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ABSTRACTS ON FIELD BEANS

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To our readers:

As of this issue, the address of the first author of documents dated from 1981 on will be included, when available, immediately after the bibliographic citation, inside brackets.

These addresses are given as reported by the authors and will hopefully promote the exchange of information among colleagues within each of the research networks for beans, cassava, and tropical pastures.

Abstracts on Field Beans

(*Phaseolus vulgaris* L.)

Vol. IX No. 1 April, 1984

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INTRODUCTION

This journal of analytical abstracts, which replaces the former combination of abstract cards and yearly cumulative volumes, 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 report condensed information from journal articles, booklets, mimeographed reports, theses, manuals and other conventional and nonconventional material, categorized into broad disciplinary fields to facilitate rapid scanning. Additionally, abstracts are author and subject indexed to enable more comprehensive consultation.

When retrospective or exhaustive coverage of a topic is desired, mechanized bibliographic searches of the entire document collection can be provided by CIAT's Documentation Center. Abstracts of all articles that match the topic of interest are provided to users who request this search service. The full text of every article abstracted by the Documentation Center is also available, through the photocopy service.

CIAT's Documentation Center also publishes journals of analytical abstracts on cassava (*Manihot esculenta* Crantz) grown under tropical conditions, and on tropical pastures. Other CIAT publications dedicated to keeping users aware of research developments in their respective fields include: Pages of Contents, Cassava Newsletter, Pastos Tropicales - Boletín Informativo, and Hojas de Fríjol.

COMPONENTS OF AN ABSTRACT

Sequential number in the journal (for use of indices)

Authors

Year of publication

Accession number (for photocopy requests)

[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. (Author's summary) F01

Abstract

Abstractor and/or translator

Subject categories

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.

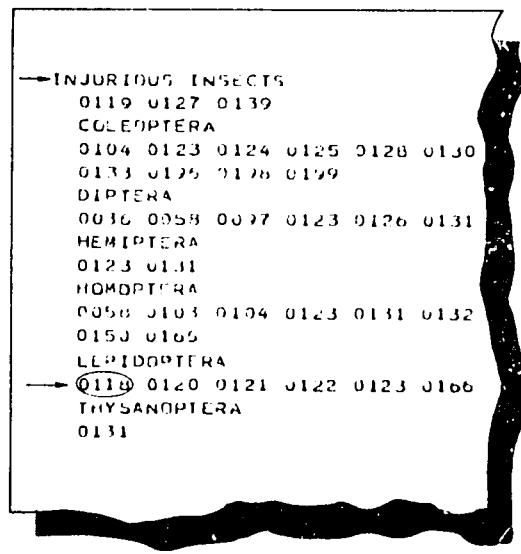
The last issue of the year contains cumulative author and subject indexes for the year.

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

See 0153

B00 PLANT ANATOMY, MORPHOLOGY AND CYTOLOGY

0001

14247 BACKES, A.; GOMES, M.F.; FERRI, M.G. 1971. Efeito de substancias de crescimento nos movimentos das articulacoes das folhas de Phaseolus vulgaris L. (Effect of growth substances on the movements of Phaseolus vulgaris leaf articulations). Ciencia e Cultura 23(3):383-388. Port., Sum. Port., Engl., 15 Refs.

Phaseolus vulgaris. Indoleacetic acid. Gibberellins. Leaves. Petioles. Hypocotyls. Epicotyl.

The effect of different concn. of IAA, GA_3, and (2-chloroethyl)trimethyl ammonium chloride (CCC) on the opening and angle between the petioles of primary leaves of bean was studied using parts of the upper hypocotyls, epicotyls, and petioles of leaves of bean var. Roxinho. These were placed in Petri dishes containing 20 ml of solutions of 10, 100, and 1000 ppm IAA, 100 and 1000 ppm GA_3, and 1000 and 10,000 ppm CCC. Substances were also used combined in pairs. Results indicate that the optimum concn. of IAA is 100 ppm; GA_3 does not incide on the movement of articulations and CCC seems to affect the process of cell elongation. Results with the different combinations of IAA with GA_3 and CCC indicate that IAA does not interact with the 2 substances. Exogenous GA_3 and CCC do not affect the level of endogenous IAA. (Summary by EDITEC. Trans. by L.M.F.) B00

0002

20090 RODRIGUEZ, M.; RODRIGUEZ, F.; SUAREZ, A. 1982. Características morfológicas y composición química de las semillas de distintas variedades de judías (Phaseolus vulgaris, L) cultivadas en la Provincia de León. (Morphological characteristics and chemical composition of dry bean seeds grown in the province of Leon, Spain). Anales de la Facultad de Veterinaria de León 28:131-146. Span., Sum. Span., Engl., 40 Refs., Illus. [Estación Agrícola Experimental. (C.S.I.C.), Grulleros, León, España]

Pnaseolus vulgaris. Seed. Seed characters. Seed color. Water content. Protein content. Ash content. Carbohydrate content. Mineral content. Ca. P. K. Na. Fe. Cu. Mn. Zn. Cultivars. Spain.

Morphological characteristics (color, drawings, form, and size), chemical composition (moisture, CP, ether extract, ash, and carbohydrates), and mineral content (Ca, P, K, Na, Fe, Cu, Mn, and Zn) of seeds of 26 bean var. grown in the province of León, Spain, were studied. White and colored var. were compared regarding their chemical composition and mineral content. (Author's summary) B00

See also 0053 0090 0162

0003

19731 BOISSYA, C.L. 1971. Stimulation of transpiration rate in Phaseolus vulgaris L. leaves by kinetin and gibberellic acid. Journal of the Assam Science Society 14(2):136-144. Engl., Sum. Engl., 26 Refs., Illus.

Phaseolus vulgaris. Transpiration. Stomata. Cytokinins. Gibberellins. Indoleacetic acid.

The possible effect of applied kinetin and GA on transpiration rate and extent of stomatal opening in detached leaves of Phaseolus vulgaris var. Prince was studied. The transpiration rate was increased by treating leaves with kinetin and GA, was not affected by IAA, and was inhibited by actinomycin and water. (Summary by Field Crop Abstract) C00

0004

19488 DOUST, J.L.; EATON, G.W. 1982. Demographic aspects of flower and fruit production in bean plants, Phaseolus vulgaris L. American Journal of Botany 69(7):1156-1164. Engl., Sum. Engl., 24 Refs., Illus. [Dept. of Biology, Amherst College, Amherst, MA 01002, USA]

Phaseolus vulgaris. Flowers. Pods. Yield components. Maturation. Seed vigor. Ovules. Statistical analysis. Plant reproduction.

The relative contributions to total pod yield of cohorts of flowers of known age were assessed. Bean plant growth was monitored, and births of individual flowers were recorded and their fates followed. For every cohort of flowers an array of yield measures was calculated, including the mean and total cohort dry wt. of fruits and the no. of viable and aborted seeds and completely undeveloped ovules. When mature, pods were removed from half of the plants. The proportion of ovules giving rise to viable seeds and to aborted seeds and undeveloped ovules was the same in plants of both groups. Approx. 50% of ovules of marketable pods, in all plants, yielded viable seeds. The 12 cohorts of flowers contributed markedly different amounts to plant yield. Early and later cohorts contributed much less than did middle cohorts in terms of marketabl. pod dry wt. and no. of fully developed seeds, aborted seeds, and undeveloped ovules. Peak productivity was obtained from the middle phase of flowering in these annual bean plants. The lower pod yield of later cohorts is interpreted as a result of competition for limited resources between maturing pods and new flowers. Possible causes for the various fates of flowers and ovules are considered and the role of flowers as plant modules suitable for demographic examination is discussed. (Author's summary) C00

0005

18777 FARQUHAR, G.D.; FIRTH, P.M.; WETSELAAR, R.; WEIR, B. 1980. On the gaseous exchange of ammonia between leaves and the environment: determination of the ammonia compensation point. Plant Physiology 66(4):710-714. Engl., Sum. Engl., 30 Refs., Illus.

Phaseolus vulgaris. Shoots. Air pollution. Leaves. Plant assimilation. Temperature.

Whole shoots of Phaseolus vulgaris cv. Hawkesbury Wonder, maize, and other species were exposed to a range of partial pressures of gaseous ammonia in

air and the resulting fluxes were measured. Net uptake was linear with partial pressure in the range 5-50 nbar and was zero at a finite partial pressure termed the ammonia compensation point. Below the compensation point, ammonia or possibly other volatile amines were evolved by the leaves. The compensation points in several species were near the low partial pressures found in unpolluted air and approximated to the K_m of glutamine synthetase in vitro. In bean the compensation point increased with increase in temp. (Author's summary) COO

0006

14353 POWELL, R.D.; MORGAN, P.W. 1980. Opening of the hypocotyl hook in seedlings as influenced by light and adjacent tissues. Planta 148(2): 188-191. Engl., Sum. Engl., 11 Refs.

Phaseolus vulgaris. Cotyledons. Roots. Hypocotyls. Light. Plant physiological processes.

The influence of the cotyledons, the apical bud, and the root system on the light-induced opening of the hypocotyl hook of etiolated seedlings of Gossypium hirsutum, Phaseolus vulgaris, Helianthus annuus, Ipomoea alla, Ipomoea sp., Cucumis sativus, Linum usitatissimum, Hibiscus esculentus, and Raphanus sativus was studied. Seeds were surface-sterilized and germinated in the dark in sterile vermiculite. Seedlings were used 1-2 days after emergence. When the roots were removed, the explants were maintained in a tray containing 1% agar with small holes to support the rootless seedlings. The following types of plants and explants were used: intact, cotyledons and plumule removed, roots removed, and the cotyledons, plumule and roots removed. The light treatment consisted of 2 h of red light. Following this treatment the seedlings or explants were incubated in the dark for a period of time until hook opening had progressed sufficiently to allow measurement. In bean the presence of roots had no effect on hook opening, whether with or without cotyledons. The variation between species in hook opening may relate to the need of that process for a proper hormonal balance, as affected by light, which must be obtained from adjacent tissues. (Summary by F.G. Trans. by L.M.F.) COO

0007

18793 ZEIGER, E.; SCHWARTZ, A. 1982. Longevity of guard cell chloroplasts in falling leaves: implication for stomatal function and cellular aging. Science 218(4573):680-682. Engl., Sum. Engl., 14 Refs., Illus. [Dept. of Biological Sciences, Stanford Univ., Stanford, CA 94305, USA]

Phaseolus vulgaris. Chloroplasts. Leaves. Timing. Stomata. Photosynthesis. Abscission.

Guard cell chloroplasts in senescing leaves of several perennial trees and 3 species of annual plant (including Vicia faba and Phaseolus vulgaris) survived considerably longer than their mesophyll counterparts. This study indicates that the capacity for stomatal movements is retained until the time of abscission. Gas exchange could be required during senescence for the uptake of O_2, for the extrusion of volatile by-products of catabolism, and for modulation of turgor in connection with leaf shedding. In senescing leaves lacking a functional mesophyll, guard cell chloroplasts would constitute the only site of photosynthesis. (Summary by F.G. Trans. by L.M.F.) COO

See also 0040

0008

19004 EMMERT, F.H. 1982. Forces limiting acropetal transport of radiophosphorus in the stem. Journal of Plant Nutrition 5(10):1187-1196. Engl., Sum. Engl., 11 Refs., Illus. [Plant Science Dept., Univ. of Connecticut, Storrs, CT 06268, USA]

Phaseolus vulgaris. Stems. Nutrient transport. P.

Fluid containing labelled phosphate was forced through the xylem of stem sections of Phaseolus vulgaris var. Red Wade in a pressure apparatus, and the amount of isotope retained in the stem tissues under various exptl. conditions was noted. Retention of ^{32}P increased linearly with time and became greater as the plant matured. Retention was not affected by rate of flow of the solution nor by variation in the composition of the solution with respect to pH, cation content, or the presence of phenylmercuric acetate or polyethylene glycol. Approx. 25% of the retained ^{32}P was in the soluble state and only a negligible amount in the exchangeable state. (Author's summary) C01

0009

19031 EMMERT, F.H. 1982. The stoicheometry of interactions between phosphorus and nutrient cations. Journal of Plant Nutrition 5(9):1171-1176. Engl., Sum. Engl., 9 Refs., Illus. [Plant Science Dept., Univ. of Connecticut, Storrs, CT 06268, USA]

Phaseolus vulgaris. Nutrient solution. P. Nutrient absorption. Mg. Plant nutrition.

The uptake of ^{32}P by the root mass, movement to the xylem sap, and accumulation in the top of intact Phaseolus vulgaris plants grown in nutrient solution, was studied with various levels of Mg, (NH_4), and K from 0.02 to 30.0 mM in the solution. K had little effect on ^{32}P in all measurements. Increasing levels of Mg and NH_4 increased ^{32}P in the root mass, xylem sap and plant top, Mg being more effective than NH_4. The increase in ^{32}P levels was not equivalent to increasing levels of Mg and NH_4 and the max. response showed little more than a doubling of ^{32}P in the xylem sap as a result of a 1500-fold increase in Mg in the root. (Summary by Field Crop Abstracts) C01

0010

17419 FELIX, J.F. 1981. Nutrition azotée du haricot (Phaseolus vulgaris L.) - nitrate reductase et nitrogénase - essai d'amelioration de la symbiose fixatrice d'azote. (Nitrogen nutrition of bean-nitrate reductase and nitrogenase-a trial to improve symbiotic nitrogen fixation). These D.Agr. Montpellier, Université des Sciences et Techniques du Languedoc. 108p. Fr., Sum. Fr., 118 Refs., Illus.

Phaseolus vulgaris. Plant nutrition. N. Rhizobium phaseoli. Nodulation. Nitrogen fixation. Crossbreeding. Photosynthesis.

A historical review on research carried out on N nutrition of legumes, in particular Phaseolus vulgaris, is initially given. The no. and quality of Rhizobium phaseoli strains in Haitian soils are discussed and the results of several preliminary trials are analyzed. The inefficacy and/or insufficiency of the no. of Rhizobium could possibly explain the poor nodulation in bean. Nitrate reductase and nitrogenase activities of P.

vulgaris cv. of different geographic origin were studied. The use of simpler techniques to screen parent lines for hybridization and selection is suggested. The nitrogenase and nitrate reductase activities and their relationship with the soluble reducing sugars content of tropical and temperate var. were also studied. The possibility of improving biological N fixation in bean through hybridization (crossing a tropical var. with a high nitrogenase activity with a temperate var. with high nitrate reductase activity) was examined and the possibility of transferring high-fixing genes was showed. It was concluded that the activities of N fixation activity from the air and N uptake from the soil are complementary in time and that there is a negative linear correlation between the 2. On the other hand, the difference between these 2 processes is related to photosynthate distribution in the plant. Under exptl. conditions there were 2 peaks in nitrate reductase activity: during the seedling phase of development and during the postflowering period. The capacity of total N fixation of bean is considerably related to the cv. (Summary by I.B. Trans. by L.M.F.) C01

0011

18780 KANNAN, S.; PANDEY, D.P. 1982. Absorption and transport of iron in some crop cultivars. Journal of Plant Nutrition 5(4-7):395-403. Engl., Sum. Engl., 13 Refs., Illus. [Biology and Agriculture Division, Bhabha Atomic Research Centre, Bombay 400085, India]

Phaseolus vulgaris. Fe. Nutrient solution. Nutrient absorption. Translocation. Nutrient transport.

Phaseolus vulgaris cv. Vaghya seedlings grown in nutrient solution and treated with ^{59}Fe translocated the Fe readily to the stem, leaves, and flowers in early growth. It was observed that ^{59}Fe content expressed as % of total content of the plant decreased in the roots with time up to about 40 h after transfer from the absorption medium, and remained steady thereafter. During this early period, there is an increase in Fe content in trifoliate leaves. Data on primary leaves show that Fe content decreased after 36 h and this is probably due to a migration from the primary to the trifoliate leaves. It was found that the absorption capacity of the roots decreased rapidly up to the 20th day and remained nearly the same up to the 40th day. The primary leaf appears to be the largest recipient of Fe in the beginning, followed by the 3 trifoliates in series. Flowers and fruits also derive a sufficient amount of Fe as these are formed. These results clearly indicate that Fe is sufficiently mobile or easily translocated to different parts, and these have a greater absorption capacity in early stages of growth. (Summary by F.G. Trans. by L.M.F.) C01

0012

19728 KARMOKER, J.L. 1982. The effect of kinetin on volume flow and ion flux in excised root systems of Phaseolus vulgaris L. cv. Redland Pioneer. Bangladesh Journal of Botany 11(2):93-100. Engl., Sum. Engl., 22 Refs. [Botany Dept., Univ. of Dhaka, Dacca, Bangladesh]

Phaseolus vulgaris. Cytokinins. Nutrient transport. Inhibitors. Water absorption.

