 1035 1042
1046 1047 1048

DISEASE TRANSMISSION
0232 0646 0676 1015
SEED TRANSMISSION
0227 0254 0262

VIROSES
0215 0248 0259 0261 0265 0694 0696
1053 1059 1060
DISTRIBUTION
0401

DNA
0310 0693 1058 1100 1105 1160

DOMINICAN REPUBLIC
0076 0113 0123 0809 0821 0917 0972
1067 1099 1183
DISEASES AND PATHOGENS
0626 0637 0742
GERMPLASM
0637 0742 0777

DRAINAGE
0671

DROUGHT
0046 0082 0180 0200 0327 0329 0346
0377 0419 0450 0498 0499 0509 0520
0527 0892 0910 0927 0930 0979 1011
1113 1158

DRY MATTER
0014 0030 0036 0052 0054 0057 0069
0078 0111 0399 0459 0462 0464 0472
0499 0514 0544 0800 0803 0857 0888
0905 0914 0922 0928 0986 1182

DRYING
0426 0824 1226

DUNG
0068 0121 0131 0137 0144 0205 0500
0570 0608 0609 0610 0916 0919 0995

DWARF BEANS
0014 0017 0020 0062 0064 0098 0149
0167 0168 0172 0174 0176 0177 0178
0180 0184 0186 0190 0194 0205 0317
0318 0323 0343 0344 0572 0585 0598
0617 0625 0868 0869 0885 0963 1142
SPACING
0127 0165 0206 0514 0539 0568 0569
0593

ECOLOGY
0396 0398 0472 0509 0511 0517 0798
0799 0802 0804 0988 1184 1187 1188

ECONOMICS
0086 0127 0155 0167 0400 0401 0403
0404 0405 0406 0407 0408 0410 0411
0412 0414 0421 0422 0492 0505 0569
0574 0586 0587 0597 0599 0604 0606

0633 0805 0809 0810 0811 0814 0817
0818 0819 0956 0979 1193 1196 1197
1201
ECUADOR
0452 0452 0503 0510 0519 0536 0806
0809 0810 0827 1206
DISEASES AND PATHOGENS
0636
INJURIOUS INSECTS
0726
PRODUCTION
0492 0565
SEED PRODUCTION
0787

EGYPT
0473 0478 0861 1039 1181

EL SALVADOR
0612 0982
DISEASES AND PATHOGENS
0613
PRODUCTION
0956

ELASMOPALPUS LIGNOSELLUS
INSECT CONTROL
0278 0723 1090
INTEGRATED CONTROL
1087
PLANT INJURIES
0712 1087
RESISTANCE
0314

ELECTRON MICROSCOPY
1061

ELSINOE PHASEOLI
0547 1012 1013
EPIDEMIOLOGY
0674

EMBRYO
0732 0876 0877 1128 1220

EMERGENCE
0870

EMPOASCA
0719 0721 0726 1102

EMPOASCA CAMARA
0723 1087

EMPOASCA FABAE
0161
INSECT CONTROL
CHEMICAL CONTROL
0720
EMIOASCA KRAEMERI
(722 1086 1088
I.'SECT CONTROL
108:
CHEMICAL CONTROL
1082
PLANT INJURIES
0779 0971
RESISTANCE
0327 1075 1077

ENTOMOLOGY
0276 0278 0301 0303 0322 0433 0556
0705 0708 0714 0718 0721 0725 0779
0809 0971 1012 1014 1075 1077 1079
1080 1087 1089 1092 1093 1213 1217

ENZYMES
0011 0260 0271 0453 0453 0460 0461
0480 0487 0644 0689 0730 0802 0851
0883 0886 1046 1165 1190 1223

EPICOTYL
0443 0476

EPILACHNA VARIVESTIS
0161
INSECT CONTROL
0290 0298 1089
CHEMICAL CONTROL
0300
RESISTANCE
0277 0333

EPINOTIA APOREMA
0723 1087 1091

EPINOTIA OPPOSITA
INSECT CONTROL
CHEMICAL CONTROL
1079

ERYSIPHE POLYGONI
0161
DISEASE CONTROL
0248 0636 0680
CHEMICAL CONTROL
0215 0253
DISEASE TRANSMISSION
0215 0248
EPIDEMIOLOGY
0215 0248
ETIOLOGY
0248

RESISTANCE
0253 0321 0354
SYMPTOMATOLOGY
0248 0636 0680
ESTIGMENE ACREA
INSECT CONTROL
0278

ETHIOPIA
0221 0409

ETHYLENE PRODUCTION
0444 0449

ETIELLA ZINCKENELLA
1083
PLANT INJURIES
0712

EUROPE
0005 0015 0016 0017 0028 0035 0037
0092 0099 0220 0234 0304 0324 0371
0378 0383 0434 0438 0449 0465 0479
0537 0644 0656 0689 0706 0709 0728
0738 0739 0745 0750 0754 0763 0769
0775 0790 0802 0825 0828 0832 0834
0836 0840 0841 0842 0844 0849 0858
0859 0863 0865 0869 0875 0876 0877
0879 0880 0887 0890 0892 0901 0911
0934 0935 1010 1020 1031 1033 1035
1042 1057 1064 1100 1110 1116 1120
1144 1146 1163 1166 1190 1219

EUXOA
0526

EVAPOTRANSPIRATION
0494 0909

EXPERIMENT DESIGN
0194 0424 1104 1207 1208

FALLOWING
0373

FAT CONTENT
0946 1170
LEAVES
0487
SEED
0893 1178 1220

FATTY ACIDS
0487 0893 1170

FERMENTATION
0392

FERTILIZERS
0001 0014 0017 0018 0040 0045 0049
0050 0051 0054 0055 0056 0060 0061
0065 0066 0069 0071 0072 0073 0075
0076 0078 0079 0080 0081 0088 0100
0104 0109 0116 0118 0120 0121 0122
0124 0131 0135 0139 0141 0144 0149
0150 0206 0207 0300 0322 0346 0374
0397 0399 0416 0451 0459 0473 0492
0493 0496 0497 0500 0503 0504 0505
0507 0511 0512 0513 0516 0517 0518
0519 0521 0522 0523 0525 0526 0533
0548 0557 0572 0578 0585 0591 0595
0609 0610 0633 0752 0765 0798 0799
0800 0801 0803 0804 0897 0898 0899
0900 0901 0902 0911 0913 0915 0917
0918 0920 0922 0924 0928 0929 0933
0937 0944 0954 0970 0976 0977 0985
0988 0995 1007 1040 1083 1098 1104
1119 1182 1183 1187

FIBRE CONTENT
1172 1174
SEED
0893 1178

FIELD EXPERIMENTS
0954

FLOODING
0469

FLOWERING
0006 0030 0052 0054 0084 0102 0165
0471 0473 0635 0847 0856 0860 0862
0870 0897 0907 0923 0930 1141
GENETICS
1148
PHOTOPERIOD
0931
TEMPERATURE
0062 0838 0931

FOLIAGE
0445 0470 0498 1069

FOOD ENERGY
0129

FOOD PRODUCTS
0393 0425 0506 0825 0830 0831 0832
0835 0837 1007 1129 1153 1223 1225
1228

FRANCE
0304 0434 0537 0706 0802 0869 0876
0877 0887 0887 0901 1010 1110 1116
1120 1219

FUSARIUM
0248 0261 0266 0326 0526 0678 0749
1037

FUSARIUM OXYSPORUM
1041
DISEASE CONTROL
0213 0636
CHEMICAL CONTROL
0215 1036
DISEASE TRANSMISSION
0215
EPIDEMIOLOGY
0213 0215 0243
ETIOLOGY
0213 1036
INOCULATION
1057
RESISTANCE
0677 1036
SYMPTOMATOLOGY
0213 0243 0636 1036

FUSARIUM SOLANI
0684 1121

FUSARIUM SOLANI PHASEOLI
0657 0670 1039 1046 1052
DISEASE CONTROL
0213 0680
CHEMICAL CONTROL
0215 1025 1036
DISEASE TRANSMISSION
0215
EPIDEMIOLOGY
0213 0215
ETIOLOGY
0213 1036
INOCULATION
1016
RESISTANCE
0319 0334 0337 0666 0671 1036
SYMPTOMATOLOGY
0213 0680 1025 1036

GENES
0039 0264 0305 0310 0353 0383 0728
0735 0736 0737 0743 0767 0769 0773
1100 1105 1127 1146 1148 1151 1159
1160

GENOTYPES
0482 0498 0499 0509 0566 0629 0733
0744 0759 0771 0774 0856 0884 1003
1097 1099 1112 1135 1145 1146 1186

GEOGRAPHICAL DISTRIBUTION
0002 0003 0306 0320

GERMANY FEDERAL REPUBLIC
0763 0834 0841 0891 0935 1033

GERMINATION
0028 0046 0084 0431 0866 0870 0877
0880
SEED
0024 0426 0427 0430 0463 0466 0532
0820 0824 0833 0854 0874 0882 1108
1212