The action of kinetin on vol. flow and the transport of ^{42}K, ^{24}Na, and ^{36}Cl into the xylem of excised bean root systems is reported and the relationship between ion and water transport is evaluated. Uniform 9-day-old plants of bean cv. Redland Pioneer were used for all expt. Kinetin inhibited vol. flow in the excised root systems with a concomitant inhibition of ^{24}Na and ^{36}Cl transport into the xylem. However, it caused an initial increase in ^{42}K transport into the xylem followed by a long-term inhibition. The degree

of inhibition by kinetin in ^{24}Na and ^{36}Cl transport appeared directly proportional to the concn. of the hormone used. Kinetin inhibited the accumulation of ^{24}Na and ^{36}Cl in bean root tissue but had no effect on that of ^{42}K. (Author's summary) C01

0013

19495 MOLINA M., S.B. 1980. Estudio de la absorción, acumulación y traslocación de N-P-K-Ca-Mg-Fe-Cu-Zn-Mn y Na en los genotipos de fríjol (Phaseolus vulgaris L.) Suchitán de ciclo intermedio y Línea-27 de ciclo corto. (Absorption, accumulation, and translocation of N, P, K, Ca, Mg, Fe, Cu, Zn, Mn, and Na in bean genotypes Suchitán, intermediate growth cycle, and Línea-27, short growth cycle). Tesis Ing.Agr. Guatemala, Universidad de San Carlos. 70p. Span., 22 Refs., Illus.

Phaseolus vulgaris. Nutrient absorption. N. P. K. Ca. Mg. Fe. Cu. Zn. Mn. Na. Cultivars. Translocation. Mineral content. Leaves. Stems. Roots. Pods. Petioles. Guatemala.

A trial was conducted on La Estancia farm, located in the municipality of Monjas, Jalapa, Guatemala, using bean genotypes Suchitán (intermediate growth cycle, 90 days) and Línea-27 (short growth cycle, 72 days), to determine the amounts of N, P, K, Ca, Mg, Fe, Cu, Zn, Mn, and Na absorbed and the time of utilization and movement of these elements in each plant type studied. The exptl. area was divided into two 20 x 20 m plots, each planted to a genotype. At 10-day intervals, beginning 12 days after planting, 100, 50, 25, and 10 plants were randomly collected from each plot and taken to the lab. The roots, stems, leaves, petioles, and fruits of each genotype were separated to make the corresponding chemical analysis of each element. Var. Suchitán had 3 critical periods of uptake for most elements, while Línea-27 only had 2. In both genotypes, all the elements had a higher % of accumulation in the leaves, then being transported to the grains, except for Na which had a higher accumulation in the stems. The highest uptake in both genotypes was reported for N, K, and Ca. In general, Línea-27 can be considered more efficient in the accumulation of absorbed nutrients than var. Suchitán. (Summary by F.G. Trans. by L.M.F.) C01

0014

19707 OLIVEIRA, S.A. DE; ALCALDE B., S.; ENGLEMAN, E.M. 1982. Influencia do boro nos parametros morfológicos e fisiológicos de crescimento do feijoeiro. (Influence of boron on the morphological and physiological growth parameters of bean). Pesquisa Agropecuária Brasileira 17(5): 683-688. Port., Sum. Engl., Port., 17 Refs., Illus. [Univ. de Brasilia, Caixa Postal 15.2958, 70.919 Brasilia-DF, Brasil]

Phaseolus vulgaris. Nutrient solution. B. Roots. Leaves. Plant development. Plant nutrition. Mineral deficiencies. Micronutrients. Brazil.

Phaseolus vulgaris var. Cacahuate was grown in nutrient solutions containing 0, 0.005, 0.05, or 0.5 ppm B. Root growth, leaf development, and DM yields were reduced by B deficiency (less than 0.005 ppm) probably as a result of reduced photosynthetic activity. (Summary by Horticultural Abstracts) C01

0015

16993 TRAORE, A. 1980. Deux legumineuses alimentaires: Vigna mungo (L) Hepper et Phaseolus vulgaris L. Influence de la nutrition minérales et principalement des apports en soufre sur le développement des plantes et les rapports en acides aminés soufrés des graines. (Two food legumes:

Vigna mungo and Phaseolus vulgaris. Influence of mineral nutrition, mainly of supplied sulphur, on plant development and on sulphur-containing amino acids in grains). Thése Ing.Agr. Gembloux, Belgique, Faculté des Sciences Agronomiques de L'Etat. 177p. Fr., Sum. Fr., 131 Refs., Illus.

Phaseolus vulgaris. Nutrient solution. S. N. P. Growth. Mineral content. Flowering. Yields. Amino acids. Protein content.

Two expt. were carried out on the influence of mineral nutrition, especially with S, on the development of Vigna mungo and Phaseolus vulgaris plants and on the content of sulphur-containing amino acids in their grains. In the 1st expt. 2 nutrient solutions were used: one without S and the other with demineralized water and 2 substrates, Rhin sand and humus (check), each with 2 replications. In the 2nd expt., replicated 4 times, different S, N, and P regimes were used: S1 (low S content), S2 (optimum S content, check), and S3 (high S content). In the total absence of S, P. vulgaris had morphological deformations on the stem, branches, and petioles, and yellow chlorotic plaques with hazy edges on the limbs. In demineralized water, in spite of the reduced growth, plants flowered but mature grain formation was not reached. With treatments S1 and S2, plants had a similar vegetative growth, better than that obtained with S3. The intensity of flowering was also greater in S1 and S2, although mineral nutrition did not affect earliness of florescence or how long pod maturation lasted. S3 had lower productivity (34%) as compared with the check. The low S content produced an excellent development of P. vulgaris. The higher accumulation of S in the plants was directly related to increased S content in the nutrient solution. Although mineral nutrition did not markedly affect total N content, S nutrition increased the relative content of cystine and methylcystine. S1 assured the highest productivity of CP and amino acids/plant. (Summary by I.B. Trans. by L.M.F.) C01

See also 0088

C02 Plant Development

0016

19041 BARRETT, J.E.; BARTUSKA, C.A. 1982. PP333 effects on stem elongation dependent on site of application. HortScience 17(5):737-738. Engl., Sum. Engl., 8 Refs. [Dept. of Ornamental Horticulture, Univ. of Florida, Gainesville, FL 32611, USA]

Phaseolus vulgaris. Inhibitors. Shoots. Leaves. Stems. Growth.

The growth retardant PP333 was applied as a soil drench (0.125 mg/pot) or as a spray (75 or 150 ppm) to the whole shoots, mature leaves or stems of container-grown Sprite bean and Bright Golden Anne chrysanthemum plants. In all cases PP333 reduced stem elongation, but retardation was greater with stem or whole shoot than leaf applications. Results indicate that in foliar applications the chemical taken up by the stem was more important than that contacting the leaves. (Summary by Horticultural Abstracts) C02

0017

19484 ERNER, Y.; JAFFE, M.J. 1982. Thigmomorphogenesis: the involvement of auxin and abscisic acid in growth retardation due to mechanical perturbation. Plant and Cell Physiology 23(6):935-941. Engl., Sum. Engl., 32 Refs., Illus. [The Volcani Center, Agricultural Research Organization, P.O.B. 6, Bet Dagan 50-200, Israel]

Phaseolus vulgaris. Auxins. Indoleacetic acid. Mechanical perturbation. Inhibitors. Growth.

When young Phaseolus vulgaris plants were mechanically perturbed daily for up to 10 days, they accumulated large amounts of an auxin-like substance and increased amounts of ABA. Exogenous ethylene, applied in the form of ethephon, produced the same result Physiologically moderately high amounts of exogenously applied IAA or lower amounts of ABA caused the same sort of retardation of elongation that is caused by either mechanical perturbation or exogenous ethephon. Either mechanical perturbation or applied ethephon significantly retarded the polar basipetal transport of ^{14}C-IAA. It is proposed that mechanical perturbation of internodes induces ethylene evolution which, in turn, induces the accumulation of high levels of IAA and the production of ABA, both of which contribute to the retardation of elongation of the internodes. (Author's summary) C02

0018

19711 FRADO, T.M.; STERN, A.I. 1982. Photosynthesis and chloroplast development in primary leaves of Phaseolus vulgaris illuminated with continuous far-red light. Zeitschrift fuer Pflanzenphysiologie 105(3): 255-265. Engl., Sum. Engl., 27 Refs., Illus. [Dept. of the Biological Sciences, Smith College, Northampton, MA 01063, USA]

Phaseolus vulgaris. Leaves. Photosynthesis. Chloroplasts. Light. Chlorophyll. Plant development.

A comparative study of photosynthetic properties of bean primary leaves illuminated with continuous far-red or white light during an 8-day period revealed that leaf size in far-red developed plants is about half that in white light developed plants. However, the rates of CO_2 fixation on an area basis in far-red developed leaves are comparable with those in white light developed tissue, although the far-red developed leaves have 20 times less chlorophyll/unit leaf area. The ethanol-soluble photosynthetic products, and the developmental patterns of ribulosebisphosphate carboxylase and of NADP-dependent glyceraldehyde-3-phosphate dehydrogenase in the 2 leaf types are similar. However, chloroplast ultrastructure, after prolonged far-red illumination, remains curtailed at a simple stage characterized by unappressed thylakoids. Gel electrophoresis indicates that chloroplasts from far-red illuminated leaves are deficient in a polypeptide corresponding in mol. wt. to the protein moiety of the light harvesting chlorophyll protein (Complex II). In addition it appears that far-red illumination, while significantly affecting chlorophyll synthesis and chloroplast structure, has little effect on the development of the enzymes and activities associated with the dark reactions of photosynthesis. (Author's summary) C02

0019

13141 HARDWICK, R.C.; INNES, N.L. 1975. It's by no means an easy start for the bean seed. Commercial Grower 12:416-417. Engl., Illus.

Phaseolus vulgaris. P. coccineus. Growth. Seed. Cultivars. Germination. Emergence. Drought. Nitrogen fixation. Selection. Yields. Snap beans. England.

Recent developments in the present understanding of the growth and agronomy of dwarf French beans and Phaseolus coccineus conducted at the National Vegetable Research Station, Wellesbourne, England, are described. Bean seeds and seedlings are affected in the seedbed by excess moisture or by

drought. In a trial using 8 var. of dwarf French bean, over 95% germination was observed under lab. conditions while in the field, over 90% germination was recorded for 6 var. but only 75 and 60% for the other 2. Aspects related to the potential of N fixation and limitations to the growth and development of the crop in the region are mentioned. At Wellesbourne over 300 accessions of P. vulgaris were selected for their ability to grow well at low temp. and the yield of 10 promising selections under British conditions was evaluated. (Summary by EDITEC. Trans. by L.M.F.) C02

0020

19726 SIDDIQUE, A.; GOODWIN, P.B. 1982. Role of cotyledons on the development of seedling vigour in snap beans (Phaseolus vulgaris L.). Bangladesh Journal of Botany 11(2):87-92. Engl., Sum. Engl., 11 Refs., Illus. [Dept. of Horticulture, Bangladesh Agricultural Univ., Campus P.O., Mymensingh, Bangladesh]

Phaseolus vulgaris. Snap beans. Cotyledons. Seedlings. Plant development. Timing. Water content. Mineral content. N. Starch content.

Two expt. were conducted to evaluate the changes in snap bean cotyledons during seedling development and associated influence on seedling vigor. The role of intact cotyledons on the development of seedling vigor in snap beans is defined. In the 1st expt., seeds of bean cv. Apollo were sown in wooden boxes in a randomized complete block design with 3 replications and 6 treatments (no. of days from sowing, 0, 6, 8, 10, 12, and 14 days). Seedlings were uprooted on scheduled days and the cotyledons were removed and weighed immediately. MC and dry wt./pair of cotyledons were determined in a random sample of cotyledons. MC, dry wt., total N content, and starch content were determined for 0-day samples. The 2nd expt. was conducted using a factorial randomized complete block design with 4 levels of treatment in one factor (8, 10, 12, and 14 days from sowing) and 2 levels in the other (cotyledons left intact; cotyledons removed from the seedlings on day 6). Measurements were taken on seedling length, leaf area, fresh and dry wt. of the seedling top and entire seedling without the cotyledons. Snap bean seedlings with a pair of intact cotyledons developed normally. The cotyledons lost stored reserves as the seedling developed. Loss of DM was approx. 90% by day 14 from the date of sowing. When the cotyledons were removed on emergence, the growth of the seedling was drastically reduced, suggesting that the normal vegetative development of the seedling takes place at the expense of the stored reserves of the cotyledons. (Summary by L.M.F.) C02

See also 0012 0032 0100 0115 0163 0174 0183

C03 Chemical Composition, Methodology and Analyses

0021

19453 DUPUIS, G.; LECLAIR, B. 1982. Studies on Phaseolus vulgaris phytohemagglutinin. Structural requirements for simple sugars to inhibit the agglutination of human group A erythrocytes. Febs Letters 144(1):29-32. Engl., 20 Refs., Illus. [Dept. de Biochimie, Univ. de Sherbrooke, Sherbrooke, Quebec, J1H 5N4, Canada]

Phaseolus vulgaris. Phytohaemagglutinins. Analysis. Sugars.

The specificity of phytohemagglutinin, the lectin from bean, toward agglutination of the major human erythrocyte blood groups was investigated.

Agglutination assays were performed according to Liener's technique (1955). Concn. of lectin necessary to bring 50% agglutination of the cells were 8 micrograms (group A), 12 micrograms (group O), and 22 micrograms (group B), whereas complete agglutination was observed with 15 micrograms (group A), 40 micrograms (group O), and 40-50 micrograms (group B). A series of monosaccharides was used to assess the structural requirements for these compounds to inhibit the agglutination reaction. Phytohemagglutinin possesses, at its sugar binding site, at least one locus which recognizes and discriminates specifically between the nature and configuration of substituents at positions 2 and 4 of the pyranose ring. (Summary by EDITEC. Trans. by L.M.F.) C03

0022

20086 ESCOBAR G., C.; TRUJILLO E., J. 1976. Determinación del contenido de humedad de algunos productos agrícolas utilizando la estufa-balanza Ohaus. (Determination of the moisture content of several farm products using an Ohaus moisture determination balance). Tesis Ing.Agr. Medellín, Universidad Nacional de Colombia. 189p. Span., Sum. Span., 8 Refs., Illus.

Phaseolus vulgaris. Water content. Temperature. Drying. Statistical analysis. Colombia.

In the agricultural lab. of the U. Nacional, Medellín (Colombia), the MC of the following 4 farm products was determined: Cargamanto bean (Phaseolus vulgaris), opaque and white dent maize (Zea mays), CF (Manihot esculenta), and Guineagrass seed (Panicum maximum). Four MC were used for each one and 4 temp. for each MC using the Ohaus moisture determination balance. Calibration consisted in determining the MC of these products at a temp. in which the product was not scorched and in the less time possible. MC was also determined on the balance by maintaining the sample at 100°C until it reached a constant wt. (between 24-48 h). Results obtained in the evaluation of the MC obtained in the oven were compared with those obtained with the Ohaus moisture determination balance through statistical analysis. Curves relating the % of MC loss and the drying time at different temp. were obtained for the different products tested. Temp. occurring on the Ohaus plate were measured at a lamp height of 1 in. and at different positions of the heat control in order to direct the person using the moisture determination balance. Indirect methods were not precise and direct methods are required for its calibration; the Ohaus moisture determination balance therefore proves to be very useful. Temp. of 145-165°C were optimum for all products since the stabilization of the final MC was broad and the product was not scorched. (Author's summary. Trans. by L.M.F.) C03

0023

19714 KON, S.; SANSHUCK, D.W. 1981. Phytate content and its effect on cooking quality of beans. Journal of Food Processing and Preservation 5(3):169-178. Engl., Sum. Engl., 15 Refs., Illus. [Western Regional Research Center, Science & Education Administration, U.S. Dept. of Agriculture, Berkeley, CA 94710, USA]

Phaseolus vulgaris. Seed. Cooking. P. lunatus. Storage. Temperature. Relative humidity. Fibre content. Ash content. Fat content. Mineral content. Analysis. Timing.

Storage of dry beans under conditions of relatively high moisture and temp. increased the cooking time of the beans about 5-fold. The cause of this hardening was studied and a method was devised to reduce the time that is required for cooking under these circumstances. California small white

beans were treated to raise their MC to 16% and were stored at 32°C for 10 mo. Other legume var. and species used were black beans, pinto beans, and kidney beans, Phaseolus lunatus, 2 var. of Vicia faba, Vigna unguiculata, and Pisum sativum. Among the changes that occur in beans stored in this way, the reduction (about 65%) in phytic acid content was the best indicator of increased cooking time. Cooking times of the various legumes studied correlated well with the ratio of % phytic acid:% Ca present in the beans. Soaking high moisture beans in a solution of either phytic acid or EDTA reduced cooking time to that of control beans. Cooking time of control beans soaked under the same conditions was reduced by between 1/3-1/2, depending on the solution used. (Author's summary) C03

0024

19411 MANEN, J.F.; OTOUL, E. 1981. Etudes électrophorétiques et détermination des fractions protéiques principales chez quelques cultivars élites de Phaseolus lunatus L. et de Phaseolus vulgaris L. (Electrophoretic studies and determination of main protein fractions in some elite cultivars of Phaseolus lunatus and P. vulgaris). Bulletin des Recherches Agronomiques de Gembloux 16(4):309-326. Fr., Sum. Fr., Engl., 15 Refs., Illus. [Laboratoire de Chimie Taxonomique, Univ. de Geneve, Suisse]

Phaseolus vulgaris. P. lunatus. Proteins. Cultivars. Amino acids. Analysis.

SDS electrophoresis clearly differentiates Phaseolus lunatus and P. vulgaris and allows some differences between cv. of the 2 species to be identified. The study on lectins revealed that one of the P. vulgaris cv. does not show any agglutinating activity. Only white-seeded teguments do not contain tannins that tend to precipitate seed cotyledon protein. Electrophoretic analysis of the large protein fractions shows that their definition is not accurate; some polypeptides are common to those fractions. The amino acid composition of the 3 major protein groups is different; however, the homologous fractions are similar from one species to another. (Author's summary) C03

0025

19721 SALUM, J.; TAVEIRA, J.J.; SILVA, D.C.; OLIVEIRA, O.G. DE 1981. Proteínas do feijao. 1. Determinacao quantitativa das proteínas em algumas cultivares de Goiás. (Bean proteins. 1. Quantitative determination of proteins in some cultivars of Goiás). Arquivos de Biología e Tecnologia 24(4):453-454. Port., Sum. Engl., 2 Refs. [Univ. Federal de Goiás, Depto. de Bioquímica e Biofísica, Inst. de Ciencias Biologicas Caixa Postal 131, Goiania-GO, Brasil]

Phaseolus vulgaris. Proteins. Cultivars. Water content. Mineral content. N. Protein content. Analysis. Brazil.

The MC, total N, and total protein content (N x 6.25) were determined in 23 bean var. and in 1 cowpea var. from Goías, Brazil. MC were between 8.06-11.56%, total N varied from 3.14 to 4.82%, and total protein content from 19.63 to 30.12%. Results are given in table form. (Author's summary) C03

0026

19720 SOARES, C. DE A.; SALUM, J.; BRESEGHELO, M. DE L. 1981. Proteinas do feijao. Estudo de algumas cultivares de Goiás. 2. Determinacao dos pesos moleculares das proteínas na fracao solúvel em NaCl a 1%, apos tratamento com dodecil sulfato de sódio (SDS), por eletroforese em gel de poliacrilamida. (Bean proteins. Study of some varieties of Goias. 2.

Determination of molecular weight of proteins of the soluble fraction in 1% NaCl after treatment with sodium dodecyl sulfate (SDS), in polyacrylamide gel electrophoresis). Arquivos de Biologia e Tecnologia 24(4):455-459. Port., Sum. Engl., 4 Refs. [Univ. Federal de Goiás, Depto. de Bioquímica e Biofísica, Inst. de Ciencias Biologicas, Caixa Postal 131, Goiania-GO, Brasil]

Phaseolus vulgaris. Proteins. Analysis. Cultivars. Cytology.

Mol. wt. of bean proteins soluble in 1% NaCl was determined by SDS-polyacrylamide gel electrophoresis. The method used was of Weber and Osborn; the results are given in table form. Of the 24 bean cv. studied, Jalo EEP-558, Tayhu, and Guatemala 344 had fractions with the highest mol. wt. (260,000, 230,000, and 225,000, resp.). Eighteen of the cv. had fractions with mol. wt. of 130,000. Cv. Guatemala 344, Jalo EEP-558, and Tayhu did not have fractions with mol. wt. ranging from 20,000 to 10,000. (Author's summary) C03

See also 0002 0015 0020 0039 0047 0052 0112 0113 0165 0180 0185

D00 AGRONOMY

0027

19744 KENYA. MINISTRY OF AGRICULTURE. 1982. Grain Legume Project. Four years progress report; April, 1978 - April, 1982. Thika, National Horticultural Research Station. 67p. Engl., 70 Refs., Illus. [National Horticultural Research Station, P.O. Box 220, Thika, Kenya]

Phaseolus vulgaris. Agricultural projects. Planting. Timing. Inoculation. Intercropping. Zea mays. Herbicides. Fertilizers. P. Rhizobium. Nitrogen fixation. Cultivars. Resistance. Drought. Seed production. Storage. Inheritance. Crossbreeding. Colletotrichum lindemuthianum. Bean common mosaic virus. Pseudomonas phaseolicola. Isariopsis griseola. Uromyces phaseoli. Kenya.

Research and development programs carried out at the National Horticultural Research Station, Kenya, from April 1978 to April 1982 are described. The agronomy program studied the effect of planting time on yield of beans in monoculture and intercropped with maize and the competition in mixed cropping for nutrients, light, water, space, and weeds. The effectiveness of various commercial herbicides in controlling weeds in beans in monoculture and in association was determined. Labor requirements, especially for planting, were assessed. Fertilization trials with simple and triple superphosphate and diammonium phosphate and expt. with Rhizobium inoculation were also conducted. No differences were found between rates of single and triple superphosphate. The efficiency of the Rhizobium strain used was measured by nodule counts and N analysis of the beans and the additional effect of N fixation by observing the growth of maize plants. The breeding program tested var. at different sites and selected material resistant to major diseases, namely, anthracnose (Colletotrichum lindemuthianum), BCMV, halo blight (Pseudomonas phaseolicola), rust (Uromyces phaseoli), and angular leaf spot (Isariopsis griseola), and to drought conditions. At the Tebere Cotton Research Station, Mwea, improved seed of var. GLP-2, GLP-24, GLP-1004, and GLP-X.92 was produced. This seed was supplied to various seed firms for its multiplication and distribution to the farming community. Seed storage conditions were assessed. The inheritance of halo blight

resistance, cotyledon and hypocotyl characters, and male sterility were also studied. The economic importance of diseases in Kenya is analyzed. A collection of slides of all the bean diseases in Kenya is being established. The farming system economics program includes the identification of research problems, interpretation of research results from the farmer's point of view, and testing the most promising methods for extension trials. An appendix with a proposal to investigate drought resistance in dry beans is also included. (Summary by F.G. Trans. by L.M.F.) D00

D01 Soil, Water, Climate and Fertilization

0028

19100 ARAUJO, R.S.; MACHADO, N.F.; PESSANHA, G.G.; ALMEIDA, D.L. DE; DUQUE, F.F. 1982. Efeitos da adubacao fosfatada, no esterco de curral e da inoculacao na nodulacao, fixacao do nitrogenio atmosférico e rendimento do feijoeiro. (Effects of phosphate fertilization, farm yard manure, and inoculation on nodulation, biological nitrogen fixation, and dry bean yield). Revista Bresileira de Ciencia do Solo 6(2):105-112. Port., Sum . Port., Engl., 19 Refs., Illus. [Conselho Nacional de Pesquisas, Conselho Nacional de Desenvolvimento Científico e Tecnológico, Av. Marechal Camara, 365, 2o. andar, 20.000 Rio de Janeiro-RJ, Brasil]

Phaseolus vulgaris. Fertilizers. P. Dung. Inoculation. Rhizobium phaseoli. Nodulation. Yields. Nitrogen fixation. Brazil.

An expt. was carried out in the wet and the dry season of 1980/81 on a red-yellow podzolic soil, in Itaguaí, RJ, Brazil, to study the immediate and the residual effects of inoculation (Rhizobium phaseoli) and the application of FYM and P on N_2 fixation and yield of dry bean cv. Venezuela 350. A 2^4 complete factorial design was used in randomized complete blocks with 4 replications. The treatments were: FYM (0 and 15 t/ha), soluble P (0 and 100 kg/ha), rock phosphate (0 and 300 kg P/ha), and with or without inoculation. A mixture of strains of R. phaseoli was used. In the wet season the application of FYM increased significantly the nodulation, N_2 fixation, total accumulated N, plant dry wt., and dry bean yield. In the dry season there was a residual effect of FYM on the total accumulated N, plant dry wt., and dry bean yield, and of soluble P on the dry bean yield. Results showed that P fertilization (soluble and rock) and seed inoculation did not influence the nodulation and N_2 fixation, plant top wt., and dry bean yield in both seasons, except for the soluble P treatment on the dry bean yield in the dry season expt. In both expt. the application of FYM attenuated the variations in soil temp., particularly at the 5-cm depth. (Author's summary) D01

0029

19835 BERTON, R.S. 1981. Efeito da cobertura de polietileno na temperatura do solo e na producao do feijoeiro (Phaseolus vulgaris L.) Carioca. (Effect of polyethylene mulch on soil temperature d yield of Carioca beans). Tese Mag.Sc. Piracicaba-SP, Brasil, Escola Superior de Agricultura Luiz de Queiroz da Universidade de Sao Paulo. 92p. Port., Sum. Port., Engl., 47 Refs., Illus.

Phaseolus vulgaris. Mulching. Soil temperature. Yields. Brazil.

During the rainy season of 1978-79 an expt. was carried out on a Terra Roxa Estruturada soil in Piracicaba, SP, Brazil, in order to evaluate the behavior of soil temp. and the yield of bean cv. Carioca when transparent

white and blue, and bright black polyethylene mulches were used. In soils covered with polyethylene the daily temp. wave was attenuated from the initial phase of growth while in the nonmulched treatment the daily temp. wave was gradually attenuated according to the crop development. The av. and min. soil temp. under polyethylene mulches, bright black and transparent, were higher than the nonmulched treatment during the entire growth period of the bean crop. During the initial stage of crop growth the treatments with transparent polyethylene films had higher av. temp. than that with bright black. The change of the soil thermal regime due to polyethylene mulches increased by 33, 29, and 18% the no. of filled pods/ plant and bean yields were significantly increased by 49, 34, and 22% in the treatments of white transparent, bright black, and blue transparent polyethylene mulches, resp., compared with the nonmulched treatment. The use of polyethylene mulches did not have a significant effect on the no. of beans/pod or on the av. final stand. (Author's summary) D01

0030

20035 BOUCHER, D.H.; ESPINOSA M., J.; ROMERO B., S.; GLIESSMAN, S.R. 1983. Out-of-season planting of grain legumes as green manure for a tropical raised-field agroecosystem. Biological Agriculture and Horticulture 1:127-133. Engl., Sum. Engl., 13 Refs. [Dept. des Sciences Biologiques, Univ. du Quebec a Montreal, C.P. 8888, Succ. A, Montreal, Quebec, Canada, H3C 3P8]

Phaseolus vulgaris. Green manures. Cultivars. Weeding. Nitrogen fixation. Cultivation systems. Mexico.

Bean cv. Nacajuca and cowpea cv. Fríjol Pelon and Fríjol Sin Tiempo planted outside the normal growing season were tested as green manure crops for a raised-field system in Tabasco, Mexico, similar to those used by the pre-Hispanic lowland Maya. All 3 cv. suppressed weeds effectively. Cowpea cv. Fríjol Pelon added an appreciable amount of fixed N to the system but the addition was achieved at the expense of seed yield, due to lack of flowering. (Author's summary) D01

0031

19745 BROOK, C.E. 1970. Field bean investigations. A review of the trials conducted with Phaseolus beans 1967-1970. Zambia, Department of Agriculture. Research Branch. Kabwe Regional Research Station. 56p. Engl., Sum. Engl.

Phaseolus vulgaris. Cultivars. Fertilizers. Spacing. Timing. Planting. Herbicides. Cultivation. Yield components. Yields. N. Micronutrients. Agricultural lime. P. Inoculation. Rhizobium. Zambia.

The primary aim of the bean trial program carried out at the Kabwe Regional Research Station (Zambia) during 1967-70 was to identify the cause of the low yields of the locally acceptable Speckled Sugar bean, and to determine whether these yields could be improved by a single agronomic mean. A total of 19 trials were conducted over the 3-yr period on fertilization, spacing, time of planting, type of cultivation, herbicides, pest and disease control, micronutrients, and var. aspects of production. Several yield components were identified at the start of the program to determine the cause of low yields. Resultant data were related to eventual yields in terms of the cultural practices with which they were associated. Field emergence and stand survival through to harvest were generally poor. While this was partly associated with climatic factors and therefore dependent on the time of planting, no other single major factor was identified. An improved source of certified disease-free seed is therefore essential. Pod

producing potential/unit area was improved by application of N up to 100 kg/ha. As individual plants tended to become more productive at wider spacings podding potential/unit area tended to remain constant, irrespective of plant population. Until field emergence and stand survival have been improved it is recommended that spacing should be 7-10 cm apart along rows 60-75 cm apart, aiming at a harvest population of approx. 100,000 plants/ ha. While the ratio between pod producing potential and actual mature pods at harvest remained similar in any one season, irrespective of treatment, seasonal differences were large. Pod set % were dependent on climatic conditions, particularly moisture stress accompanied by hot dry winds. The effect of excessive rainfall was less severe. To ensure adequate rainfall at flowering and pod set planting should be during late Nov.-mid Dec. rather than mid Jan. Stands, pod producing potential, and pod set % were found to be directly related to final yield. A combination of late Nov.- early Dec. planting with spacing between 7-10 cm apart along rows 60-75 cm apart and N application up to 100 kg/ha resulted in the highest yields. No advantage has been found in split application of N. Application of lime, P, and micronutrients did not increase yields. There was no beneficial effect due to the use of fungicides and inoculation with strains of Rhizobium did not improve nodulation. Routine sprays of insecticide were found to be essential, although details of frequency of application require clarification. Planting on ridges was superior to planting on the flat when sowing took place during Nov. and Dec. There was virtually no difference between the 2 at later plantings. Row planting proved superior to broadcast sowing on the flat. Herbicides Vernolate, trifluralin, and alachlor were promising. In the var. evaluations, yields of Speckled Sugar were only moderate. Productivity of Mexican Wonder 142 has been particularly disappointing at Kabwe in view of the success of this var. elsewhere in Zambia. (Author's summary) DOI

0032

19409 COSTA, J.G.C. DA; KOHASHI-SHIBATA, J.; COLIN, S.M. 1983. Plasticidade no feijoeiro comum. (Plasticity of bean). Pesquisa Agropecuária Brasileira 18(2):159-167. Port., Sum. Port., Engl., 7 Refs., Illus. [Centro Nacional de Pesquisa de Arroz e Feijao-EMBRAPA, Caixa Postal 179, 74.000, Goiania-GO, Brasil]

Phaseolus vulgaris. Spacing. Plant habit. Cultivars. Growth. Yields. Brazil.