GERMPLASM
0004 0006 0105 0125 0140 0157 0158
0159 0160 0162 0163 0164 0165 0167
0172 0173 0174 0175 0176 0177 0178
0179 0180 0181 0182 0183 0184 0185
0186 0187 0189 0190 0191 0192 0193
0194 0195 0197 0198 0199 0200 0202
0206 0210 0233 0234 0240 0312 0323
0327 0333 0336 0339 0341 0342 0343
0344 0348 0349 0354 0355 0356 0357
0360 0364 0370 0372 0380 0578 0616
0617 0619 0631 0635 0637 0645 0648
0683 0731 0742 0745 0748 0751 0756
0765 0777 0783 0808 0823 0884 0926
0931 0979 1006 1012 1013 1020 1037
1075 1096 1098 1102 1108 1121 1122
1126 1132 1133 1147 1149 1153 1157
1158

GIBBERELLINS
0031 0871 0875

GREEN MANURES
0049 0508 0916 1040

GROWTH
0007 0009 0012 0025 0028 0029 0031
0032 0048 0082 0132 0266 0470 0476
0499 0667 0840 0868 0870 0872 0875
0876 0878 0879 0882 0907 0920 0955
0963 0964 1057 1072 1158
LIGHT
0445 0477 0845 0857
MINERALS AND NUTRIENTS
0020 0022 0045 0149 0451 0461 0495
0514 0523 0657 0671 0701 0858 0861
0866 0911
NUTRIENT SOLUTION
0020 0022 0036 0657 0858 0863 0866
PLANTING
0026 0501 0514 0941
SALINITY
0475
SOLAR RADIATION
0026 0905
SPACING
0514
TEMPERATURE
0026 0033 0465 0468 0474 0671 0857
1135

GROWTH CHAMBER EXPERIMENTS
0273

GUATEMALA
0086 0132 0307 0388 0399 0430 0485
0592 0612 0793 0807 0809 0866 0891
0894 0930 0973 0982 1109 1168 1169
1175 1179 1180 1221
DISEASES AND PATHOGENS
0244 0613 0770 1034
GERMPLASM
0777 0921
PRODUCTION
0814

HAITI
0454 0454

HARVESTING
0001 0028 0042 0087 0093 0094 0100
0102 0104 0114 0115 0120 0165 0327
0374 0431 0492 0504 0505 0526 0530
0531 0537 0555 0564 0824 0827 0836
0864 0937 0938 0954

HEAT TREATMENT
0658

HELIANTHUS ANNUUS
0581 0591 0976

HELIOTHIS ARMIGERA
0716

HELIOTHIS ZEA
INSECT CONTROL
1091
CHEMICAL CONTROL
0710
PLANT INJURIES
0998

HEMIPTERA
0712

HERBICIDES
0083 0085 0089 0090 0092 0113 0117
0119 0142 0496 0528 0534 0541 0542
0543 0544 0549 0550 0553 0554 0558
0873 0939 0942 0946 0948 0950 0953
0989 1007 1008
DISEASES AND PATHOGENS
0280 0529 0556
PLANT INJURIES
0703

HETEROSIS
0306 0757 1116

HETEROZYGOSIS
0774 1116

HOMOPTERA
0161 0211 0212 0327 0691 0698 0716
0721 0722 0726 0779 0971 0998 1075
1077 1086 1088 1094
INSECT CONTROL
0278 0293 0298 0526 0548 0708 0719
0720 0723 1014 1082 1087 1089

HOMOZYGOTE
0774

HONDURAS
0274 0612 0809 0982
DISEASES AND PATHOGENS
0613 1032
GERMPLASM
0777 0808
INJURIOUS INSECTS
0713 0724
PRODUCTION
0987

HOST RANGE
0248 0262 0265 0275 0278 0640 0688
0702 0714

HOSTS AND PATHOGENSNS
0667 1035 1055

HUMAN NUTRITION
0311 0387 0393 0479 0792 0793 0794
0795 0809 0912 1112 1129 1167 1169
1170 1172 1173 1174 1175 1176 1177
1178 1179 1180 1221 1224

HYBRIDIZING
0304 0305 0338 0342 0347 0353 0362
0366 0371 0375 0376 0377 0383 0647
0728 0732 0734 0736 0758 0769 0774
0777 0783 1103 1128 1137 1144 1151

HYBRIDS
0008 0187 0369 0371 0375 0440 0736
0758 0766 0774 0784 1151

HYLEMYA
0723

HYPOCOTYLS
0251 0443 0476

ILLUMINATION
0035 0466

INCOME
0026 0127 0400 0408 0503 0569 0574
0586 0587 0597 0599 0604 0606 0811
0956

INDETERMINATE CULTIVARS
0008 0029 0064 0149 0361 0538 0540

INDIA
0019 0021 0037 0278 0307 0369 0396
0453 0454 0455 0456 0458 0461 0466
0467 0472 0476 0759 0862 0865 0920
0922 1130
DISEASES AND PATHOGENS
0229 0249 0265 1038 1046 1054
INJURIOUS INSECTS
0275

INDOLEACETIC ACID
0474 0871

INFLORESCENCES
0353 0839 1106

INHIBITORS
0270 0480 0482 0850 0851 1167

INJURIOUS INSECTS
0001 0041 0100 0126 0216 0280 0281
0282 0284 0285 0286 0288 0296 0299
0374 0490 0491 0506 0577 0713 0725
0765 0813 0895 0940 0980 1053 1076
1078 1084 1085 1104 1149
COLEOPTERA
0277 0279 0289 0290 0292 0298 0300
0303 0333 0432 0433 0434 0435 0526
0706 0712 0714 0716 0721 0723 0724
0726 0823 0871 1014 1075 1077 1081
1083 1089 1096 1111 1112 1213 1214
1215 1216 1217 1219 1224
DIPTERA
0040 0192 0194 0195 0211 0212 0246
0275 0276 0278 0283 0287 0293 0301
0526 0705 0711 0715 0716 0717 0718
0723 0724 0770 0998 1012 1014 1087
1089 1090 1092 1093 1094 1095 1119
HEMIPTERA
0712
HOMOPTERA
0211 0212 0278 0293 0298 0327 0526
0691 0698 0715 0716 0719 0720 0721
0722 0723 0723 0726 0770 0871 0998
1014 1075 1077 1082 1086 1087 1088
1089 1094
LEPIDOPTERA
0278 0279 0294 0297 0314 0710 0712
0716 0723 0726 0998 1014 1083 1087
1090 1091 1094
THYSANOPTERA
0278 0526 0716 1014

INJURIOUS MITES
0709 0723 0726 1014
POLYPHAGOTARSONEMUS LATUS
1089
TETRANYCHUS TELARIUS
0526 1080 1089

INSECT BIOLOGY
0275 0276 0278 0289 0294 0301 0303
0433 0434 0705 0708 0714 0718 0725
0779 1012 1014 1079 1087 1089 1092
1093 1213 1218

INTEGRATED CONTROL
1074
DISEASES AND PATHOGENS
0482
INJURIOUS INSECTS
0716 1087

INTERCROPPING
0113 0122 0128 0130 0141 0149 0151
0206 0327 0346 0548 0568 0572 0573
0576 0583 0585 0592 0603 0755 0786
0957 0958 0961 0966 0979 0989 0992
0996 0997
ZEA MAYS
0121 0123 0124 0125 0126 0127 0129
0131 0132 0133 0134 0135 0136 0139
0140 0142 0143 0144 0145 0147 0148
0150 0152 0153 0154 0155 0162 0163
0196 0199 0200 0300 0322 0348 0364
0416 0567 0569 0571 0574 0576 0577
0578 0579 0580 0581 0582 0584 0586
0587 0588 0589 0590 0591 0593 0594
0596 0597 0598 0599 0600 0601 0602
0604 0605 0606 0607 0609 0610 0673
0737 0757 0789 0940 0955 0956 0959
0960 0963 0964 0965 0967 0968 0969
0970 0971 0972 0973 0974 0975 0976
0977 0978 0980 0981 0983 0984 0986
0987 0988 0993 0994 0995 0998 1005
1012 1119 1158

IRON
0015 0070 0657 0899
LEAVES
0016 1016
MINERAL DEFICIENCIES
0452 0453
ROOTS
0016 0233 0858 0865

IRRADIATION
0024 0034 0433 0470 0485 0841 0882
1109

IRRIGATION
0001 0042 0048 0057 0063 0100 0112
0116 0179 0180 0450 0492 0502 0505
0506 0510 0515 0524 0526 0617 0784
0804 0808 0879 0895 0906 0907 0921
0924 0930 0934 0937 0954 1158

ISARIOPSIS GRISEOLA
0547 1041
DISEASE CONTROL
0211 0212 0213 0636 0638 0642 0740
0813
CHEMICAL CONTROL
0215 0242 0668 1036 1043
DISEASE TRANSMISSION
0215
EPIDEMIOLOGY
0213 0215 0243
ETIOLOGY
0213 0638 1036
INOCULATION
0228 0651 1037
RESISTANCE
0217 0228 0327 0354 0364 0613 0632
0651 0813 0979 1004 1006 1028 1036
1134 1136 1138 1140 1145 1149
SYMPTOMATOLOGY
0213 0243 0636 0638 0642 1036