The influence of population densities on the plasticity of beans was studied by determining the no. of branches, nodes, and seeds, and the total leaf area/plant at the end of the growth cycle. Four bean cv. were used: Canario 107, determinate bush; Michoacan 12-A-3, indeterminate short vine, erect; and Negro 150 and Flor de Mayo X-16441, both indeterminate, long vine, climbing. Canario 107 showed lower plasticity than the indeterminate type cv. and its grain yield is expected to increase with increasing population density. Among the indeterminate types, Michoacan 12-A-3 showed lower plasticity than Negro 150 and Flor de Mayo X-16441. (Author's summary) DOI

0033

19035 DURON A., E.; CABALLERO, A. 1982. Resumen de la investigación en niveles de nitrógeno y fósforo en el cultivo del fríjol rojo en la zona frijolera de Olancho. (Summary of research carried out on levels of nitrogen and phosphorus in red bean crops in the bean producing area of Olancho). Honduras, Programa de Investigación, Región Nor-Oriental, Catacamas. 9p. Span., 2 Refs. [Región Nor-Oriental, Catacamas, Olancho, Honduras]

Paper presented at Reunión Anual del PCCMCA, 28a., San José, Costa Rica, 1982.

Phaseolus vulgaris. Fertilizers. N. P. Yields. Costs. Income. Honduras.

In 1978, 11 trials were established in the localities of Salamá, Silca, Ulua, and San Roque in Olancho, Honduras. to study the response of bean to 4 levels of N and P. A randomized factorial block design was used in an exptl. plot containing six 6-m-long furrows. According to the results obtained in 1978, P limits bean production since significant differences (at the 1% level) were observed in Salamá, Silca, and Ulua; N/P interaction was significant at Salamá and Silca. Bean treated with 25-40 kg N-P/ha yielded 840 kg/ha whereas the check only yielded 400 kg/ha. In 1979 yield increases of 300 kg/ha were obtained with the application of 97.5 kg fertilizer 18-46-0/ha in Ulua. In the other localities increases of 155 kg/ha were obtained. Applications of 25-40 and 25-80 kg N-P/ha prior to planting and 25-80 kg N-P/ha at planting produced yields of 565, 569, and 499 kg/ha, resp., while the check only yielded 293 kg/ha at the 3 sites in 1980. Marginal economic analysis indicates that the application of 25-40 kg N-P/ha is the best alternative, having a marginal return rate of 172%. (Author's summary. Trans. by L.M.F.) D01

0034

20021 FLOOR-DREES, E.M. 1982. Research on drought resistance in dry beans (Phaseolus vulgaris). In Kenya. Ministry of Agriculture. Grain Legume Project. Four years progress report: April 1978-April 1982. Thika, National Horticultural Research Station. pp.52-62. Engl., 20 Refs. [National Horticultural Research Station, P.O. Box 220, Thika, Kenya]

Phaseolus vulgaris. Cultivars. Resistance. Drought Selection. Water stress. P. acutifolius. Yields. Water requirements. Kenya.

A proposal to investigate and develop an adequate screening procedure of dry bean var. for drought resistance is given. The relationship between moisture stress and plant behavior is analyzed. The objectives, exptl. design, materials and methods, and observations are included for each of the following expt. carried out in Kenya: yield and yield reduction of several Phaseolus vulgaris cv. and one of P. acutifolius in relation to moisture stress (under both lab. and field conditions); growth rate and yield reduction in relation to moisture stress; seedling resistance to drought and ability to recover; root growth in relation to moisture stress. (Summary by F.G. Trans. by L.M.F.) D01

0035

19450 HERRERA, J. 1983. Necesidades de agua del fríjol, riego y manejo de agua aplicado en las condiciones de producción en la Provincia de Matanzas. (Water requirements of bean, irrigation, and water management under production conditions of the province of Matanzas). In Curso Intensivo de Postgrado en la Producción de Fríjol, 4o., Matanzas, Cuba, 1983. Conferencias. Cuba, Ministerio de Agricultura. pp.67-70. Span.

Phaseolus vulgaris. Irrigation. Water requirements (plant). Cuba.

Water requirements of bean depend on the development stage of the plant and this should be considered when supplying irrigation according to recommended norms and at necessary intervals. Recommendations on furrow and sprinkler irrigation in bean crops in the province of Matanzas, Cuba, are given. Furrow irrigation should be carried out in short rows (30-50 m)

with a gradient of approx. 0.5-3% (max. 3.0-6.0%) to avoid flooding. Under these regional conditions, sprinkler irrigation is done with DDA-100 MA machines. To assure a good germination the amount of water supplied in the 1st watering is estimated at 350 m^3/ha and in the 2nd watering at 3-4 days at 250 m^3/ha. On ferralitic soils with plenty infiltration, the amount of water applied (m^3/ha) has to be increased and the intervals between waterings reduced in the 1st phase of the crop. (Summary by EDITEC. Trans. by L.M.F.) DOI

0036

13144 INNES, N.L.; HARDWICK, R.C. 1975. Horses for courses in the bean field. Commercial Grower 19:447-448. Engl., Illus.

Phaseolus vulgaris. Snap beans. P. coccineus. Genotypes. Climatic requirements. Selection. Cultivars. Mechanization. Harvesting. Herbicides. Botrytis cinerea. Colletotrichum lindemuthianum. Pseudomonas phaseolicola. Bean common mosaic virus. Bean yellow mosaic virus. Delia platura. Disease control. England.

The adaptation of French bean plants to particular growing conditions (genotype-environment interaction) is considered as well as other aspects related to bean growing in Wellesbourne, England. Information from trials conducted by different governmental institutions and other seed firms indicate the different performance of materials over diverse locations. A var. like Bush Blue Lake 274 does well in north Norfolk and Lincolnshire but not in Essex or Suffolk. Improvement of the French bean has included the selection for agronomic characteristics for mechanical harvesting. Several herbicides that can be used in weed control and are selective or not to the crop are indicated. Disease problems caused by the fungal pathogens Botrytis cinerea, Fusarium spp., Colletotrichum lindemuthianum, bacteria such as Pseudomonas phaseolicola, and BCMV and BYMV are discussed. Reference is made to the bean seed fly, Delia platura, and control measures are given. (Summary by EDITEC. Trans. by L.M.F.) DOI

0037

17742 KENYA. MINISTRY OF AGRICULTURE. 1980?. Grain legume project. Thika, Kenya, National Horticultural Research Station. Interim Report no.16. Short Rains 1979/80. 50p. Engl., Illus.

Phaseolus vulgaris. Fertilizers. N. P. Nodulation. Weeding. Herbicides. Intercropping. Disease control. Uromyces phaseoli. Isariopsis griseola. Pseudomonas phaseolicola. Whetzelinia sclerotiorum. Bean common mosaic virus. Erysiphe polygoni. Sclerotium rolfsii. Xanthomonas phaseoli. Resistance. Selection. Cultivars. Germplasm. Crossbreeding. Kenya.

Research work carried out during the short rains 1979/80 in Kenya, aimed at increasing bean production, is discussed. Studies include NP fertilizer trials and expt. on nodulation; weed control through herbicides (trifluralin, penoxalin, linuron, propachlor, alachlor); mixed cropping with maize; effect of planting time in mixed cropping; weed control in mixed cropping; crop protection against different diseases caused by Uromyces phaseoli, Isariopsis griseola, Pseudomonas phaseolicola, Sclerotinia sclerotiorum, BCMV, Elsinoe phaseoli, Erysiphe polygoni, Sclerotium rolfsii, and Xanthomonas phaseoli. Cv. GLP-16 was tested for BCMV resistance. Adverse climatic conditions affected breeding and selection trials; however, disease incidence facilitated effective screening and enabled useful observations. Backcrossing is used to incorporate resistance to Colletotrichum lindemuthianum. Selection was carried out on local farms in monocrops and intercrops and the germplasm collection was evaluated for

disease resistance. Crossbreeding expt. as well as pedigree and bulk selection were conducted. Research results are given in table form. (Summary by EDITEC. Trans. by L.M.F.) D01

0038

16717 LIMO, J.K.A.; SCHOONMAN, J.I. 1973. Interim report, short-rains 1972-1973. Thika, Kenya, Bean Research Project. 12p. Engl.

Phaseolus vulgaris. Fertilizers. Planting. Spacing. Selection. Cultivars. Resistance. Uromyces phaseoli. Xanthomonas phaseoli. P. N. Yields. Kenya.

General information on the trials carried out by the Bean Research Project during the short-rain season, 1972-73, at the Plant Breeding Station in Njaro, Nakuru (Kenya) is given. Cultural practices carried out before the fertilization trials, planting distances, and selection are discussed. In the 1st trial there was no clear response to N and optimum rates of P were estimated at 20-80 kg/ha. A plant density of 25 plants/m^2 is optimum. Local sources of resistance to Uromyces appendiculatus var. typica and Xanthomonas phaseoli were selected among 118 lines. Future research is outlined and the project plans to include other grain legumes such as soybean, groundnut, and broad bean. (Summary by EDITEC. Trans. by L.M.F.) D01

0039

19848 McCLEAN, P.E. 1982. Water stress effects on protein and yield traits in dry bean. Ph.D. Thesis. Fort Collins, Colorado State University. 89p. Engl., Sum. Engl., 79 Refs., Illus.

Phaseolus vulgaris. Seed. Irrigation. Analysis. Protein content. Water stress. Yields. Cultivars. Yield components. Flowering. USA.

Percent protein is usually higher in seeds from nonirrigated plants than seeds from fully-irrigated plants. An insight into the mechanism of this difference may provide the plant breeder with selection techniques for increased protein percentage. Three dry bean cv. (Olathe, UI 111, and Roza) were grown with full, half, and no irrigation during 1980 and 1981. Precipitation and irrigation provided 17% max. seasonal evapotranspiration (ET) for the nonirrigated plots, 38% for the half-irrigated plots, and 65% for the fully-irrigated plots. The 2-yr mean for % protein was 28.7, 27.5, and 25.8% for nonirrigated, half-irrigated, and fully-irrigated plots, resp. Seed compositional analysis revealed that seed size was increased with each added increment of water. Significant cv. differences for % protein in the mature seed were observed. Calculating protein content on a per seed basis showed that each cv. had a characteristic quantity of protein that was independent of the irrigation treatment. The seed wt. increase with increasing soil moisture coupled with constant protein content resulted in a decreased % protein. Globulin 1 (G1) content was related to the seed protein content and was found to be constant for each cv. for all irrigation treatments. Correlation analysis and path coefficient analysis revealed that the relationships between yield and its components changed with added irrigation. The no. of pods/plant was highly correlated with yield within each water treatment. Seeds/pod, however, was highly correlated with yield for the nonirrigated and half-irrigated plants but not for fully-irrigated ones. Further, seeds/pod was the only yield component significantly correlated with selected ET parameters. This indicates that selecting for more seeds/pod may produce increased yields for plants grown with limited irrigation. A large negative correlation was found between % protein and yield. Yield was associated with % nonstructural carbohydrates. Deflowering treatments had no significant effect on

yield or on the yield components. However, the fully deflowered treatments (flowers removed for 2 wk. during peak bloom period) resulted in an increased quantity of protein/seed. Since seed protein % did not increase, this data suggested that both protein and carbohydrate were utilized for deposition in seeds when the deflowering treatments were terminated. (Author's summary) DOI

0040

19416 MURAOKA, T. 1981. Solubilidade do zinco e do manganes em diversos extratores e disponibilidade desses dois micronutrientes para o feijoeiro (Phaseolus vulgaris, L.) cv. Carioca. (Solubility of zinc and manganese in different extractants and availability of these two micronutrients for bean cultivar Carioca). Tese Mag.Sc. Piracicaba-SP, Brasil, Escola Superior de Agricultura Luiz de Queiroz da Universidade de Sao Paulo, 159p. Port., Sum. Port., Engl., 135 Refs.

Phaseolus vulgaris. Zn. Mn. Translocation. Nutrient absorption. Nutrient transport.

To evaluate the availability of soil Zn and Mn for bean cv. Carioca, several acid, saline, and complexing extractants, and methods of total analysis for Zn and Mn were assessed. The following parameters were considered for evaluating the extractants: (1) contents of Mn and Zn extracted; (2) the amount of these micronutrients taken up by the plant; (3) relationship between specific activity of ^{65}Zn and ^{54}Mn in the plant and in the extracts, and (4) L value (amount of element that can be translocated as a chemically identical element added to the soil and measured by a plant cultivated in the system). From bean seed, 59.5% Zn was translocated to the canopy and 5.0% to the roots, of which the greatest part (27.5%) was found in the primary leaves. Only 30% Mn was translocated to the whole plant; of this amount 4% went to the roots and 12% to the primary leaves. Of the extractants evaluated, the modified DTPA (diethylene triamine pentaacetic acid) and the EDTA + $CaCl_2$, both buffered according to the pH of each soil, were the best for estimating soil Zn availability, and $CaCl_2$ at 0.05 M was the most indicated for determining soil Mn availability. The majority of extractants, with the exception of the above mentioned, could not distinguish the behavior of Zn and Mn in the limed and unlimed soil. Fusion with sodium carbonate was the best method for determining total Zn and Mn, although the total soil Zn and Mn did not correlate with the amounts of elements taken up by bean. The L value of Zn and Mn did not correspond resp. to the immediately available soil Zn and Mn. N increased the Mn and Zn uptake by bean, while K affected only Zn uptake. (Extracted from author's summary) DOI

0041

20072 RHEENEN, H.A. VAN 1982. Bean research in Eastern Africa. Thika, Kenya, National Horticultural Research Station. Grain Legume Project. 17p. Engl., 17 Refs. [Ministry of Agriculture, National Horticultural Research Station, P.O. Box 220, Thika, Kenya]

Paper presented at the Biennial Conference of the Bean Improvement Cooperative, Gainesville, Florida, 1982.

Phaseolus vulgaris. Production. Temperature. Rainfall. Cultivars. Selection. Colletotrichum lindemuthianum. Uromyces phaseoli. Pseudomonas phaseolicola. Isariopsis griseola. pH. Soil fertility. Burundi. Kenya. Malawi. Rwanda. Tanzania. Uganda. Zambia.

Bean production data, major producing areas, climatic aspects (rainfall and temp.), and type of beans cultivated in Burundi, Kenya, Malawi, Rwanda, Tanzania, Uganda, and Zambia are given. Factors limiting production in these East African countries are briefly analyzed: climatic, soil, biological, cultural, economic, commercial, and technical factors. Advances of the different research programs are discussed. Local var. and imported material are being collected. Disease control trials have been carried out on anthracnose (Colletotrichum lindemuthianum), rust (Uromyces phaseoli), halo blight (Pseudomonas phaseolicola), and angular leaf spot (Isariopsis griseola). Research priorities are listed, namely soil conditions (pH and fertility), resistance to diseases, pests, and drought, and Rhizobium activity. (Summary by F.G. Trans. by L.M.F.) D01

0042

19451 RODRIGUEZ C., R. 1983. Métodos, momento y técnica de aplicación de los fertilizantes químicos al fríjol. (Application methods, time, and techniques of chemical fertilizers in bean). In Curso Intensivo de Postgrado en la Producción de Fríjol, 4o., Matanzas, Cuba, 1983. Conferencias. Cuba, Ministerio de Agricultura. pp.11-23. Span., 5 Refs.

Phaseolus vulgaris. Fertilizers. Mechanization. Timing. Cuba.

The different methods, times, and techniques of fertilizer application in bean are given. Broadcasting is not recommended; however, if it is used a fertilizer spreader should be utilized and incorporation should take place after application. Band application is the most commonly used method but the fertilizer should be placed below the level of the seed. The other 2 methods studied are localized application and leaf application. Fertilizers of complete formula and microelements should be applied prior to or at planting. N fertilizers lixiviate and vaporize quickly due to their high solubility; therefore split applications should be made at planting and 20-35 days afterwards depending on the flowering period of the var. Recommendations are included and the advantages and disadvantages of the 2 types of fertilizer spreader used in Cuba, IRMG-4 and KPN-4.2, are discussed. (Summary by EDITEC. Trans. by L.M.F.) D01

0043

19722 ROSADO M., F.J. 1982. Influencia de la materia orgánica sobre el cultivo del fríjol común, con énfasis en la incidencia de la mustia hilachosa (Thanatephorus cucumeris Frank. Donk.) en la Chontalpa, Tabasco. [Effect of organic matter on common bean, emphasizing the incidence of web blight (Thanatephorus cucumeris) in Chontalpa, Tabasco]. Tesis Mag.Sc. Tabasco, México, Colegio Superior de Agricultura Tropical. 148p. Span., Sum. Span., 72 Refs., Illus.