ISRAEL
0682

ITALY
0092 0220 0438 0738 0739 0745 0754
0775 0828 0836 0844 0934 1042 1146

JAMAICA
1009

KENYA
0081 0120 0155 0309 0329 0423 0533
0560 0579 0580 0809 1007
DISEASES AND PATHOGENS
0238 0240 0263 0264 0419 0642 0661
0674 1059 1068
GERMPLASM
0240 1158
MARKETING
0415 0817

LABORATORY ANIMALS
0387 1165 1166

LABORATORY EXPERIMENTS
0032 0208 0228 0273 1037

LABOUR
1201

LAND PREPARATION
0043 0076 0087 0100 0150 0502 0504
0506 0526 0529 0532 0565 0673 0813
0925 0937 0938 0941 0944 0947 1183

LATIN AMERICA
DISEASES AND PATHOGENS
0234 0653 1024
GERMPLASM
0234 0635
MARKETING
1194
PRODUCTION
1194

LEAD
0455 0455 0456

LEAF AREA
0030 0036 0054 0070 0099 0111 0122
0285 0445 0800 0905 0923 1065 1072
1192

LEAVES
0002 0013 0016 0030 0035 0036 0048
0054 0111 0269 0270 0271 0272 0442
0443 0444 0449 0450 0465 0467 0475
0476 0477 0487 0489 0509 0541 0703
0839 0841 0844 0846 0848 0849 0853
0876 0881 0868 0890 0892 0905 0908
1069 1071 1071 1072 1073 1127 1192
DISEASES AND PATHOGENS
0260 0644 0648 0658 0684 0689 1016
MINERALS AND NUTRIENTS
0021 0022 0045 0055 0451 0456 0461
0495 0516 0860 0864 0932 1016

LECTINS
0479 0889 0894 1162 1165 1166 1167
1189

LEPIDOPTERA
0297 0314 0712 0716 0726 0998 1083
1094
INSECT CONTROL
0278 0279 0294 0710 0723 1014 1087
1090 1091

LIGHT
0035 0038 0466 0849 0881
GROWTH
0445 0477 0845 0857

LIRIOMYZA
0711 0726 1092

LIRIOMYZA QUADRATA
0723 1087

LODGING
0373 1157

LYCOPERSICUM ESCULENTUM
0603 0981

LYGUS OBLINEATUS
1085

LYTTA DIMIDIATA
0712

MACROPHOMINA PHASEOLI
1026
DISEASE CONTROL
0213 0638
CHEMICAL CONTROL
0215 1036
DISEASE TRANSMISSION
0215
EPIDEMIOLOGY
0213 0215 0243
ETIOLOGY
0213 0638 0654 1036
RESISTANCE
1036 1121
SYMPTOMATOLOGY
0213 0243 0638 1036

MADAGASCAR
0397 0744

MAGNESIUM
0020 0078 0452 0452 0495 0516 0858
0885 0899
PLANT ASSIMILATION
0015 0862

MALAWI
0128 0129 0448 0508 0538 0539 0540
0800 0809 0831 0975
DISEASES AND PATHOGENS
0363 0578 0752 0765
GERMPLASM
0578 0765 1096

MANGANESE
0451 0452 0452 0858 0861 0889 0899
0900 1155

MANIHOT ESCULENTA
0143 0154 0571 0575 0576 0583 0957
0958 0989 0990 0997

MANURES
0049 0068 0121 0131 0137 0144 0205
0492 0500 0508 0519 0570 0608 0609
0610 0916 0919 0962 0995 1040

MAPS
0956 0973 0985 0987 0990

MARKETING
0042 0401 0404 0405 0406 0410 0411
0418 0421 0490 0491 0504 0526 0811
0812 0813 0815 0817 0818 0819 0825
0979 1191 1194 1197

MARUCA TESTULALIS
0716
INSECT CONTROL
1091
PLANT INJURIES
0211 0212
RESISTANCE
1094

MATURATION
0026 0028 0166 0170 0191 0320 0331
0344 0431 0856 0862 0870 1157

MECHANICAL DAMAGE
0108

MECHANIZATION
0086 0093 0094 0108 0113 0114 0115
0148 0327 0531 0537 0555 0577 1226

MEDICAGO SATIVA
0991

MEGALOTOMUS PARVUS
0712

MELOIDOGYNE
0526

MELOIDOGYNE INCOGNITA
0701 0852 1026
RESISTANCE
0381 0742

MERCURY
0880

METABOLISM
0033

METHIONINE
0037 0388 0481 1168 1169

MEXICO
0002 0003 0007 0010 0022 0030 0031
0032 0036 0045 0046 0051 0061 0063

0064 0066 0067 0070 0073 0074 0080
0082 0083 0088 0091 0094 0101 0104
0111 0112 0118 0119 0121 0122 0124
0130 0131 0133 0135 0139 0149 0150
0166 0196 0322 0366 0389 0390 0394
0424 0450 0474 0495 0509 0534 0550
0552 0554 0559 0562 0589 0590 0599
0602 0610 0620 0621 0623 0624 0628
0629 0704 0743 0785 0797 0801 0809
0847 0886 0897 0910 0923 0955 0995
0996 1119 1182 1185 1193
DISEASES AND PATHOGENS
0001 0145 0159 0161 0200 0230 0231
0248 0254 0262 0412 0346 0349 0354
0356 0357 0382 0654 0678 0788 1029
1040
GERMPLASM
0004 0006 0125 0140 0157 0158 0159
0162 0197 0198 0199 0202 0333 0348
0349 0354 0355 0356 0357
INJURIOUS INSECTS
0126 0277 0278 0281 0282 0290 0293
0300 0433 1216
MARKETING
0421
PRODUCTION
0413
SEED PRODUCTION
0412

MICROBIOLOGY
1181

MICRONUTRIENTS
0015 0018 0020 0021 0055 0060 0451
0452 0452 0455 0455 0456 0459 0513
0516 0657 0858 0861 0862 0864 0865
0903 0915 0932 1143 1155

MINERAL CONTENT
0015 0068 0070 0078 0079 0394 0457
0488 0793 0858 0862 0866 0885 0889
0899 0900 0933
LEAVES
0016 0022 0045 0055 0451 0456 0475
0495 0516 0860 0864 1016
POTS
0022
SEED
0481 0821 0893
STEMS
0456 0864

MINERAL DEFICIENCIES
0018 0020 0022 0061 0452 0452

MINERALS AND NUTRIENTS
0061 0701 0903
ALUMINIUM
0452 0452 0915 1143 1155

BORON
0018 0022 0055 0060 0452 0452 0657
0932
CALCIUM
0015 0020 0070 0078 0446 0451 0452
0452 0453 0453 0473 0495 0516 0858
0862 0866 0885 0889 0899 0932 0933
COPPER
0021 0452 0452 0455 0455 0456
IRON
0015 0070 0452 0452 0657 0858 0865
0899 1016
MAGNESIUM
0015 0020 0078 0452 0452 0495 0516
0858 0862 0885 0899
MANGANESE
0451 0452 0452 0858 0861 0889 0899
0900 1155
MOLYBDENUM
0060 0516
NITROGEN
0015 0017 0045 0049 0051 0056 0060
0066 0068 0069 0072 0073 0078 0079
0080 0081 0088 0109 0118 0120 0121
0122 0124 0131 0135 0139 0144 0149
0207 0397 0399 0451 0452 0452 0454
0454 0457 0461 0462 0472 0473 0481
0488 0493 0495 0496 0497 0500 0503
0507 0511 0514 0516 0517 0518 0521
0522 0523 0533 0591 0765 0798 0799
0800 0803 0804 0858 0860 0862 0885
0897 0898 0899 0901 0911 0917 0918
0924 0928 0933 0970 0976 0995 1007
1040 1098 1182 1183
OXYGEN
0453 0453 0671
PHOSPHORUS
0014 0015 0050 0065 0070 0122 0394
0451 0452 0452 0459 0525 0858 0862
0900 0913 0929 1143 1155
POTASSIUM
0015 0020 0049 0060 0066 0068 0069
0072 0073 0078 0079 0120 0122 0124
0131 0451 0452 0452 0453 0453 0495
0497 050 0503 0507 0516 0521 0858
0862 0885 0898 0901 0970
SULFUR
0452 0452 0793 0911
ZINC
0060 0451 0452 0452 0456 0459 0513
0864 0899

MOLYBDENUM
0060 0516

MULCHING
0862 0914

MUTATION
0485 0768 0882 1109 1142 1159

MYCORRHIZAE
0394 0913

MYCOSES
0001 0105 0145 0161 0165 0168 0200
0201 0207 0211 0212 0217 0222 0229
0232 0234 0235 0236 0237 0238 0239
0240 0241 0242 0244 0245 0246 0247
0249 0250 0253 0254 0255 0261 0264
0266 0312 0315 0317 0318 0319 0321
0323 0324 0326 0330 0334 0337 0344
0346 0349 0352 0354 0356 0357 0358
0363 0364 0365 0367 0372 0504 0526
0529 0547 0578 0594 0613 0626 0632
0636 0637 0638 0642 0643 0649 0650
0652 0653 0654 0655 0656 0659 0660
0661 0662 0663 0664 0665 0666 0667
0668 0669 0672 0673 0676 0677 0678
0679 0680 0681 0682 0683 0685 0686
0688 0727 0740 0743 0745 0746 0748
0749 0751 0752 0761 0763 0764 0770
0773 0778 0781 0782 0813 0979 1004
1006 1012 1013 1014 1025 1026 1027
1028 1029 1030 1031 1032 1033 1034
1035 1036 1038 1039 1040 1041 1042
1043 1044 1046 1047 1048 1049 1050
1051 1052 1068 1124 1125 1134 1136
1138 1140 1141 1145 1149 1150
EPIDEMIOLOGY
0212 0215 0230 0243 0248 0673 0674
INOCULATION
0228 0230 0252 1016 1037 1057
ISOLATION
0657 0658 1037
LEAVES
0658 0684 1016
ROOTS
0233
SEED
0188 0230 0231 0327 0760 1102 1121
1122
SEEDLINGS
0251 0670
TEMPERATURE
0671 1045

MYLABRIS OCULATA
0606

NEMATODES
0266 0268 0381 0526 0678 0701 0702
0743 0852 1014 1026 1065 1066 1067
NEMATODE CONTROL
0267 0700

NETHERLANDS
0016 0017 0099 0465 0750 0763 0859
0865 0879 1031

NEW ZEALAND
0223 0660

NICARAGUA
0044 0056 0065 0071 0072 0089 0095
0096 0097 0106 0107 0114 0117 0169
0170 0171 0204 0295 0350 0379 0384
0385 0618 0982 0985
DISEASES AND PATHOGENS
0201 0217 0222 0224 0247 0351 0352
0365 0374 0613
GERMPLASM
0619 0777
INJURIOUS INSECTS
0285 0286 0296
SEED PRODUCTION
0156

NIGERIA
0809 1177

NITROGEN
0068 0454 0454 0457 0461 0472 0481
0495 0514 0858 0860
FERTILIZERS
0017 0045 0049 0051 0056 0060 0066
0069 0072 0073 0078 0079 0080 0081
0088 0109 0118 0120 0121 0122 0124
0131 0135 0139 0144 0149 0207 0397
0399 0451 0473 0493 0496 0497 0500
0503 0507 0511 0516 0517 0518 0521
0522 0523 0533 0561 0765 0798 0799
0800 0802 0804 0897 0898 0899 0901
0911 0917 0918 0924 0928 0933 0970
0976 0995 1007 1042 1098 1182 1183
MINERAL DEFICIENCIES
0452 0452
NUTRIENT UPTAKE
0015 0017 0122 0451 0462 0862
PLANT ASSIMILATION
0015 0122 0451 0862
PROTEIN CONTENT
0488 0885 0897

NITROGEN FIXATION
0045 0141 0395 0399 0454 0454 0796
0799 0802 0804 0867 0918 0924 0969
0994 1113 1126 1182 1183 1184 1186
1189

NITROGEN-FIXING BACTERIA
1183

NODULATION
0396 0398 0509 0802 0984 0988 1100
1126 1184 1185 1186 1187 1188 1189
1190
MINERALS AND NUTRIENTS
0045 0397 0399 0472 0511 0798 0799
0800 0803 0804 0911 0918 0924 1182

NORWAY
0880

NOXIOUS ANIMALS
0001 0040 0126 0192 0193 0195 0211
0212 0216 0246 0268 0274 0275 0276
0277 0278 0279 0280 0281 0282 0283
0284 0285 0286 0287 0288 0289 0290
0292 0293 0294 0296 0297 0298 0299
0300 0301 0303 0314 0327 0333 0381
0432 0433 0434 0435 0490 0491 0505
0526 0677 0691 0695 0700 0701 0704
0705 0706 0708 0709 0710 0711 0712
0713 0714 0715 0716 0717 0718 0719
0720 0721 0722 0723 0724 0726 0765
0779 0813 0872 0895 0940 0971 0979
0980 0998 1010 1014 1063 1067 1075
1076 1077 1078 1080 1081 1082 1083
1084 1085 1086 1087 1088 1089 1090
1091 1092 1093 1094 1095 1104 1139
1211 1212 1213 1214 1215 1216 1217
1218 1219

NUCLEIC ACIDS
DNA
0310 0694 1098 1100 1105 1160
RNA
0310 0494 0853 0874 1100

NUTRIENT SOLUTION
0014 0015 0016 0020 0022 0036 0457
0460 0657 0858 0859 0860 0863 0864
0866 0867 1016

NUTRIENT TRANSPORT
0015 0016 0019 0021 0446 0456 0458
0856 0871

NUTRIENT UPTAKE
0014 0015 0016 0017 0019 0021 0022
0023 0054 0070 0122 0451 0453 0453
0455 0455 0456 0462 0519 0859 0862
0864 0865 0867 0902 0903 0913 0922
0925

NUTRITIONAL REQUIREMENTS
0001 0014 0017 0018 0040 0042 0045
0049 0050 0051 0054 0055 0056 0060
0061 0065 0066 0069 0071 0072 0073
0075 0076 0078 0079 0080 0081 0088
0104 0109 0116 0118 0120 0121 0122
0124 0131 0135 0139 0141 0144 0149
0206 0207 0300 0322 0346 0374 0397
0399 0416 0451 0459 0473 0492 0493
0496 0497 0500 0503 0504 0505 0507
0508 0511 0512 0513 0516 0517 0518
0521 0522 0523 0525 0526 0533 0548
0557 0570 0572 0578 0585 0591 0595
0608 0609 0609 0610 0633 0752 0765
0798 0799 0800 0801 0803 0804 0897
0898 0899 0900 0901 0902 0911 0913
0915 0916 0917 0918 0919 0920 0922
0924 0928 0929 0933 0937 0944 0954
0970 0976 0977 0985 0988 0995 1007
1040 1083 1098 1104 1119 1182 1183
1187

NUTRITIVE VALUE
0311 0387 0389 0390 0790 0791 0793
0794 0795 0809 0912 1112 1129 1172
1174 1175 1176 1177 1178 1221 1224

NYSIUS NATALENSIS
0526

OCEANIA
0223 0234 0252 0437 0660 0717 0718
0725 0776 0855 0871

OOTHECA
0716 1094

OPHIOMYIA
0726

OPHIOMYIA CENTROSEMATIS
1093

OPHIOMYIA PHASEOLI
0193 0246 0705 0716 1093
INSECT CONTROL
1012
BIOLOGICAL CONTROL
0301
CHEMICAL CONTROL
0276 0283 0301 0302 0717 0718 1095
PLANT INJURIES
0211 0212 0275 0998
RESISTANCE
0192 0195 0979 1012 1094 1139

OPHIOMYIA SPENCERELLA
1093 1094

ORGANOLEPTIC PROPERTIES
1209

OSCINIS PHASEOLI
0725

OSMOTIC POTENTIAL
0477 0909

OUTCROSSING
1142

OZONE
0271 1127
AIR POLLUTION
0272 0703 0843 1068 1069

PLANT INJURIES
0270 0703 0936 1068 1071 1073

PACKAGING
0820

PALATABILITY
0183

PANAMA
0493 0528 0982 0990
DISEASES AND PATHOGENS
0751
GERMPLASM
0751 0777

PATHOGENSNICITY
0639 0645 0647 0648 0654 0657 0666
0677 0683 0686 0687 0697 1022 1027
1041 1046 1049 1051

PENICILLIUM PATULUM
1039

PERU
0085 0203 0205 0906 0942 1074 1079
1115
DISEASES AND PATHOGENS
0105 0106 0253 0895 1053 1114
GERMPLASM
0105
INJURIOUS INSECTS
0279 0314 0435 1078 1081 1092 1211
MARKETING
1191
PRODUCTION
1000 1200

PEST CONTROL
0040 0079 0087 0100 0104 0150 0205
0211 0212 0213 0215 0216 0219 0221
0224 0241 0242 0244 0246 0248 0250
0252 0253 0254 0255 0261 0263 0267
0274 0276 0278 0279 0280 0283 0288
0290 0292 0293 0294 0295 0298 0300
0301 0302 0374 0428 0432 0435 0492
0504 0505 0526 0529 0548 0582 0633
0636 0646 0650 0656 0658 0662 0663
0668 0669 0672 0674 0675 0676 0680
0681 0682 0687 0694 0700 0704 0710
0711 0717 0718 0719 0720 0723 0727
0740 0761 0777 0813 0822 0895 0937
0940 0943 0985 0999 1012 1014 1015
1021 1025 1030 1034 1036 1043 1055
1056 1060 1074 1076 1079 1081 1082
1085 1087 1090 1092 1095 1104 1211
1213 1214 1218