Phaseolus vulgaris. Green manures. Rhizoctonia solani. Soil fertility. Yields. Disease control. Mexico.

To determine the effect of OM on soil fertility, incidence of web blight (Thanatephorus cucumeris), and bean yield, 3 field trials were established in the exptl. area of the Colegio Superior de Agricultura Tropical in Cárdenas, Tabasco (Mexico): (1) addition of OM, (2) residual effect of OM, and (3) soil management. Treatments in trials 1 and 2 were 25 and 50 t maize and Stizolobium deeringianum stubble and a control treatment (no addition of OM). Treatment in trial 3 consisted of 8 different forms of soil preparation prior to crop establishment. Bean var. 2 Meses was used and in each trial soil fertility, flora composition, climatic conditions, incidence of web blight, dry wt. of stems and leaves, and yield were evaluated. The addition of maize stubble at 25 and 50 t/ha significantly

reduced the incidence of web blight; this effect lasted throughout the following year. The addition of S. deeringianum stubble at 25 and 50 t/ha significantly favored web blight incidence; this effect also lasted throughout the year following application. The addition of both sources of OM slightly increased soil fertility but the effect was lost the following year. Maize stubble at 25 and 50 t/ha significantly increased clean dry bean production. (Summary by F.G. Trans. by L.M.F.) D01

0044

19491 SINGH, K.N.; PRASAD, R.D.; TOMAR, V.P.S. 1981. Response of French bean to different levels of nitrogen and phosphorus in Nilgiri-Hills under rainfed condition. Indian Journal of Agronomy 26(1):101-102. Engl., 3 Refs. [Central Soil Salinity Research Inst., Karnal 132001, India]

Phaseolus vulgaris. Snap beans. Fertilizers. N. P. Yields. India.

The response of French bean to 3 levels of N (0, 10, and 20 kg/ha) and 4 levels of P (0, 30, 60, and 90 kg/ha) was studied in Mannavanur Kadaikanal, Tamil Nadu (India) under rainfed conditions in a randomized block design with 3 replications. Yields increased with increasing rates of N and the difference due to any 2 levels of N was significant. P applied at 60 and 90 kg/ha significantly increased yields in comparison with 30 kg. (Summary by L.M.F.) D01

0045

20095 SOTO, J.; AGUILERA, M. 1983. Prueba de bioestimulante e inoculante en el cultivo del frejol (Phaseolus vulgaris L.). (Biostimulant and inoculant test on bean). Revista Boliviana de Investigación 1:33-35. Span., Sum. Span., Engl., 5 Refs. [Inst. de Investigaciones Agrícolas El Vallecito, Univ. Gabriel René Moreno, Casilla 702, Santa Cruz, Bolivia]

Phaseolus vulgaris. Fertilizers. Yields. Yield components. Nodulation. Bolivia.

Biostimulants and leaf fertilizers were applied to bean plants to determine their effect on yield. Var. ICA TUI was planted, being previously disinfected with benzothiazole. The inoculant (200 g/ha) or Ergostim (100 cc/ha) were applied at planting and Stimunfol in 3 applications of 1 kg/ha each at 21, 41, and 68 days after planting. During the growth cycle the following data were registered: temp., precipitation, days to flowering, physiological maturity and harvest, nodulation, major pests and diseases. At harvest the final stand, no. of pods/plant, and the no. of grains/pod were recorded. Results obtained show that the treatment with Ergostim and Stimunfol, either combined or alone, increases yields by 12-21% and stimulates leaf development. The most important pest during this crop cycle was Empoasca sp. and the most frequent disease, rust (Uromyces phaseoli). (Author's summary. Trans by L.M.F.) D01

0046

19944 VEGA, J.D.; CANTU, F. 1982. Análisis de la relación clima-agua de algunos cultivos como apoyo a la calendarización y cuantificación del agua de riego. (Analysis of the climate-water relationship of some crops to support timing and quantity of irrigation). Turrialba 32(2): 155-159. Span., Sum. Engl., Span., 4 Refs., Illus. [Inst. Tecnológico y de Estudios Superiores de Monterrey, México]

Phaseolus vulgaris. Evapotranspiration. Irrigation. Soil moisture. Mexico.

In a field trial in 1979 at Apodaca, Nuevo León (Mexico), evapotranspiration - evaporation quotients (EEQ) were determined for (a) sorghum, (b) maize cv. NLVS-1, (c) maize cv. NLVS-1 dwarf, (d) sunflower, and (e) Phaseolus vulgaris from early growth to maturity. For each crop, an analysis was made of the dependence on the environment, differences between consumption patterns, and the efficiency of evapotranspiration. EEQ increased linearly in the early growth stages of all crops and were highest at 40-80% development after which they decreased. Evapotranspiration and evaporation efficiency for (a) to (e) were 25.1, 31.3, 30.6, 25.1 and 21.3 cm and 1.67, 1.28, 1.96, 0.63, and 0.39 g/kg, resp. (Summary by Field Crop Abstracts) D01

0047

19748 WAGENET, R.J.; RODRIGUEZ, R.R.; CAMPBELL, W.F.; TURNER, D.L. 1983. Fertilizer and salty water effects on Phaseolus. Agronomy Journal 75(2):161-166. Engl., Sum. Engl., 23 Refs. [Dept. of Agronomy, Cornell Univ., Ithaca, NY 14853, USA]

Phaseolus vulgaris. Snap beans. Salinity. Irrigation. Fertilizers. N. Water stress. Dry matter. Yields. Mineral content. P. Yield components. USA.

Greenhouse studies, involving interactive effects on snap bean yield of 3 levels of irrigation water salinity, 3 frequencies of irrigation water application, 2 levels of N applied in the irrigation water, and 7 levels of P and K fertilization, were conducted to determine if the adverse effects of saline conditions or water stress on Phaseolus could be overcome by enhanced fertility status and/or improved saline water management on an Argixeroll. DM and bean yields were reduced with decreasing irrigation frequency (2 to 8 days) and increasing salinity of irrigation water (0.5 to 8.0 mmho/cm). Percentage yield decrements were measured for both salt and irrigation regimes. Yield increases were noted for all fertilizer treatments so long as salinity did not become too high (8 mmho/cm). Plant N content and root wt. were shown to be responsive to irrigation frequency and salinity, but not to fertilizer form. N applied in the irrigation water produced increased yield across all treatments in one set of expt. where greenhouse conditions were hot, dry, and of high potential evapotranspirational demand. No N effect was measured in a 2nd series of expt. with low potential evapotranspiration. (Author's summary) D01

See also 0049 0051 0053 0056 0058 0059 0064 0065 0071 0076 0136 0145 0148 0154 0158 0159 0169 0172 0189

D02 Cultivation Practices: Planting, Weed Control and Harvesting

0048

19837 AGUDELO J., J.M.; MARTINEZ C., A. 1974. Estudio comparativo del rendimiento de fríjol (Phaseolus vulgaris L.) con diferentes tratamientos de control de malezas. (Comparative yield trial of bean with different weed control treatments). Tesis Ing.Agr. Medellín, Universidad Nacional de Colombia. 84p. Span., Sum. Span., 32 Refs., Illus.

Phaseolus vulgaris. Herbicides. Yields. Colombia.

A trial was conducted at the Centro Nacional de Investigaciones Agropecuarias Tulio Ospina, Valle de Aburrá, Antioquia (Colombia) to determine which

of the herbicides recommended for the region, increases bean yields. The herbicides studied were: linuron + DCPA (0.5 kg a.i./ha + 1.4 kg a.i./ha), linuron + butylate (0.5 kg a.i./ha + 2.0 kg a.i./ha), and methabenzthiazuron (2.1 kg a.i./ha). Both a mechanical and an absolute check treatments were also used. Predominant weeds during the trial were Cyperus rotundus, Cynodon dactylon, Nycandra physalodes, Amaranthus sp., Galinsoga spp., Portulaca oleracea, and Xanthium occidentali. Results obtained showed that methabenzthiazuron was toxic to the plants and if linuron was incorporated into the soil, it lost its effectivity. The best treatment was linuron + DCPA, although it did not control the most resistant weeds (Cyperus rotundus and Cynodon dactylon). Increased production and reduced production costs can be achieved if herbicides are employed adequately. (Author's summary. Trans. by L.M.F.) D02

0049

19494 AJQUEJAY A., S. 1980. Efecto de la densidad y la fertilización en seis genotipos diferentes de fríjol (Phaseolus vulgaris L.) en el sur-oriente de Guatemala. (Effect of density and fertilization on six different bean genotypes in southeastern Guatemala). Tesis. Ing.Agr. Guatemala, Universidad de San Carlos. 72p. Span., 21 Refs., Illus.

Phaseolus vulgaris. Planting. Spacing. Genotypes. Fertilizers. Cultivars. N. P. Flowering. Maturation. Yield components. Yields. Guatemala.

In 1978 two preliminary trials were conducted to determine the effect of planting density (180, 250, 416, and 1250 thousand plants/ha) of 6 bean genotypes (Rabia de Gato, Línea 78-86, Línea 78-64, Línea 78-47, Goiano Precoce, and Culma) of growth habits I and II at the localities of Atescatempa and Jalpatagua in SE Guatemala. During 1979-80, 2 other trials were installed at Monjas and Ipala, which incorporated the factor fertilization in addition to the other tested factors (density and var.). At Monjas 20 and 40 kg N and 25 and 50 kg P were applied per hectare, and at Ipala, 20 and 50 kg N and 25 and 55 kg P were applied per hectare. Parameters determined were the no. of days to the initiation of flowering, days to physiological maturity, no. of nodes, no. of pods/plant, no. of seeds/pod, wt. of 100 seeds, no. of harvested plants, and yield. As planting density increased in the 1st 2 trials, the % of harvested plants progressively decreased in relation to the no. of seeds initially planted. The no. of seeds/pod and seed wt. were not affected by the different densities. A significant difference was observed among var. regarding wt. of 100 seeds. The no. of pods/plant was the component most affected by density. In density and fertilization trials, final stand was less than that expected in the different treatments. Recommendations include the development of erect genotypes with scarce branching and with most of the pods on the main stem since this type responds better to high planting densities. (Summary by F.G. Trans. by L.M.F.) D02

0050

19461 ASHLEY, R.A. 1982. Timing applications of diclofop for control of large crabgrass. Proceedings Northeastern Weed Science Society 36:199-202. Engl. [Univ. of Connecticut, Storrs, CT 06268, USA]

Phaseolus vulgaris. Snap beans. Weeding. Herbicides. Timing. USA.

Field expt. were conducted at the U. of Connecticut Agronomy Research Farm (Storrs, USA) to determine the feasibility of timing diclofop treatments for control of Digitaria sanguinalis in snap beans in terms of days after sowing rather than leaf count. D. sanguinalis was controlled with diclofop at 1.1 kg/ha either preemergence or up to 14 days after sowing. Applica-

tions in the early morning or in the evening were significantly more effective than those at midday. (Summary by Herbage Abstracts) D02

0051

12325 BELIZE. MINISTRY OF AGRICULTURE. 197? Growing red kidney beans. Belize. 6p. Engl.

Phaseolus vulgaris. Planting. Timing. Seed. Land preparation. Spacing. Fertilizers. N. P. K. Weeding. Pest control. Harvesting. Belize.

Some aspects of bean cultivation in Belize are briefly described in relation to planting date; soil type; seeds; land preparation; planting distance; fertilization; weed, insect, and disease control; and harvesting. The best planting time is in the months of Nov. and Dec. Well-drained soils are recommended; selected treated seed should be used and land preparation should be completed at least 7 days before planting. Seeds should be planted approx. 2-3 cm deep, spacing 7-8 cm apart in the row and 50-60 cm between rows. The crop requires 20-35, 25-40, and 25-35 kg, resp., of N, P, and K/ha. Most common diseases are rust (Uromyces appendiculatus), BCMV, and web blight (Thanatephorus cucumeris). (Summary by EDITEC. Trans. by L.M.F.) D02

0052

19741 DANIELLS, J.W.; WILSON, G.L. 1983. Plant spacing in French beans. 1. Yield. Australian Journal of Experimental Agriculture and Animal Husbandry 23(120):54-57. Engl., Sum. Engl., 8 Refs., Illus. [Dept. of Primary Industries, South Johnstone Research Station, P.O. Box 20, South Johnstone, Qld. 4859, Australia]

Phaseolus vulgaris. Planting. Spacing. Cultivars. Snap beans. Dry matter. Yields. Australia.

Four French bean cv. (Providor, Gallatin 50, Slenderette, and Redlands New Pioneer) were grown at a range of plant population densities and rectangularities in 2 seasons in SE Queensland, Australia. Plant population densities 2-3 times those used commercially increased yields by 25-30%. This increase resulted from a greater no. of pods/unit area with only a small reduction in pod size. Rectangularity in the range 1-8 had no effect on yield. These responses are discussed in terms of time courses of LAI development, light interception by canopies, crop growth rates, and DM distribution between vegetative and reproductive growth after flowering. (Author's summary) D02

0053

16462 EGYPT. MINISTRY OF AGRICULTURE. 1932. French beans (Fasoolia). Phaseolus vulgaris, L. Cairo, New Series Leaflet no.7. 4p. Engl.

Phaseolus vulgaris. Snap beans. Agronomic characters. Planting. Timing. Spacing. Fertilizers. Irrigation. Maturation. Egypt.

Plant characteristics and cultivation of snap bean in Egypt are described. The most cultivated var. in Cairo is Baladi. Planting takes place in Jan. and harvesting in early April; however, successive sowings are made throughout the summer until the beginning of Oct. Aspects related to planting, quantity of seed, planting distances, fertilizers, and irrigation are given. Pods are ready for harvest in 45 days in summer and in 70-80 days in spring. In the northern part of Delta the 1st planting is made 10-15 days later than in the southern district. (Summary by EDITEC. Trans. by L.M.F.) D02

0054

20033 ELLAL, G.; BRYAN, H.H.; McMILLAN JUNIOR, R.T. 1982. Influence of plant spacing on snap bean yield and disease incidence. Proceedings of the Florida State Horticultural Society 95:325-328. Engl., Sum. Engl., 4 Refs., Illus. [IFAS, Univ. of Florida, Agricultural Research & Education Center, 18905 SW 280 Street, Homestead, FL 33031, USA]

Phaseolus vulgaris. Spacing. Planting. Yields. Snap beans. Rhizoctonia solani. Fusarium solani phaseoli. Yield components. USA.

Five in-row spacings (0.75, 1.3, 2.5, 5.1, and 7.6 cm) between plants were evaluated for yield and disease incidence in snap bean at the Agricultural Research and Education Center, Homestead, Florida, USA. Yields were significantly higher at 5.1, 2.5, and 1.3 cm spacings than at the 0.75 and 7.6 cm spacings. Stem diameter was correlated (P = 0.01) to space between plants. Yield components (pods, foliage, and roots) were correlated (P = 0.01) to stem diameter. No correlation was found between yield and stem lesions caused by either Rhizoctonia or Fusarium. In a factorial plant population expt. with plant populations ranging from 140 to 608 thousand plants/ha, bean yield was highly correlated with plant population (P = 0.01). Av. plant wt. and pod wt./plant were inversely correlated to plant population (P = 0.01). (Author's summary) D02

0055

19013 EMPRESA BRASILEIRA DE ASSISTENCIA TECNICA E EXTENSAO RURAL. 1980. Sistema de producao para feijao (Revisao). (Bean production system - a review). Irece-BA, Brasil, Série Sistema de Producao. Circular no.222. 20p. Port.

Phaseolus vulgaris. Planting. Spacing. Land preparation. Pest control. Harvesting. Threshing. Storage. Trade. Brazil.