PETIOLES
0443 0444 0483 0516 0888 0904

PH
0046 0068 0071 0457 0460 0915 1143
1155
AGRICULTURAL LIME
0522 0920 1187

PHASEOLLIN
0436 0438 0481 0486 0666 1105 1107
1111
ANALYSIS
0039

PHASEOLUS ACUTIFOLIUS
0003 0065 0254 0362 0371 0375 0376
0377 0520 0560 0645 0647 0758 0766
0774 0784 1103 1135 1158

PHASEOLUS COCCINEUS
0003 0008 0182 0184 0190 0191 0290
0304 0338 0343 0344 0347 0353 0371
0380 0383 0446 0447 0474 0647 0732
0769 0772 0783 1020 1103 1119 1128
1135 1144

PHASEOLUS LUNATUS
0254 0343 0371 0474 0476 0744 1103
1135 1217

PHENOLIC CONTENT
0894 1029 1176 1222
SEED
0884 0891

PHENOLOGY
0026 0996

PHOSPHORUS
0049 0050 0051 0056 0060 0065 0066
0068 0069 0072 0073 0078 0079 0080
0088 0118 0120 0121 0124 0131 0135
0139 0144 0149 0394 0459 0473 0493
0495 0496 0497 0500 0503 0507 0516
0521 0523 0525 0765 0858 0885 0898
0899 0900 0901 0917 0929 0970 0995
1143 1155
MINERAL DEFICIENCIES
0452 0452
NUTRIENT UPTAKE
0014 0015 0054 0070 0122 0451 0862
0913
PLANT ASSIMILATION
0014 0015 0070 0122 0451 0862 0913
TRANSLOCATION
0054

PHOTOPERIOD
0931

PHOTOSYNTHESIS
0035 0048 0442 0448 0475 0845 0846
0848 0852 0857 0935 0955 1084

PHYLLONORYCTER
0726

PHYTOALEXINS
0436 0438 0441 0481 0486 0666 0703
1039 1052 1105 1107 1111 1167

PHYTOHEMAGGLUTININS
0836 0844 0894 1107 1161 1162

PHYTOPHTHORA MEGASPERMA
1039

PLANT ANATOMY
0002 0004 0006 0007 0012 0013 0024
0028 0035 0050 0077 0269 0272 0320
0325 0353 0361 0373 0394 0431 0437
0439 0462 0469 0495 0839 0877 0878
1104 1106

PLANT ARCHITECTURE
0816 1097 1101 1152

PLANT ASSIMILATION
0010 0014 0015 0016 0017 0019 0021
0022 0023 0054 0070 0074 0077 0122
0451 0453 0453 0455 0455 0456 0460
0462 0519 0527 0541 0859 0862 0864
0865 0867 0902 0903 0913 0922 0925

PLANT BREEDING
0001 0306 0307 0311 0314 0315 0322
0325 0336 0346 0361 0368 0376 0380
0382 0419 0471 0492 0556 0557 0690
0729 0735 0740 0742 0771 0775 0776
0778 0779 0785 0787 0789 0809 0884
0912 0940 1062 1097 1104 1113 1117
1129 1132 1135 1152 1154
BACKCROSSING
0753 0774 0784 1107 1159
CROSSBREEDING
0304 0338 0359 0362 0364 0371 0375
0376 0736 0737 0745 0746 0754 0757
0758 0762 0769 0774 0783 0784 1101
1116 1122 1127 1131 1136 1137 1148
1150 1151 1158
HYBRIDIZING
0304 0305 0338 0342 0347 0353 0362
0366 0371 0375 0376 0377 0383 0647
0728 0734 0736 0758 0769 0774 0777
0783 1103 1128 1137 1144 1151
MUTATION
0485 0768 0882 1109 1142
SELECTION
0201 0324 0326 0327 0329 0334 0335
0342 0358 0359 0364 0366 0373 0374
0379 0578 0744 0745 0750 0754 0762
0764 0786 0788 1116 1126 1131 1133
1137 1145 1151 1157

PLANT DEVELOPMENT
0007 0009 0012 0018 0020 0022 0025
0026 0028 0029 0031 0032 0033 0036
0045 0048 0060 0082 0132 0149 0166
0170 0191 0266 0320 0331 0344 0351
0431 0445 0461 0462 0465 0469 0470
0474 0475 0476 0477 0499 0501 0514
0523 0657 0667 0671 0701 0721 0839
0840 0845 0857 0858 0861 0863 0866
0868 0870 0872 0875 0876 0878 0879
0881 0882 0905 0907 0911 0920 0941
0955 0963 0964 1057 1072 1135 1157
1158

PLANT FERTILITY
0304 0370 0375 0440 0753 0774

PLANT GROWTH SUBSTANCES
0007 0013 0025 0027 0031 0270 0467
0474 0482 0840 0850 0851 0855 0868
0871 0873 0875 0876 0877 0878 0887
0887 1085

PLANT HABIT
0006 0008 0017 0020 0029 0062 0064
0098 0125 0127 0131 0132 0140 0149
0162 0165 0166 0167 0168 0172 0174
0176 0177 0178 0180 0184 0186 0190
0194 0196 0199 0205 0206 0210 0317
0318 0323 0343 0344 0345 0348 0361
0366 0538 0540 0546 0594 0617 0625
0629 0731 0736 0743 0765 0767 0839
0868 0869 0885 0931 0932 0959 0963
1006 1102 1142 1157

PLANT INJURIES
0145 0211 0212 0231 0270 0275 0284
0294 0301 0692 0712 0713 0715 0724
0726 0779 0936 0971 0998 1014 1070
1071 1084 1087 1213
AIR POLLUTION
0269 0703 1068 1072
HARVESTING
0100
WATER STRESS
1073

PLANT NUTRITION
0023 0061 0460 0657 0860 0903

PLANT PHYSIOLOGICAL DISORDERS
0271 0272 0273 0854 1069 1070 1072
1084 1109

PLANT PHYSIOLOGICAL PROCESSES
0038 0443 0450 0495 0509 0850 0879
ABSCISSION
0036 0444 0473 0847 0853 0905 0907
0908 1158
NUTRIENT TRANSPORT
0015 0016 0019 0021 0446 0456 0458
0858 0871
PHOTOSYNTHESIS
0035 0048 0442 0448 0475 0845 0846
0848 0852 0857 0935 0955 1084
PLANT ASSIMILATION
0010 0014 0015 0017 0023 0054 0070
0074 0077 0122 0451 0453 0453 0455
0456 0460 0462 0519 0527 0541 0859
0864 0867 0902 0913 0925
PLANT RESPIRATION
0857

PLANT PIGMENTS
0035 0848 0853 0863 1068

PLANT REPRODUCTION
0338 0370 0375 0378 0447 0728 0734
1142

PLANT RESPIRATION
0857 0935

PLANT TISSUES
0474

PLANT TOXINS
0686

PLANT VASCULAR SYSTEM
0077 0437

PLANTING
0026 0041 0042 0087 0101 0103 0104
0105 0110 0120 0123 0150 0203 0205
0332 0340 0505 0526 0545 0547 0548
0559 0561 0566 0571 0616 0765 0836
0937 0941 0949 0954 0965 0971 0986
0990 0998 1013 1129
AGRICULTURAL EQUIPMENT
0148
SPACING
0030 0040 0043 0051 0075 0080 0084
0088 0095 0100 0102 0106 0109 0111
0113 0116 0118 0121 0124 0127 0130
0131 0135 0139 0143 0144 0152 0155
0179 0204 0206 0221 0320 0325 0361
0374 0501 0502 0506 0514 0532 0533
0535 0539 0551 0552 0557 0562 0565
0568 0569 0573 0574 0579 0580 0583
0586 0589 0590 0593 0596 0601 0602
0603 0604 0609 0633 0752 0755 0786
0813 0938 0940 0945 0952 0958 0966
0972 0978 0979 0980 0985 0988 0992
0994 0995 0997 1098 1119

PLUSIA ORICHALCEA
0526

PODDING
0030 0052 0062 0102 0471 0473 0870

PODS
0007 0022 0028 0036 0057 0325 0888
0904 0908 1106 1128
DISEASES AND PATHOGENS
0648
INJURIOUS INSECTS
0713

POLLEN
0008 0440 0896 0932

POLLINATION
0338 0370 0375 0373 0447 0728 0734
0766 1142

POLYPHAGOTARSONEMUS LATUS
INSECT CONTROL
1089

PORTUGAL
0728

POTASSIUM
0049 0060 0066 0068 0069 0072 0073
0078 0079 0120 0124 0131 0495 0497
0500 0503 0507 0516 0521 0858 0885
0898 0901 0970
MINERAL DEFICIENCIES
0020 0452 0452
NUTRIENT UPTAKE
0015 0122 0451 0453 0862
PLANT ASSIMILATION
0015 0122 0451 0453 0453 0862

PRATYLENCHUS PENETRANS
1025 1065

PREDATORS AND PARASITES
0136 0297 0301 0709 0711 0712 0722
0971 1074 1093 1216

PRICES
0400 0401 0405 0406 0408 0410 0411
0421 0422 0805 0817 0818 0819 1193
1196 1197

PROCESSING
0094 0108 0393 0426 0492 0824 0826
0827 0828 0830 0832 0833 0834 0835
0836 0837 0912 1010 1129 1220 1221

1222 1223 1225 1226 1227 1228

PRODUCTION
0041 0141 0402 0403 0404 0407 0411
0413 0414 0420 0422 0490 0491 0492
0505 0526 0532 0548 0557 0565 0597
0733 0775 0805 0811 0813 0814 0815
0817 0818 0819 0895 0940 0956 0987
1000 1083 1114 1191 1194 1200 1204

PROLINE
0908

PROPAGATION
0176 0758

PROTEIN CONTENT
0033 0037 0166 0236 0311 0369 0392
0398 0488 0745 0829 0863 0885 0892
0897 0920 0946 1168 1180
SEED
0039 0435 0768 0884 1109 1178 1220

PROTEINS
0005 0129 0305 0387 0436 0438 0480
0482 0486 0730 0783 0790 0829 0844
0853 0874 0886 1107 1111 1163 1166
AMINO ACIDS
0039 0311 0388 0392 1169
ANALYSIS
0039 0449 0883 1224
DIGESTIBILITY
0388 0893 0894 1169 1175 1179

PSEUDOMONAS PHASEOLICOLA
0145 0161 0223 0644 1022 1023
DISEASE CONTROL
0504 0636 0638 0642 0646 0740
CHEMICAL CONTROL
0100 0219 1021
DISEASE TRANSMISSION
0227 0646
EPIDEMIOLOGY
0100
ETIOLOGY
0638 1021
INOCULATION
0220 1017 1037
RESISTANCE
0218 0226 0324 0354 0363 0504 0578
0646 0738 0739 0752 0769 0775 0786
1020 1021 1024 1123 1144 1149
SYMPTOMATOLOGY
0100 0636 0638 0642 0643 0646 1021

PSEUDOMONAS PUTIDA
1016

PSEUDOMONAS SYRINGAE
DISEASE CONTROL
CHEMICAL CONTROL
0100 0219
DISEASE TRANSMISSION
0215
EPIDEMIOLOGY
0100 0215 0640 0641
RESISTANCE
0218 0313 0335 0336
SYMPTOMATOLOGY
0100 0643

PUERTO RICO
0507 0912 0947 1227
DISEASES AND PATHOGENS
0647 0648 0699 0742 0756 1121
GERMPLASM
0648 0742 0756 0777 0783 0808 0884
1121
INJURIOUS INSECTS
1082

PYTHIUM
0678 1036

PYTHIUM ULTIMUM
0684
DISEASE CONTROL
CHEMICAL CONTROL
1025
RESISTANCE
0326 0749
SYMPTOMATOLOGY
1025

RACES
0218 0226 0234 0238 0239 0240 0320
0639 0647 0661 0666 0683 0687 0694
0773 0781 1017 1023 1027 1044 1049
1062 1063 1122 1124

RAINFALL
0662 0959 0968 0970

RAINFALL DATA
0494

RAMULARIA PHASEOLI
0211 0212 1030

RELATIVE HUMIDITY
0494 0502 0846 0892 0935 1045 1209
1226

RELAY CROPS
0549 0570 0575 0587 0588 0595 0605
0606 0608 0672 0973 0985

RESEARCH
0059 0208 0228 0247 0402 0954 1205
1207 1208

REUNION
0512 0622

RHIZOBIUM
0141 0207 0509 0517 0918 0984 1007
1100 1186 1190
INOCULATION
0043 0081 0206 0395 0396 0397 0399
0511 0797 0798 0799 0800 0801 0803
1183 1187
ISOLATION
1185
STRAINS
0397 0398 0516 0796 0797 1182 1184
1185 1187 1188 1189

RHIZOBIUM LEGUMINOSARUM
NODULATION
1189 1190
STRAINS
1189

RHIZOBIUM MELILOTI
1190

RHIZOBIUM PHASEOLI
0207
INOCULATION
0081 0395 0396 0399 0511 0797 0800
0801 0803 0911 1183 1187
ISOLATION
1185
NODULATION
0399 0509 0511 0800 0803 0911 0918
0984 1100 1182 1184 1188 1189
STRAINS
0796 0797 1182 1184 1185 1187 1188
1189

RHIZOCTONIA SOLANI
0247 0678 0684 1040
DISEASE CONTROL
0213 0248 0636 0680
CHEMICAL CONTROL
0215 0244 0246 0255 0529 0672 0682
0687 1025 1034 1036
INTEGRATED CONTROL
0682
DISEASE TRANSMISSION
0215 0248
EPIDEMIOLOGY
0213 0215 0248
ETIOLOGY
0213 0248 1036 1051
INOCULATION
1037

RESISTANCE
0201 0217 0233 0251 0255 0334 0352
0372 0613 0672 0679 0683 1036 1121
1150
SYMPTOMATOLOGY
0213 0246 0248 0636 0680 1025 1036

RHIZOSPHERE
1181

RNA
0310 0489 0853 0874 1100

ROASTING
1178

ROOTING
0027 0050 0077 0270 0563 0941

ROOTS
0002 0016 0017 0019 0021 0022 0024
0045 0050 0233 0270 0373 0394 0439
0446 0456 0458 0469 0483 0489 0839
0858 0859 0865 0878 0888 0890 0904
1181

ROTATIONAL CROPS
0137 0138 0547 0912 0991
ZEA MAYS
0163 0962 0981 0987 0990

RWANDA
0058 0059 0098 0138 0340 0347 0398
0408 0535 0546 0551 0625 0768 0798
0983 1005
DISEASES AND PATHOGENS
0241 0246
GERMPLASM
0163 0167 0174 0175 0176 0177 0178
0179 0180 0181 0182 0194 0206 0339
0341 0617

SACCHARUM
0961

SACCHARUM OFFICINARUM
0572 0575 0585 0592 0977 0981 0989
0992 0996

SALINITY
0014 0890
GROWTH
0475
PLANT DEVELOPMENT
0475
TEMPERATURE
0502

SAUDI ARABIA
1026

SCAPHYTOPIUS FULIGINOSUS
0971

SCLEROTIUM ROLFSII
1041 1042
DISEASE CONTROL
0213 0636 0638
CHEMICAL CONTROL
0215
DISEASE TRANSMISSION
0215
EPIDEMIOLOGY
0213 0215
ETIOLOGY
0213 0638
INOCULATION
1037
RESISTANCE
0217 0363 0578
SYMPTOMATOLOGY
0213 0636 0638

SCUTIGERELLA IMMACULATA
0727 1084

SEED
0005 0034 0108 0384 0385 0386 0436
0480 0486 0612 0731 0747 0826 0830
0888 0891 0893 1096
AMINO ACIDS
0039 0478 0481
DISEASES AND PATHOGENS
0230 0231 0327 0345 0491 0760 0776
1102 1121 1122
GENETICS
0305 0310 0736 0767 0771 0874 1108
GERMINATION
0024 0426 0427 0430 0463 0466 0532
0820 0824 0833 0854 0874 0882 1108
1212
INJURIOUS INSECTS
0327 0491 0713 0940 1212
MARKETING
0491
PRODUCTION
0491 0532 0940
PROTEIN CONTENT
0039 0485 0768 0884 1109 1178 1220
STORAGE
0425 0427 0429 0430 0820 0821 0836
1178 1209 1210 1212
YIELDS
0024 0160 0188 0331 0345 0472 0545
0635 0767 0768 0831 0884 1010 1108
1130 1224

SEED CHARACTERS
0160 0327 0328 0331 0345 0385 0426
0463 0491 0532 0545 0736 0747 0760
0767 0771 0821 0826 0831 0833 0836
0854 1010 1096 1121 1130 1209
SEED COLOR
0034 0188 0384 0386 0388 0425 0506
0612 0635 0731 0738 0768 0776 0830
1007 1102 1112 1115 1122 1224

SEED COAT
0894 1219 1220 1226
INHERITANCE
1112

SEED COLOR
0034 0188 0384 0386 0388 0425 0480
0506 0612 0635 0731 0738 0768 0776
0830 0891 1007 1102 1112 1115 1122
1224

SEED PRODUCTION
0100 0156 0412 0491 0547 0611 0668
0787 0999

SEED TREATMENT
0087 0472 1095

SEED VIGOR
0463 0824 0854 1212

SEEDS
0002 0007 0028 0431 0732 0839 0876
0877 0894 0904 1112 1128 1219 1220
1226

SELECTION
0096 0097 0140 0157 0158 0162 0169
0170 0171 0177 0178 0179 0184 0186
0187 0189 0192 0198 0199 0200 0202
0206 0214 0217 0225 0312 0320 0323
0332 0337 0346 0349 0350 0352 0354
0355 0356 0357 0363 0365 0367 0369
0372 0385 0498 0499 0520 0527 0594
0605 0611 0612 0613 0617 0622 0631
0632 0634 0646 0679 0738 0741 0747
0749 0751 0756 0761 0763 0780 0781
0782 0813 0915 1001 1002 1009 1010
1021 1049 1075 1114 1123 1130 1138
1149 1155 1156
PLANT BREEDING
0201 0324 0326 0327 0329 0334 0335
0342 0358 0359 0364 0366 0373 0374
0379 0578 0744 0745 0750 0754 0762
0764 0786 0788 1116 1126 1131 1133
1137 1145 1151 1157