Farmers, researchers, and extension workers met in the municipality of Irece, BA, Brazil, in July 1980 to review bean production systems and promote the transfer of technology. The characteristics of each system and cultural operations are described. This information is specially oriented toward farmers with land resources above 100 ha, with available machinery and equipment, and includes operations such as land preparation, planting, cultural practices, pest and disease control, harvesting and processing, storage, and commercialization. Rocky areas that could readily be flooded should be avoided for planting and plowing should take place 30-60 days before at a depth of 15-20 cm; certified seed or seed from reliable sources should be used, treated with 90 g captan or thiram 50%/60-kg-sack; 40 kg seed should be planted per hectare at 65 cm, 10-12 plants/m. For storing, beans should have a MC around 13%. Cooperatives are in charge of the commercialization with a support price policy. Technical coefficients/ha are given for each one of the operations. Expected production is 1.08 t/ha. (Summary by EDITEC. Trans. by L.M.F.) D02

0056

18575 ERDMANN, M.H.; ADAMS, M.W. 1978. Row width, plant spacing and planting depth. In Robertson, L.S.; Frazier, R.D., eds. Dry bean production—principles and practices. East Lansing, Michigan State University. Cooperative Extension Service. Agricultural Experiment Station. Extension Bulletin E-1251. pp.124-133. Engl., 6 Refs., Illus.

Phaseolus vulgaris. Planting. Spacing. Yields. Irrigation. Cultivars. Timing. USA.

Results of research carried out in Michigan, USA, are discussed to recommend the most appropriate row width, plant spacing, planting depth and date for the region to obtain optimum bean yields. (Summary by EDITEC. Trans. by L.M.F.) DO2

0057

19443 FIGUEREDO G., F.E. 1983. Algunos aspectos fundamentales sobre la mecanización del fríjol. (Basic aspects on bean mechanization). In Curso Intensivo de Postgrado en la Producción de Fríjol, 4o., Matanzas, Cuba, 1983. Conferencias. Cuba, Ministerio de Agricultura. pp.41-46. Span., Illus.

Phaseolus vulgaris. Land preparation. Planting. Harvesting. Weeding. Mechanization. Cuba.

The different operations of land preparation, preplanting, planting, cultivation, and harvesting for bean production using mechanization are described. Emphasis is placed on the elimination of superficial stubble and other obstacles such as stones and tree trunks. Fundamental aspects that should be taken into account at harvesting are indicated: (1) optimum time of harvest according to MC (18-20%); (2) piling up in continuous rows with a high density for shelling on a clean surface without stones; (3) threshing the grain at the optimum moisture point (15-16%); (4) harvester in good working condition; and (5) use of qualified personnel. (Summary by EDITEC. Trans. by L.M.F.) DO2

0058

19449 IRAÑETA, M.; RODRIGUEZ, R. 1983. Agrotecnia del fríjol. (Agrotechny of bean). In Curso Intensivo de Postgrado en la Producción de Fríjol, 4o., Matanzas, Cuba, 1983. Conferencias. Cuba, Ministerio de Agricultura. pp.71-85. Span., 7 Refs., Illus.

Phaseolus vulgaris. Climatic requirements. Land preparation. Herbicides. Fertilizers. P. Seed. Planting. Timing. Spacing. Irrigation. Harvesting. Weeding. Empoasca sp. Bemisia tabaci. Agromyza sp. Uromyces phaseoli. Cuba.

Different agrotechnical aspects of bean cultivation in the province of Matanzas, Cuba, are described as well as edaphoclimatic requirements, land preparation, use of herbicides, fertilizers, seeds, planting method, time and density, the var. most frequently used, irrigation, cultivation, pest and disease control, and harvesting. Trifluralin is the herbicide most frequently used at rates between 1.5-2.0 l/ha according to soil type. When applying fertilizers, the formula should include at least 85 kg P/ha. Fertilizers are broadcasted or applied in a localized form. Planting time is from Sept. 10 to Jan. 15 and in nonirrigated areas, from Sept. 10 to Oct. 15. Major pests include leafhoppers (Empoasca sp.), whiteflies (Bemisia tabaci), leafminers (Agromyza sp.), and chrysomelids; most important diseases are rust (Uromyces phaseoli) and bacteriosis. Harvesting takes place when 95% of the pods have completely changed their color, once the crop has reached its physiological maturity. (Summary by EDITEC. Trans. by L.M.F.) DO2

0059

16463 JACKSON, T.? 1977. Report on progress of experiments on bean growing in Awash Valley of Ethiopia. Ethiopia. 14p. Engl.

Phaseolus vulgaris. Planting. Timing. Spacing. Weeds. Yields. Fertilizers. N. P. K. S. Irrigation. Resistance. Uromyces phaseoli. Bean common mosaic

virus. Sclerotium rolfsii. Macrophomina phaseoli. Disease control. Ethiopia.

Objectives, exptl. design, plot size, treatments, and field operations carried out during the following expt. on bean in Ethiopia are given: effect of planting date and plant population on weed population and yield; fertilizer trials with N, P, K, S, and their combination; determination of optimum irrigation interval; seedbed preparation under irrigation. Selection work and haricot seed production are also discussed. Studies included Rhizobium inoculation of different pulse specie . Regarding crop protection, testing was carried out for resistance to Uromyces phaseoli and BCMV. Soil treatments to control Meloidogyne spp., Sclerotium rolfsii, and Macrophomina phaseoli are described. (Summary by EDITEC. Trans. by L.M.F.) D02

0060

19452 IABRADA, R. 1983. Formulaciones de herbicidas útiles para el cultivo del fríjol (Phaseolus vulgaris L.). (Useful herbicide formulations for bean crops). In Curso Intensivo de Postgrado en la Producción de Fríjol, 4o., Matanzas, Cuba, 1983. Conferencias. Cuba, Ministerio de Agricultura. pp.24-42. Span., 10 Refs.

Phaseolus vulgaris. Herbicides. Cuba.

The characteristics, application times and doses of herbicides recommended for weed control in bean crops are described. There are selective and nonselective products, among which are: (1) dinitroanilines, preplant incorporated at a depth of 6-8 cm, which include trifluralin, nitralin, dinitramine, isopropalin, and fluchloralin; (2) acetanilides, preemergence applied to the soil with sufficient moisture, which include alachlor, propachlor, and metolachlor; (3) urea-derived herbicides, of which only a few are selective such as metobromuron, linuron, and monolinuron, applied preemergence to moist soil to control dicotyledonous weeds; (4) thiocarbamates, preplant incorporated, and including EPTC, pebulate, butylate, and vernolate. Other compounds studied are diphenyl ethers (fluorodifen), phenoxypropionate (setoxidium), and metribuzin. Information is given in table form regarding the efficacy of the different herbicide combinations in controlling weed species such as Amaranthus dubius, Parthenium hysterophorus, Equinochloa colonum, Brachiaria platyphyla, Cyperus rotundus, and Digitaria sanguinalis. (Summary by EDITEC. Trans. by L.M.F.) D02

0061

19474 TOVAR H., S. 1981. Evaluación preliminar de la eficiencia en el rendimiento del cultivo del fríjol en la Comarca Lagunera. (Preliminary evaluation of yield efficiency of bean crops in the Comarca Lagunera). In Centro de Investigaciones Agrícolas del Norte. Informe de investigación agrícola: fríjol y soya 1976-1978. México, Instituto Nacional de Investigaciones Agrícolas. pp.80-94. Span., Sum. Span. [Campo Agrícola Experimental de La Laguna, Centro de Investigación Agrícola del Noreste, Inst. Nacional de Investigaciones Agrícolas, México]

Phaseolus vulgaris. Planting. Timing. Yields. Land preparation. Mechanization. Statistical analysis. Costs. Income. Irrigation. Mexico.

A field survey was made on bean growers in the Comarca Lagunera, Mexico, to obtain information on soil management practices, adoption of available technical information, efficiency of cultivation, and possible factors that affected yield. Av. yield in spring was higher (1157 kg/ha) than during

the summer (735 kg/ha). The mean cost/ha was $3364.05 and the av. income was $4595.25. An av. profit of $2292.16/ha was obtained by 60% of the farmers and 40% of the farmers had losses of $1329.38/ha. Possible causes of these low yields in comparison with those obtained by the Centro de Investigaciones Agrícolas del Norte of 2500 kg/ha (although there were some bean growers that reached this efficiency) are: lack of machinery for adequate crop management, the large area planted to bean, lack of information on the crop by the farmer, late plantings, deficient irrigation, and scattered location of plots in the Ejido sector. (Author's summary. Trans. by L.M.F.) D02

0062

19953 VENCATASAMY, D.R.; RUHEE, K.C. 1981. Preliminary studies on dry beans, Phaseolus vulgaris L. production. Revue Agricole et Sucriere de l'Ile Maurice 60(3-4):167-173. Engl., Sum. Engl., Fr., 5 Refs., Illus. [School of Agriculture, Univ. of Mauritius, Reduit, Mauritius]

Phaseolus vulgaris. Cultivars. Planting. Spacing. Yields. Seed production. Fertilizers. N. Inoculation. Rhizobium phaseoli. Yield components. Mauritius.

Phaseolus vulgaris cv. Long Tom, Local Red, Pioneer, and Noorimbee were grown at spacings of 12 x 12, 18 x 18, or 24 x 24 cm and were given 30, 60, or 90 kg N/ha and inoculated with Rhizobium phaseoli at the University Farm, Réduit, Mauritius. Seed yields were 59-219, 233-567, and 290-764 kg/ha for Local Red, Long Tom, and Pioneer, resp. Noorimbee gave no yield because of cyclone damage. There was no response to more than 30 kg N/ha. Seed yield increased with plant density. Data on yield components are also given. (Summary by Field Crop Abstracts) D02

0063

19413 ZAFFARONI, E.; FERNANDEZ M., B. 1981. Efeito de sistemas de cultivo do feijoeiro (Phaseolus vulgaris L.) em algumas características físicas do solo. (Effect of bean cropping systems on some physical characteristics of the soil). Agropecuária Técnica 2(2):111-119. Port., Sum. Port., Engl., 29 Refs., Illus. [Univ. Federal da Paraíba, Campus III - Areia, 58.397 Areia-PB, Brasil]

Phaseolus vulgaris. Land preparation. Mechanization. Brazil.

The effects of 6 different systems of soil preparation for planting beans on soil MC, bulk density, and total porosity were studied on a Red-Yellow Latosol of the Agrarian Science Center of the U. Federal da Paraíba, Areia, Brazil. Treatments were (1) disk plowing and disk harrowed twice, (2) mechanized preparation using a rotary hoe, (3) manual cultivation on ridges or furrows using a hoe, (4) manual cultivation without furrows, (5) cultivation using animal traction (cultivator pulled by oxen), and (6) direct planting applying glyphosate. The different soil preparation systems did not affect physical properties of the soil, except for the total porosity at a depth of 10-20 cm. The direct planting system yielded the highest value of total porosity. The little effect of soil preparation systems on soil physical properties was mainly due to the fact that short-term management practices do not substantially modify the physical behavior of soil. (Author's summary) D02

See also 0031 0036 0037 0038 0066 0069 0072 0076
0077 0078 0134 0148 0158 0170 0174 0192

0064

19839 ARGEL M., P. 1972. Respuesta de la papa (Solanum tuberosum L.) al N, P_2O_5 y K_2O bajo el sistema papa-maíz-fríjol de enredadera, asociados. (Response of potato (Solanum tuberosum) to N, P, and K in potato-maize-climbing bean intercropping). Tesis Ing.Agr. Medellín, Universidad Nacional de Colombia. 70p. Span., Sum. Span., 5 Refs., Illus.

Phaseolus vulgaris. Intercropping. Zea mays. Solanum tuberosum. Fertilizers. N. P. K. Yields. Statistical analysis. Colombia.

An expt. was conducted on a farm in the municipality of Viboral, Antioquia, Colombia, on a loamy soil with a pH of 4.9, rich in OM, high P fixation and water-binding capacity to observe the response of potato to N, P, and K in potato-maize-bean intercropping. A randomized block design was used with 20 treatments and 3 replications. Fertilizers were applied to maize and bean according to the formulations 50-50-0 and 20-60-20 resp. Av. yields obtained were compared with the sole check (farmer's system) planted immediately after the trial planting. Potato var. Purace, maize var. Criollo or Montaña, and bean var. Cargamanto were used. Potato responded well to N, P, and K, in particular P (0-450 kg/ha). Av. maize and bean yields were analyzed statistically, and the residual effect of fertilizers applied to potato on these yields was determined through diagrams. The response of bean to the residual effect of fertilizers varied greatly. (Extracted from author's summary. Trans. by L.M.F.) D03

0065

19730 BARRERO R., M.A. 1980. Efecto de dos fuentes (boñiga y gallinaza) y tres niveles de materia orgánica en la producción del sistema de cultivo de maíz (Zea mays) asociado con fríjol (Phaseolus vulgaris) de enredadera o voluble. [Effect of two sources of organic matter (cattle and chicken dung) and three levels of application on the production of maize intercropped with bean]. Tesis Ing.Agr. Bogotá, Universidad Nacional de Colombia. 97p. Span., Sum. Span., 36 Refs., Illus.

Phaseolus vulgaris. Manures. Dung. Green manures. Intercropping. Yields. Fertilizers. N. Income. Colombia.

During the 1st semester of 1979, an expt. was conducted at the Centro Nacional de Investigaciones Agropecuarias, Tibaitatá (Colombia) to determine if the use of 3 different rates of OM (1.5, 3.0, and 4.5 t/ha) increased yield and productivity of maize/bean intercrops and to evaluate 2 sources of OM (cattle and chicken dung). A split-split plot design was used with 3 replications; regional var. Sogamoseño (maize) and Bola Roja (bean) were planted simultaneously, with 0.90 m in square and a population of 3 maize and 2 bean plants/site. The application of the different rates of OM (cattle and chicken dung) was done at thinning and the nutritional requirements of the association were later fulfilled by applying 100 kg N/ha. Maize yields showed that 3.0 t OM/ha, regardless of the source, was better than the other rates. There were significant differences in yield. Chicken manure increased maize yields, but these were not significantly higher than those obtained with cattle dung. N fertilization did not have a favorable effect on yield in the intercropping system. An unidentified physiological disturbance in bean, with an infestation of 70-80%, did not allow yield data to be consistent in order to evaluate the 2 sources of OM and their incidence on yield potential in associated cropping. The possible relationship between the higher OM rate and the increased % of disturbance placed cattle dung as less severe than chicken manure. Higher av. gross incomes/ha in associated cropping were obtained using 1.5 and 3.0

t OM/ha; however, the 1st is recommended due to the lower production costs. In spite of the lack of experience in the exptl. management of this system and the presence of the disturbance, the potentiality of the system was observed, justifying further study. An appendix on the weeds, pests, and diseases identified in the intercropping system during this trial is included. (Author's summary. Trans. by L.M.F.) D03

0066

20627 CAMARENA M., P.; CERRATE V., A. 1980. Comparación de sistemas en monocultivo y asociado y época oportuna de siembra de fríjol en asociación con maíz en el Callejón de Huaylas, Perú. (Comparison of sole cropping and intercropping systems and appropriate planting time of bean in association with maize in the Callejón de Huaylas, Peru). Anales Científicos U.N.A. 18(1-4):191-197. Span., Sum. Span., Engl., 17 Refs.

Phaseolus vulgaris. Intercropping. Zea mays. Planting. Timing. Yields. Cultivars. Climbing beans. Peru.

An intercropping trial was carried out with maize cv. PMS 635 and climbing bean cv. Cargamanto (introduced) and Numia (native) at Carhuaz, Peru, to compare this intercropping system with sole cropping and to determine the optimum planting date of bean in relation to maize. Treatments were maize and bean in monoculture, simultaneous planting of maize and bean, and bean planted 20, 40, and 60 days after maize. A split plot design was used with bean types as main plots and planting dates as subplots. The yields obtained indicate that bean and maize monocultures are significantly higher yielders than associated cropping, but the productivity of the maize/bean intercropping system is 37% more than that of monoculture. Simultaneous planting of maize and beans was the best planting date for the var. used. Maize yields were not significantly affected by bean planting dates, but bean yields were significantly affected when planted 20 days after maize. Maize yields are lower in association with Cargamanto than with Numia. Av. yield differences of Cargamanto and Numia beans are not significant. The association of maize PMS 635 with Cargamanto in simultaneous planting is most advantageous for the conditions of Carhuaz. (Author's summary. Trans. by L.M.F.) D03

0067

19872 CASADIEGO L., E.M.; GARCIA G., J.C. 1982. Evaluación agronómica de veinticinco variedades de maíz (Zea mays L.) de clima frío bajo el sistema de asociación con fríjol voluble. (Agronomic evaluation of twenty-five maize varieties of cold climate grown in association with climbing bean). Tesis Ing.Agr. Bogotá, Universidad Nacional de Colombia. 187p. Span., Sum. Engl., Span., 64 Refs., Illus.