SENEGAL
0809

SEROLOGY
0647 0697 1059 1064

SHADING
0495 0904 0905

SHOOTS
0474 0476 1065

SLUGS
1090

SNAP BEANS
0018 0024 0026 0036 0042 0048 0076
0078 0092 0093 0099 0109 0110 0113
0160 0161 0229 0239 0243 0259 0280
0307 0316 0321 0368 0369 0381 0406
0425 0445 0451 0467 0470 0472 0489
0506 0516 0526 0555 0626 0627 0640
0641 0658 0662 0683 0701 0702 0715
0718 0727 0730 0747 0759 0763 0780
0781 0782 0802 0834 0835 0836 0837
0885 0892 0920 0922 0943 1007 1017
1025 1026 1031 1035 1038 1051 1054
1057 1071 1105 1108 1117 1130 1144
1150 1223 1225

SOCIOECONOMIC ASPECTS
0806 0809 0812 0816 0894 0979 1191
1195 1199 1201 1202 1203 1206

SODIUM
0858 0866

SOIL AMENDMENTS
0068 0915

SOIL COMPACTION
0912 0925 0926 0941 1097 1098 1129

SOIL FERTILITY
0023 0069 0071 0452 0452 0492 0507
0511 0556 0678 0902 0912 0928 0991

SOIL MOISTURE
0010 0067 0073 0501 0662 0671 0684
0909 0923

SOIL PHYSICAL PROPERTIES
0074

SOIL REQUIREMENTS
0023 0040 0043 0065 0068 0071 0074
0076 0080 0452 0452 0492 0504 0507
0511 0526 0556 0670 0671 0678 0912
0915 0928

SOIL TEMPERATURE
0033 0670 0671

SOILS
0023 0025 0050 0053 0078 0289 0296
1181

SOLANUM TUBEROSUM
0568 0570 0573 0575 0595 0608

SOLAR DRYING
0426

SOLAR RADIATION
0026 0494 0905

SOLUBLE CARBOHYDRATES
0437 0890

SORGHUM
0956 0973

SORGHUM VULGARE
0154 0163

SOUTH AFRICA
0041 0102 0526 0541 0646 0675 0688
1017 1143

SPACING
0030 0040 0043 0075 0100 0102 0109
0113 0116 0121 0131 0135 0152 0155
0320 0374 0416 0447 0502 0506 0514
0532 0533 0568 0596 0755 0936 0938
0940 0957 0985 0988 1119
YIELDS
0051 0080 0084 0088 0095 0106 0111
0118 0124 0127 0130 0139 0143 0144
0165 0179 0204 0206 0221 0325 0361
0501 0535 0539 0551 0552 0557 0562
0565 0569 0573 0574 0579 0580 0583
0586 0589 0590 0593 0601 0602 0603
0604 0609 0633 0752 0786 0813 0945
0952 0958 0959 0966 0972 0977 0978
0979 0980 0992 0994 0995 0997 1098

SPAIN
0858 0863 0911

SPODOPTERA
1090

SPODOPTERA FRUGIPERDA
0297
PLANT INJURIES
0712

SRI LANKA
0514

STAMENS
0440 0932 1159

STARCH CONTENT
0392 0482 0483 0856 0890 1171
PODS
0904
SEED
0893 1220

STATISTICAL ANALYSIS
0099 0134 0412 0421 0424 0785 1120
1130 1192

STATISTICAL DATA
0405 0406 0407

STEMS
0002 0437 0483 0743 0839 0842 0888
0904
GROWTH
0012 0022 0840
MINERALS AND NUTRIENTS
0022 0456 0497 0864
NUTRIENT UPTAKE
0456

STERILITY
0753

STOMATA
0013 0270 0442 0450 0475 0509 0846
0848 0849 0853 0881 0908 1071 1072
1073 1127

STORAGE
0411 0425 0427 0428 0429 0430 0431
0492 0793 0812 0820 0821 0827 0836
1112 1178 1221 1222 1223
DISEASES AND PATHOGENS
0042 0504
INJURIOUS INSECTS
1212 1213
TEMPERATURE
1209 1210

STORED GRAIN PESTS
0291 0428 0432 0435 0822 0823 1081
1211 1213 1214 1216 1217 1218

SUCROSE
0437 0890

SUDAN
0259

SUGAR CONTENT
0277 0483 0484 0888

SULFUR
0452 0452 0752 0793 0911

SUNN-HEMP MOSAIC VIRUS
1057

SUPPORT
0538 0546 0607 1005

SYMBIOSIS
0517
NODULATION
0396 0398 0509 0802 0984 0988 1100
1126 1164 1185 1186 1187 1188
MINERALS AND NUTRIENTS
0472 0511 0798 0799 0804 0911 0918

TANNIN CONTENT
0829 0884 1029 1112 1129 1176 1222

TANZANIA
0527 0803 0809 0862 0880 0908 0914
0927 0945 0949 0951 0974 0978 0994
1164 1195 1198 1199 1201 1202 1203
DISEASES AND PATHOGENS
0239 0547 0638 0661 0681 0740 0979
1004 1006 1011 1059 1118 1123 1134
1136 1138 1140 1141 1149
INJURIOUS INSECTS
0288 0710 0716 0980 1139
MARKETING
1197
PRODUCTION
0548

TAXONOMY
0001 0002

TECHNOLOGICAL PACKAGE
0416 0985 1007

TECHNOLOGY
0059 0116 0159 0164 01[illegible] 0167 0168
0173 0174 0175 0178 0179 0182 0183
0184 0185 0186 0187 0189 0190 0191
0192 0193 0195 0203 0210 0274 0339
0340 0364 0415 0416 0505 0633 0792
0793 0796 0797 0807 0808 0816 0985
1007 1191 1198 1204

TECHNOLOGY EVALUATION
0116 0159 0164 0165 0167 0168 0173
0174 0175 0178 0179 0182 0183 0184
0185 0186 0187 0189 0190 0191 0192
0193 0195 0203 0210 0274 0339 0340
0364 0415 0416 0985 119[illegible]

TEMPERATURE
0062 0071 0377 0419 0457 0494 0498
0502 0670 0684 0714 0733 0753 0762
0838 0869 0892 0931 1045 1069 1209
1210

GROWTH
0026 0033 0465 0468 0474 0671 0857
1135
PHOTOSYNTHESIS
0857
PLANT RESPIRATION
0857
YIELDS
0110 0468 0857 1135

TETRANYCHUS
0723 0726 1087

TETRANYCHUS TELARIUS
0526 1080 1089

TETRANYCHUS URTICAE
0709

THIELAVIOPSIS BASICOLA
DISEASE CONTROL
0264
CHEMICAL CONTROL
1025
RESISTANCE
0264
SYMPTOMATOLOGY
1025

THINNING
0539

THRESHING
0492 0531 0827 0938 0951

THYSANOPTERA
0278 0526 0716 1014

TIMING
0026 0041 0043 0054 0087 0100 0101
0103 0105 0109 0123 0131 0165 0203
0205 0206 0325 0332 0340 0384 0385
0430 0431 0526 0531 0545 0547 0548
0559 0561 0565 0566 0616 0755 0765
0793 0794 0821 0824 0836 0864 0937
0938 0949 0965 0966 0971 0979 0986
0990 0992 0998 1013 1119 1129 1164
1210 1223

TISSUE CULTURE
0032 0474 0475

TOBACCO MOSAIC VIRUS
0260

TOXICITY
0273 0863
HERBICIDES
0083 0085 0090 0092 0117 0119 0534
0543 0544
MINERALS AND NUTRIENTS
0018 0 55 0452 1147 1155

TOXINS
0644 1038 1052 1163

TRADE
0418 0421 0490 0491 0811 0812 0815
1194

TRANSFER OF TECHNOLOGY
0505 0633 0793 0796 0797 0807 0808
0816 1191 1198 1204

TRANSLOCATION
0019 0021 0054 0458 0856 0880

TRANSPIRATION
0010 0442 0443 0450 0495 0509 0846
0848 0853 0879 0935

TRICHODERMA HARZIANUM
0682

TRICHOPLUSIA NI
1089

TRICHOTHECIUM ROSEUM
0685

UGANDA
0291 0822
DISEASES AND PATHOGENS
0661 0668 1043 1059
PRODUCTION
0557
SEED PRODUCTION
0668

UNITED KINGDOM
0028 0324 0371 0449 0479 0644 0709
0769 0790 0825 0832 0840 0849 0875
0892 1020 1035 1057 1064 1100 1144
1163 1166 1190

UREA
0570

UROMYCES PHASEOLI
0145 0161 0547 0659 0661 0664 0665
0667 0760 1027 1033 1041 1047 1048
DISEASE CONTROL
0211 0212 0213 0248 0526 0636 0638
0642 0658 0740 0761
CHEMICAL CONTROL
0215 0241 0246 0253 0650 0656 0668
0669 0675 1036
DISEASE TRANSMISSION
0215 0248

EPIDEMIOLOGY
0213 0215 0248 0673
ETIOLOGY
0213 0237 0248 0638 0655 1036
INOCULATION
0651 1037
RESISTANCE
0105 0168 0217 0234 0236 0238 0239
0243 0253 0321 0327 0345 0354 0356
0366 0367 0594 0613 0626 0632 0637
0651 0653 0742 0751 0752 0764 0770
0775 0781 0782 0979 1004 1006 1029
1032 1036 1044 1049 1102 1121 1124
1125 1134 1136 1138 1141 1145
SYMPTOMATOLOGY
0213 0248 0248 0526 0636 0638 0642
0643 1036

USA
0009 0012 0013 0010 0025 0026 0038
0039 0048 0052 0053 0062 0077 0087
0090 0093 0267 0270 0271 0272 0273
0305 0306 0310 0311 0338 0353 0362
0373 0375 0376 0377 0351 0356 0391
0392 0393 0425 0439 0441 0443 0444
0445 0446 0447 0451 0458 0459 0462
0469 0470 0475 0477 0480 0481 0483
0484 0486 0506 0513 0516 0520 0542
0563 0564 0700 0702 0703 0732 0747
0753 0758 0762 0766 0774 0784 0794
0829 0830 0835 0837 0843 0850 0853
0856 0862 0864 0868 0873 0878 0888
0893 0894 0896 0899 0900 0904 0909
0910 0925 0932 0933 0936 0939 0941
0944 0962 0964 1045 1066 1071 1072
1073 1077 1101 1105 1106 1107 1111
1112 1113 1117 1118 1120 1121 1135
1142 1153 1161 1167 1170 1172 1173
1176 1178 1184 1188 1189 1209 1220
1222 1224 1225 1226
DISEASES AND PATHOGENS
0218 0225 0229 0234 0237 0245 0251
0260 0262 0280 0313 0316 0315 0326
0330 0334 0335 0337 0337 0358 0365
0419 0504 0639 0640 0641 0643 0645
0649 0650 0653 0655 0657 0659 0662
0666 0669 0670 0671 0683 0687 0695
0697 0717 0741 0744 0745 0749 0760
0778 0780 0781 0782 0943 1016 1019
1022 1023 1025 1027 1044 1046 1047
1048 1049 1051 1061 1058 1061 1063
1065 1122 1124 1125 1147 1150
DERMILAOM
0160 0234 0356 0380 0645 0683 0748
0884 0926 1095 1108 1112 1126 1132
1133 1147
INJURIOUS INSECTS
0100 0284 0287 0289 0297 0298 0299
0577 0715 1084 1085
INJURIOUS MITES
1080
MARKETING
0410
PRODUCTION
0402 0733
SEED PRODUCTION
0100

USES
0829

VAGINULUS PLEBEIUS
1090

VARIETAL MIXTURES
0770 0980 1008 1134

VECTORS
0691 0698 1053 1055 1056 1059

VEGETABLE CROPS
0136

VENEZUELA
0084 1192
DISEASES AND PATHOGENS
0693 0937 1030
INJURIOUS INSECTS
0303
PRODUCTION
0422

VERONICELLA MORELETI
0704

VICIA FABA
0306 0596 0597

VIRUSES
0001 0100 0106 0159 0161 0168 0201
0213 0215 0248 0256 0257 0258 0259
0260 0261 0262 0263 0264 0265 0308
0315 0316 0317 0318 0319 0320 0324
0327 0351 0368 0482 0504 0626 0636
0638 0642 0651 0689 0690 0691 0692
0693 0694 0695 0696 0697 0698 0699
0736 0739 0740 0745 0754 0760 0775
0778 0780 0788 0979 1004 1006 1011
1014 1053 1054 1055 1056 1057 1058
1059 1060 1061 1062 1063 1064 1102
1110 1114 1118 1121 1125 1136 1138
1146 1149 1153

VITAMIN CONTENT
0895

WATER ABSORPTION
0010 0074 0077 0527 0925 1220

WATER CONTENT
0427 0430 0527 0520 0821 0824 0826
0830 1176 1210 1220 1224

WATER REQUIREMENTS
0010 0044 0091 0116 0443 0450 0506
0515 0524 0657 0879 0906 0909 0934

WATER STRESS
0001 0013 0048 0052 0057 0062 0077
0498 0499 0520 0684 0797 0853 0907
0908 0910 0912 0927 0929 1073

WEEDING
0083 0085 0086 0087 0089 0090 0092
0100 0104 0107 0113 0117 0119 0120
0142 0148 0150 0221 0280 0322 0346
0492 0496 0504 0505 0528 0529 0534
0536 0542 0543 0544 0548 0549 0550
0553 0554 0556 0558 0581 0591 0755
0765 0873 0890 0937 0939 0940 0942
0946 0948 0950 0953 0976 0989 1098

WEEDS
0107 0122 0374 0593 0813 0905
HERBICIDES
0085 0089 0542 0553 0942 0946 0950

WHETZELINIA SCLEROTIORUM
0652 1041
DISEASE CONTROL
0248 0250 0638 0662 0680 0727 0813
CHEMICAL CONTROL
0254
DISEASE TRANSMISSION
0248
EPIDEMIOLOGY
0243 0248
ETIOLOGY
0248 0250 0638 0688
RESISTANCE
0330 0649 0686 0741 0746 0748 0763
0813
SYMPTOMATOLOGY
0243 0248 0250 0638 0680

XANTHOMONAS PHASEOLI
0145 0151 0222 0648 1019 1041
DISEASE CONTROL
0211 0212 0213 0504 0636 0638 0680
CHEMICAL CONTROL
0100 0215 0221 0224 1021
DISEASE TRANSMISSION
0215 0227
EPIDEMIOLOGY
0100 0213 0215 0351
ETIOLOGY
0213 0638 1021
INOCULATION
0639 0647 1037
RESISTANCE
0207 0217 0225 0327 0351 0354 0359
0360 0504 0613 0632 0637 0645 0647
0742 0752 0756 0764 0772 0775 0776
1021 1102 1147
SYMPTOMATOLOGY
0100 0213 0636 0638 0680 1021

XANTHOMONAS PHASEOLI VAR. FUSCANS
0648 0648
DISEASE CONTROL
0504 0636
DISEASE TRANSMISSION
0227
RESISTANCE
0504 1147
SYMPTOMATOLOGY
0636

YIELD COMPONENTS
0004 0006 0024 0030 0031 0045 0048
0053 0054 0064 0082 0084 0102 0103
0111 0133 0145 0149 0165 0166 0168
0169 0170 0171 0172 0209 0210 0253
0256 0290 0300 0307 0366 0369 0394
0468 0473 0495 0501 0502 0524 0525
0538 0539 0540 0552 0588 0593 0601
0628 0696 0721 0745 0752 0757 0759
0764 0767 0789 0800 0831 0847 0857
0863 0897 0904 0914 0920 0923 0929
0930 0932 0949 0955 0963 0975 0976
0978 0996 1009 1109 1110 1130 1134
1156

ZABROTES SUBFASCIATUS
0433 1217
INSECT CONTROL
0278 0723 1213
CHEMICAL CONTROL
0435 1211 1218
PLANT INJURIES
1213
RESISTANCE
1215

ZAIRE
0188
DISEASES AND PATHOGENS
0344 0761
GERMPLASM
0183 0184 0185 0186 0187 0189 0190
0191 0192 0193 0195 0342 0343 0344

ZAMBIA
DISEASES AND PATHOGENS
1012 1013
GERMPLASM
1012 1013
INJURIOUS INSECTS
0998 1093 1094 1095

ZEA MAYS
0549 0570 0595 0608 0817 0962 0985
0990
INTERCROPPING
0121 0123 0124 0125 0126 0127 0129
0131 0132 0133 0134 0135 0136 0139
0140 0142 0143 0144 0145 0147 0148
0150 0152 0153 0154 0155 0162 0163
0196 0199 0290 0300 0322 0348 0364
0416 0567 0569 0571 0574 0575 0577
0578 0579 0580 0581 0582 0584 0586
0587 0588 0589 0590 0591 0593 0594
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0604 0605 0606 0607 0609 0610 0673
0737 0752 0789 0940 0955 0956 0959
0960 0963 0964 0965 0967 0968 0969
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0977 0978 0980 0981 0983 0984 0986
0987 0988 0993 0994 0995 0998 1005
1012 1119 1158

ZINC
0060 0451 0452 0452 0456 0459 0513
0864 0899

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