Phaseolus vulgaris. Intercropping. Zea mays. Yields. Colombia.

At the Centro Nacional de Investigaciones Agropecuarias Tibaitatá (Cundinamarca, Colombia) in 1979, 25 maize var. adapted to cold climates were assessed in association with climbing bean and in monoculture. A randomized complete block design was used with 4 replications. Maize yields tended to decrease when intercropped with bean; however, MB52 (MPR)XI, MB56 (MP)III x MB51 (MPR)VIII, MB56 (MP)XI, and ICA V555 increased their yields in association with climbing bean. An av. yield of 726 kg bean/ha was obtained when associated with the 25 maize var. Bean yields were observed to vary according to the maize genotype used as intercrop. Beans gave higher yields when associated with promissory maize materials (807 kg/ha) than with the native var. (554 kg/ha). If both crops are to produce good results, maize plants of intermediate height that do not significantly affect bean yields should

be selected and thus guarantee higher economic incomes/ha. (Summary by F.G. Trans. by L.M.F.) D03

0068

19983 GALVAO, E.U.P.; CESAR, J.; HOMMA, A.K.O. 1980. Comparacao entre cultivos solteiros e consorciados (mandioca, feijao, arroz e milho) em terra firme, do Estado do Amazonas. [Comparison of pure stands and associated crops (cassava, bean, rice, and maize) grown on firm soil in the state of Amazonas, Brazil]. Manaus-AM, Brasil, Empresa Brasileira de Pesquisa Agropecuária. Unidade de Execucao de Pesquisa de Ambito Estadual. Circular Técnica no.03. 12p. Port., Sum. Port., 5 Refs.

Phaseolus vulgaris. Intercropping. Manihot esculenta. Zea mays. Income. Brazil.

In expt. carried out during the 1975-76 crop year on a Yellow latosol, clay texture, in Manaus, AM, Brazil, cassava, rice, bean, and maize crops were evaluated in pure stand and in associated crops. Combinations among crops gave 15 different planting systems, carried out in a randomized block design with 3 replications. Neither fertilization nor soil amendment was carried out. Fluctuations in crop yields in associated cropping systems were assessed and the advantages that they represent for the farmer are discussed. Estimated indices include total food production, productivity, LER, and economic efficiency. Highest gross returns were obtained, in descending order, with the combinations cassava x bean, cassava x maize, cassava x maize x bean, cassava in monoculture, cassava x rice x maize, and cassava x maize. Lowest productivity corresponded to bean in the treatment cassava x rice x bean and the lowest profitability occurred in rice x maize intercropping. The importance of associated cropping is emphasized since this practice is not widespread among farmers of this region. (Author's summary. Trans. by L.M.F.) D03

0069

20621 JIMENEZ C., T. 1981. Desempeño de sistemas de cultivos con maíz, fríjol común y fríjol lima, en dos tipos de laboreo del suelo y dos niveles de fertilización con nitrógeno. (Performance of maize, common bean, and lima bean cropping systems under two types of land preparation and two levels of nitrogen fertilization). Tesis Mag.Sc. San José, Universidad de Costa Rica. 86p. Span., Sum. Span., Engl., 60 Refs., Illus.

Phaseolus vulgaris. Rotational crops. Zea mays. P. lunatus. Cultivation. Land preparation. Fertilizers. N. Intercropping. Yields. Income. Productivity. Costa Rica.

An expt. was conducted at Turrialba, Costa Rica, to measure the agronomic, economic, and energetic efficiency of 6 cropping systems under no tillage and conventional soil tillage and with N fertilizations of 0 and 120 kg/ha. The 6 cropping systems were maize followed by maize ($M_1 \cdot M_2$), common bean followed by maize ($F \cdot M_2$) lima bean followed by maize ($L \cdot M_2$), $M_1 + F \cdot M_2$, $M_1 + L \cdot M_2$, and $F + L \cdot M_2$. The no tillage treatment consisted in the application of the herbicide glyphosate to weeds 8 days prior to planting and the conventional tillage in plowing, two diskings, and the application of pendimethalin in preemergence. N was applied to the 1st planting, Dec. 1979, with 6 cropping arrangements. The 2nd planting, in June 1980, was maize alone without fertilizer in all plots. Data from 1977 to 1980 showed greater increment of the soil OM with no tillage than with conventional tillage; the inverse occurred with Mn. Other soil chemical properties varied little. Capillary porosity increased more with no tillage than with

conventional tillage. Tillage and cropping systems interactions with damage of pests and diseases were observed. The lima bean monoculture with no tillage was more damaged by slugs than intercrops or with conventional tillage. In plantings, the predominant weeds Panicum maximum and Paspalum fasciculatum, were less with no tillage. Maize grain yield for the 1st planting was not affected by cropping arrangement, but was greater in no tillage plots with N. The common bean grain yields was superior in monoculture with application of N. Regardless of the cropping arrangement and fertilization, common bean grain yield was greater with no tillage. Lima bean also yielded more in monoculture but when N was applied with conventional tillage. Most profitable cropping systems was $F \rightarrow M_2$, in no tillage with 120 kg N/ha. The profit was the return on the human labor, investment, and cultivated land area. No cropping system was capable of returning as harvested energy, all of the additional energy required for tillage and N fertilization. From the energy point of view, the most simple cropping system, $M_1 \rightarrow M_2$ with no tillage and without N fertillzation, was the most efficient in transforming cultural energy into harvested energy. (Author's summary) D03

0070

20014 MUIGAI, S.G.S.; RHEENEN, H.A. VAN 1982. Screening for mixed cropping. Thika, Kenya, National Horticultural Research Station. Grain Legume Project. 12p. Engl., 8 Refs., Illus. [National Horticultural Research Station, P.O. Box 220, Thika, Kenya]

Paper presented at the Biennial Conference of the Bean Improvement Cooperative, Gainesville, Florida, 1982.

Phaseolus vulgaris. Cultivars. Intercropping. Yields. Statistical analysis. Kenya.

From 1977 to 1981 a no. of trials were carried out in Kenya to evaluate different var. under 2 cropping systems (monocropping and mixed cropping). A split plot design was used with the 2 systems corresponding to the main plot and the different var. randomly distributed in the subplots. Correlation coefficients of yields of the different systems were calculated. The av. r-value equals 0.260 ± 0.024. Tables are included with the correlations found. A variance analysis was carried out, indicating that interactions between cropping system and var. occur. (Summary by F.G. Trans. by L.M.F.) D03

0071

19490 SOLIS A., M.A. 1980. Niveles de fertilización con nitrógeno y fósforo en sistema asociado, maíz-fríjol de primera en tres localidades y fríjol de segunda en cuatro localidades de Jutiapa. (Levels of nitrogen and phosphorus fertilization in associated cropping, maize/bean in the first planting at three sites and beans in the second planting at four sites in Jutiapa). Tesis Ing.Agr. Guatemala, Universidad de San Carlos. 59p. Span., 27 Refs., Illus.

Phaseolus vulgaris. Fertilizers. N. P. Intercropping. Zea mays. Yields. Guatemala.

An expt. was carried out at the Guatemalan Instituto de Ciencia y Tecnología Agrícolas to evaluate 4 levels of N (125, 100, 75, and 50 kg/ha) and 3 of P (90, 70, and 50 kg/ha) in the maize/bean association and to determine an economic optimum. Two planting seasons were used; in the 1st planting season maize and bean were evaluated in the localities of Quesada, Jutiapa, and El Progreso and in the second planting season, only beans were evalu-

ated in Agua Blanca, Asunción Mita, and Yupiltepeque. Maize had a better yield response to high fertilization rates than to low rates, whereas beans had higher yields with low fertilization rates. The optimum level of fertilization found was 50 kg N and 50 kg P/ha. In bean, components that most affected yield were the no. of pods/plant and the av. wt. of beans in the 1st planting season, and in the 2nd planting season, the av. wt. of beans. (Extracted from author's summary. Trans. by L.M.F.) D03

0072

19300 THOMAS, P.K.; MOHAN KUMAR, C.R.; PRABHAKAR, M. 1982. Intercropping cassava with French beans. Indian Farming 32(4):5. Engl. [Central Tuber Crops Research Inst., Sreekariyam, Trivandrum, 17 Kerala, India]

Phaseolus vulgaris. Snap beans. Intercropping. Manihot esculenta. Planting. Spacing. Timing. Fertilizers. Harvesting. India.

Some of the intercropping studies with cassava at the Central Tuber Crops Research Institute, Trivandrum, India, have shown that the French bean var. Contender can be taken as a successful intercrop with cassava. Management practices for this association are given. Cassava cuttings should be planted in the 1st half of June and immediately after cassava planting, been seeds should be dribbled at a spacing of 30 cm interrow and 20 cm within the rows. Fertilizers are applied 3 wk. after seed germination and chemical products are sprayed to control insects. The 1st harvest of green pods can be done 45-50 days after planting, and 2 more pickings can be done within 10-15 days time. Cassava will be ready for harvest 10 mo. after planting. (Summary by F.G. Trans. by L.M.F.) D03

0073

19479 TORREGROZA C., M.; RAMIREZ DE M., C.; MORENO, J.D. 1983. Investigaciones agronómicas en el sistema maíz-fríjol. 1. Efectos en la productividad y prolificidad de asociar dialélicamente siete genotipos de maíz con cinco de fríjol voluble. (Agronomic research on maize/bean intercropping. 1. Effects on productivity and prolificacy of a diallel association of seven maize genotypes with five of climbing bean). Tibaitatá, Colombia, Instituto Colombiano Agropecuario. Subgerencia Investigación. 19p. Span., Illus.

Phaseolus vulgaris. Intercropping. Zea mays. Cultivars. Yields. Statistical analysis. Genotypes. Colombia.

Results of research on the maize/bean intercropping system carried out during 1979-81 by the Centro Nacional de Investigaciones of the Instituto Colombiano Agropecuario (ICA) in Tibaitatá, Colombia, are given in table form and as figures. Maize genotypes tested corresponded to the exptl. lines MB 54, MB 56, MB 58, MB 510, MB 512, MB 513, and the var. ICA V 507. Bean genotypes included the var. Ecuador 51 and Antioquia 48, and the exptl. lines L32980 (M4), L32980 (M8), and L3298. (M4). The most important characteristics analyzed were: av. yield of materials, prolificacy of maize (ears/plant), and phenotypic stability. Among bean materials, line L32980 (M4) had the best performance in associated cropping with 606 kg/ha; in monoculture it yielded 1388 kg/ha. Other outstanding materials were L32980 (M8) and Antioquia 48 with av. yields in monoculture and in associated cropping of 1432 and 582, and 931 and 515 kg/ha, resp. (Summary by EDITEC. Trans. by L.M.F.) D03

0074

17859 WILL, A.G.K. 1971. Notes on a small vegetable market garden trial in Uganda. In East African Horticultural Symposium, 1st., Kampala, Uganda, 1970. Papers. The Hague, Netherlands, International Society for Horticultural Science. Technical communications no.21. pp.66-72. Engl., 2 Refs.

Phaseolus vulgaris. Rotational crops. Marketing. Snap beans. Income. Irrigation. Uganda.

Five years of monitoring an intensively cultivated vegetable garden with crop rotation at the Kawanda Research Station, Uganda, showed the most successful crop sequence to be: for the 1st year, cabbage, broccoli, cauliflower, leeks; the 2nd yr, tomato, French bean; the 3rd year, Swiss chard, lettuce, cucumber and with the following catch crops: carrots, spring onions, beet, spinach, Amaranthus sp., Solanum sp., and French bean. With supplementary irrigation, all year round vegetable production can be achieved in Uganda. A min. size of 2 ha is recommended to allow an adequate profit margin. (Summary by IDITEC. Trans. by L.M.F.) D03

See also 0148 0157 0158 0194 0195

D04 Seed Production

0075

20028 GONZALEZ L., C.O.; OSPINA G., F. 1983. Evaluación del daño mecánico en semilla de fríjol (Phaseolus vulgaris (L)) durante la cosecha y el beneficio. (Evaluation of mechanical damage to bean seed during harvest and processing). Tesis Ing. Agrícola. Cali, Colombia, Universidad Nacional de Colombia. 114p. Span., Sum. Span., 31 Refs., Illus.

Phaseolus vulgaris. Seed. Mechanical damage. Harvesting. Threshing. Processing. Colombia.

The mechanical damage recorded during harvesting and processing of bean seed of var. ICTA QUETZAL was evaluated at the processing plant of CIAT's Seed Unit. Two bean lots with different runs in the plant were used, selecting several sampling places along the route followed by the seed to locate places where mechanical damage occurs. Four methods of evaluation (visual observation, germination trial on sand, tetrazolium test, accelerated aging test) were used to determine the characteristics and effects of mechanical damage. The visual observation method of evaluation allows total mechanical damage to be quantified globally and levels of damage to be established (5.5% for the 1st lot; 11% for the 2nd lot). The combine was found to be the 1st place where mechanical damage to the seed occurs to a great extent. In the processing plant places identified as damage generators were the fall of the seed into the silo, passage through the grain auger, the grain bin, and the outlet of the grain elevator 1. The amount and type of damage were determined for each place. Germination and viability tests verified that the effects of mechanical damage originated during the conditioning process are not large and vary little. Samples were stored for 4 mo. to be able to compare immediate and subsequent effects. When damage was slight, the effects during storage were not great. One of the determinant factors that caused large variations was the accumulative effect of mechanical damage, that was clearly evident after the storage period for the 2nd lot. The difference in MC between the lots was not large; however, the lot with the higher MC also had the higher mechanical damage and the lower germination %. (Extracted from author's summary. Trans. by L.M.F.) D04

0076

17811 KERR, W.E. 1962. Bean seed production. Rhodesia Agricultural Journal 59(3):159-164. Engl., Sum. Engl., 6 Refs., Illus.

Phasuolus vulgaris. Seed production. Snap beans. Climatic requirements. Fertilizers. Soil requirements. Planting. Timing. Irrigation. Harvesting. Threshing. Yields. Melanagromyza phaseoli. Uromyces phaseoli. Colletotrichum lindemuthianum. Meloidogyne javanica. Xanthomonas phaseoli. Pseudomonas phaseolicola. Rhizoctonia solani. Isariopsis griseola. Rhodesia.

Bean cultivation in Rhodesia is confined to irrigable land. Climatic and soil conditions for growing, and cultivation practices are described; special attention must be paid to irrigation. The potential yield is about 1500 kg/ha. Various pests and diseases and their control are reviewed. (Summary by Abstracts on Tropical Agriculture) D04

0077

19446 MANSO A., F. 1983. Producción de semillas de fríjol de buena calidad. (Production of good quality bean seed). In Curso Intensivo de Postgrado en la Producción de Fríjol, 4o., Matanzas, Cuba, 1983. Conferencias. Cuba, Ministerio de Agricultura. pp.68-79. Span.

Phaseolus vuglaris. Seed production. Cultivars. Cultivation. Harvesting. Threshing. Storage. Cuba.

A brief historical description of seed production in Cuba is given and the different factors that determine the obtainment of good quality bean seed are defined. In 1961 the Seed Division of the Production Dept. of the Instituto Nacional was created under the Agrarian Reform to establish a control of seed production and seed selling activities. Seeds of var. Holguín 3, Criollo, Bonita 11, and Velasco Largo, the 1st 2 black-seeded and the other 2 white- and red-seeded, resp., were produced initially. Later on, materials such as B-42, V-8, Jicotea 47, Cuba C-25-9, and Borinque Jaspeado were obtained; ICA Pijao was introduced through CIAT (Colombia). The seed produced is classified into 5 categories: basic, registered 1, registered 2, certified 1, and certified 2. For good quality seed production the following factors should be taken into account: (1) production factors (adequate selection of land, crop rotation, isolation, land preparation, seed selection, plant density, fertilization, irrigation, cultural practices, and others); (2) harvest factors (seed moisture %, calibration and cleaning of the thresher); (3) conditioning factors (cleaning of all the equipment used in the process, form of drying, selection and calibration of the sieves); (4) storage factors (temp. and RH during storage). The values (%) for the different parameters of evaluating quality of the 5 categories are indicated, including pure seed, inert material, spotted seed, weed seed, seeds of other crops and var., germination, and moisture. (Summary by EDITEC. Trans. by L.M.F.) D04

0078

19445 MOYA, J. 1983. Producción de semilla básica. (Production of basic seed). In Curso Intensivo de Postgrado en la Producción de Fríjol, 4o., Matanzas, Cuba, 1983. Conferencias. Cuba, Ministerio de Agricultura. pp.62-67. Span.

Phaseolus vulgaris. Seed production. Legal aspects. Harvesting. Storage. Cultivation. Cuba.

The background of bean seed production in Cuba is reviewed. The lack of policies regulating production and low availability of human and material resources were limiting factors. Related concepts (var. purity, physical purity, germination %, and disease-free seed) are defined and the methodology for basic seed production and the maintenance of commercial var. (ICA Pijao, M-112, Bolita 42) are described. Fundamental stages of basic seed production are: selection and purification of var. (mixture-free), phytosanitary control, adequate crop management, and supervision to eliminate undesirable plants. Harvesting basic seed can be done mechanically or manually, with a MC between 14-18% and storage at 12-12.5%. When hot air is used to dry seed the temp. should not be above 43°C. Storage in cold chambers (4-10°C) with 50% RH conserves seed viability for 3 yr or more. (Summary by EDITEC. Trans. by L.M.F.) D04

0079

20039 RAVA, C.A.; VIEIRA, E.H.N.; COSTA, J.G.C. DA; SILVEIRA, P.M. DA 1981. Obtencao de germoplasma de feijao livre de patógenos transmissíveis pela semente. (Production of bean seed free from seed-borne pathogens). Revista Brasileira de Sementes 3(3):135-146. Port., Sum. Port., Engl., 10 Refs., Illus. [EMBRAPA-Centro Nacional de Pesquisa de Arroz e Feijao, Caixa Postal 179, 74.000 Goiania-GO, Brasil]

Phaseolus vulgaris. Germplasm. Seed production. Brazil.

The program at the Centro Nacional de Pesquisa de Arroz e Feijao (Brazil) to obtain bean germplasm free from seed-borne diseases is described. The points which soon may become bottlenecks in healthy seed multiplication are identified: (a) evaluation of relative needs of seed of various cv., by region; (b) training of seed inspectors in the evaluation of the sanitary condition of the field; (c) availability of adequate seed health testing lab.; (d) improvement of research techniques in seed health. (Author's summary) D04

0080

19444 SANCHEZ, A. 1983. Normativas para la certificación de semillas de fríjol, categorías de semillas, muestreo y almacenaje. (Norms for certifying bean seed, seed categories, sampling, and storage). In Curso Intensivo de Postgrado en la Producción de Fríjol, 4o., Matanzas, Cuba, 1983. Conferencias. Cuba, Ministerio de Agricultura. pp.47-61. Span., 10 Refs., Illus.

Phaseolus vulgaris. Snap beans. Seed production. Legal aspects. Seed. Cuba.

The different norms regulating common bean and snap bean production in Cuba are reported. The following aspects are analyzed: land requirements and separation or isolation of lots to prevent var. mixture, removal of undesirable plants, field inspection to verify isolation, monitoring of pests and diseases and var. characteristics. Max. tolerance under field conditions or threshold levels of (a) plant types not corresponding to the var. and (b) presence of viruses, fungal pathogens (Colletotrichum lindemuthianum and Sclerotium sp.), and bacteria (Xanthomonas phaseoli) are important. Harvesting should take place when beans have a MC between 12.5-18%. Among the different types of seed (basic, registered 1, registered 2, certified 1, and certified 2), differences were established regarding field tolerance and quality specifications such as % pure seed, inert material, seeds of other crops, of other var. and weeds, spotted seed, germination, and moisture. Concepts related to seed sampling are defined, among which are classes (elemental, global, and lab. sampling), sampling intensity

according to the no. of sacks or amount of seed, and fundamental data to allow identification. (Summary by EDITEC. Trans. by L.M.F.) D04

0081

20038 VIEIRA, E.H.N. 1981. Pesquisa em semente de feijao no Brasil. (Bean seed research in Brazil). Revista Brasileira de Sementes 3(3):59-65. Port., Sum. Port., Engl., 3 Refs. [EMBRAPA-Centro Nacional de Pesquisa de Arroz e Feijao, Caixa Postal 179, 74.000 Goiania-GO, Brasil]

Phaseolus vulgaris. Seed production. Germplasm. Storage. Agricultural projects. Brazil.

The main problems related to bean seed in Brazil are the low use of improved seed, seed-borne diseases, loss of viability during storage, and low potential of cv. in use. The seed research projects planned and underway at the Centro Nacional de Pesquisa de Arroz e Feijao and in 13 other units of the Cooperative System of Agricultural Research, coordinated by the Empresa Brasileira de Pesquisa Agropecuaria, are listed. (Author's summary) D04

E00 PLANT PATHOLOGY

0082

19485 SERRADA, J.; SANCHEZ-SERRANO, J.J.; BELTRA, R. 1982. Disease symptoms on plants by non-phytopathogenic bacteria. Phytopathologische Zeitschrift 104(4):309-315. Engl., Sum. Engl., Germ., 26 Refs. [Inst. Jaime Ferrán de Microbiología, C.S.I.C., Joaquin Costa 32, Madrid-6, Spain]

Phaseolus vulgaris. Symptomatology. Bacterioses. Inoculation.

Some soil bacteria, human pathogens, and other microorganisms (Micrococcus luteus-CP, Staphylococcus aureus-CP, S. epidermis-8375, Serratia marcescens-CP, Pseudomonas fluorescens-AP, P. aeruginosa-109, Bacillus pumilus-29, B. subtilis-FF, B. megaterium-FF, Azotobacter chroococcum-374, A. indicum-AM, Escherichia coli-AP) produced various disease symptoms on inoculation of different plants, Pinto bean being the most susceptible. A relationship was found between IAA synthesis by these bacteria and overgrowth formation. (Summary by Review of Plant Pathology) E00

See also 0027 0036 0059 0076

E02 Bacterioses

0083

19846 ADIMIHARDJA, M. 1981. Seed treatment for eradication of common and fuscous blight bacteria from navy bean seed. Ph.D. Thesis. East Lansing, Michigan State University. 91p. Engl., Sum. Engl., 85 Refs.

Phaseolus vulgaris. Seed. Xanthomonas phaseoli. X. phaseoli var. fuscans. Disease control. Chemical control. Germination.

The eradication of internally-borne common and fuscous blight bacteria (Xanthomonas phaseoli, X. phaseoli var. fuscans) from been seed was studied

using hot acidified cupric acetate soaks and bactericide infusion by organic solvents or water. The study was conducted in 5 steps: (1) effect of solvent on antibiotic activity; (2) ability of solvent to infuse antibiotic into the seed; (3) efficient method for contaminating bean seed with blight bacteria; (4) effect of treatment on eradication of blight bacteria from seed; and (5) effect of treatment on seed germination and field emergence. Effect of solvent on antibiotic activity, as assayed in Xanthomonas-seeded agar plates, depended on specific chemical/solvent combination and bacterial isolate. All solvents, except dimethyl sulfoxide, were able to move antibiotics into the seed when assayed in Bacillus subtilis-seeded agar. Artificial inoculation with blight bacteria was more efficient in providing adequate amounts of infected seed than field and greenhouse inoculations. Hot, acidified cupric acetate (0.1, 0.25, 0.5%) soaks at 50°C for 20 min eradicated blight bacteria, provided that all seeds took up the chemical. However, such treatments greatly reduced seed germination and field emergence. A treatment with tetracycline HCl (800 ppm) in methanol under partial vacuum for 2 min eradicated seed-borne bacteria completely from the seed and greatly reduced seed germination of 2-yr-old but not 1-yr-old seed. Therefore, the treatment may be useful for seeds less than 1 yr old. Seed immersion in 400 and 800 ppm of aqueous tetracycline and aureomycin, while giving good eradication, drastically reduced seed germination. A subsequent sodium hypochlorite rinse decreased seed viability beyond that caused by the antibiotic alone. Seed immersion in tetracycline HCl and aureomycin (800 ppm) for 30 min decreased the no. of seed containing bacteria without impairing seed germination, and therefore, can be recommended for bean seed treatment. (Author's summary) E02

0084

19440 HERNANDEZ D., T. 1983. Principales enfermedades bacterianas del fríjol (Phaseolus vulgaris). (Major bacterial diseases of bean). In Curso Intensivo de Postgrado en la Producción de Fríjol, 4o., Matanzas, Cuba, 1983. Conferencias. Cuba, Ministerio de Agricultura. pp.1-11. Span., 7 Refs.

Phaseolus vulgaris. Symptomatology. Disease transmission. Epidemiology. Xanthomonas phaseoli. X. phaseoli var. fuscans. Resistance. Cultivars. Foliage. Pods. Crossbreeding. P. coccineus. Disease control. Pseudomonas phaseolicola. Cuba.

The symptoms, forms of transmission, and epidemiological aspects of diseases caused by Xanthomonas phaseoli and X. phaseoli var. fuscans are described. In Cuba these diseases are found in almost all areas where bean is grown and produce min. losses at an exptl. level of 16%. Disease resistance is inherited quantitatively and can be obtained from crosses with Phaseolus acutifolius. The degree of resistance of the foliage and pods of the tested var. is indicated. Among the control methods are the use of clean seed, cultural practices (elimination of crop residues and crop rotation), chemical control based on Cu, use of resistant var., and elimination of host plants. Symptoms of the disease caused by Pseudomonas phaseolicola are described, although this disease has not yet been detected in Cuba. (Summary by EDITEC. Trans. by L.M.F.) E02

0085

20094 LANGUIDEY, P. 1983. Prueba de eficiencia del oxicloruro de cobre en el control de bacteriosis en frejol (Phaseolus vulgaris L.). (Efficiency of copper oxychloride in controlling bean bacteriosis). Revista Boliviana de Investigación 1:30-32. Span., Sum. Span., Engl., 5 Refs. [Univ. Gabriel René Moreno, Casilla 702, Santa Cruz, Bolivia]

Phaseolus vulgaris., Xanthomonas phaseoli. Disease control. Chemical control. Yields. X. phaseoli var. fuscans. Bolivia.

At the Instituto de Investigaciones Agrícolas El Vallecito, Santa Cruz (Bolivia), the efficiency of copper oxychloride in controlling common blight (Xanthomonas phaseoli) and fuscous blight (X. phaseoli var. fuscans) was determined in addition to the no. of applications required to ensure good crop protection. Five treatments were used: check (no application) and 4 plots that received from 1 to 4 applications every 15 days. Results showed that there was no significant difference among the treatments for the agronomic factors under study. Plots receiving 4 applications of copper oxychloride yielded 22% more than the check although this increase in yield was not significant. Copper oxychloride, however, had a beneficial effect on seed quality. To ensure good crop protection under conditions favorable for the development of plant pathogens, the interval between applications should be reduced to 7 or 10 days and, be continued until the plant is near harvest maturity. (Author's summary) E02

0086

19718 SIRRY, A.R.; SALEM, S.H.; GEWAILY, E.M.; TOHAMY, M.R. 1981. Isolation and identification of the causal organisms of bacterial blight of bean plants in Egypt. Egyptian Journal of Microbiology 16(1-2):53-63. Engl., Sum. Engl., Arab., 15 Refs., Illus. [Botany Dept., Faculty of Agriculture, Zagazig Univ., Zagazig, Egypt]

Phaseolus vulgaris. Isolation. Pathogenicity. Pseudomonas aeruginosa. Etiology. Inoculation. Symptomatology. Egypt.

The causal organisms from diseased bean plants showing symptoms of bacterial blight in Egypt were isolated. The pathogenicity test for isolated bacteria using several methods of artificial inoculation (atomizing of bacterial suspension, direct injection into primary leaf node or into the middle leaf vein) was also assessed. Koch's postulates were applied to confirm the pathogenicity of the isolated microorganisms from the diseased plants on the corresponding healthy plants. Morphological and biochemical studies were also conducted on the isolated microbes. Isolated organisms were identified as Pseudomonas aeruginosa, reported for the 1st time as causing bacterial blight of bean plants in Egypt. The procedure of needle puncture into middle leaf vein induced severe necrosis followed by the destruction of the whole leaf. Spraying had a slight effect, if any, on the var. used. (Author's summary) E02

0087

18734 STOETZER, H.A.I. 1981?. Diseases of beans in Kenya. Thika, Kenya, National Horticultural Research Station. Grain Legume Project. 5p. Engl., 8 Refs. [National Horticultural Research Station, P.O. Box 220, Thika, Kenya]

Also in Phaseolus Beans Newsletter for Eastern Africa no.1. 1983.

Phaseolus vulgaris. Bean common mosaic virus. Pseudomonas syringae. Colletotrichum lindemuthianum. Uromyces phaseoli. Isariopsis griseola. Cultivars. Resistance. Disease control. Kenya.

The Grain Legume Project of the National Horticultural Research Station in Thika, Kenya, is carrying out investigations on major bean diseases: BCMV, halo blight (Pseudomonas syringae pv. phaseolicola), anthracnose (Colletotrichum lindemuthianum), angular leaf spot (Phaeoisariopsis griseola), and rust (Uromyces appendiculatus). Control measures are given,

especially those feasible for smallholders which include the use of resistant cv., disease-free seed, seed treatment, crop rotation, and field sanitation. So far, 3 cv. have been released which are not fully resistant to the mentioned diseases, although a new cv., GLP-X.92, is very resistant to P. syringae pv. phaseolicola. Resistant cv. with commercially acceptable seed types are being tested. (Summary by EDITEC. Trans. by L.M.F.) E02

0088

19941 TEJERINA, G.; SERRA, M.T.; CASTRESANA, M.C.; RODRIGUEZ, J.F. 1982. Encapsulation of Erwinia carotovora in bean leaves, correlated with phosphorus fertilizers. Phytopathologische Zeitschrift 105(2):97-108. Engl., Sum. Engl., Germ., 28 Refs., Illus. [Inst. Jaime Ferrán de Microbiología, C.S.I.C., Joaquín Costa 32, Madrid-6, Spain]

Phaseolus vulgaris. Erwinia carotovora. Fertilizers. P. Plant nutrition. Resistance.

Both the normal development of the plant and its predisposition to contract or to resist certain infectious diseases depend on plant nutrition. The modification of P in the cultivation medium of Phaseolus vulgaris produced plant resistance to the soft rot caused by Erwinia carotovora, when the quantity of $NH_4H_2PO_4$ exceeds 5×10^{-4} M. The type of resistance observed was HR (hypersensitive reaction) and direct contact between the bacterial and plant cells, with deep structural alterations and immobilization of the phytopathogenic bacteria which were confirmed by ultrastructural studies. The enzymatic changes, which undoubtedly take place, determine starch accumulation in the chloroplasts, and possibly intervene in the synthesis of those substances which play a part in host-parasite recognition. (Author's summary) E02

0089

19402 WEBSTER, D.M.; TEMPLE, S.R.; GALVEZ, G. 1983. Expression of resistance to Xanthomonas campestris pv. phaseoli in Phaseolus vulgaris under tropical conditions. Plant Disease 67(4):394-396. Engl., Sum. Engl., 11 Refs. [Twin Falls, ID 83316, USA]

Phaseolus vulgaris. Cultivars. Resistance. Xanthomonas phaseoli. Photoperiod. Maturation. Colombia.

The effects of foliar blights and day length on the expression of resistance to common bacterial blight (Xanthomonas campestris pv. phaseoli) in dry beans were determined. Cv. Jules and the PI 207262 line are moderately resistant to X. campestris pv. phaseoli in the temperate zone but appeared susceptible in field evaluations in the tropics (CIAT). Susceptibility to the pathogen was related to environmental factors that caused very early maturity and poor growth; blight resistance was expressed relative to controls when these factors were altered to permit more normal growth of Jules and PI 207262. The effect of environmental factors on resistance to common blight was observed in evaluations made at 44 and 55 days after planting but not at 34 days based on a severity index that considered lesion size and proportion of leaves infected. (Author's summary) E02

See also 0037 0038 0041 0147 0167 0168 0171

0090

20043 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. [Centro de Fitopatología, Colegio de Postgraduados, Chapingo, México]

Phaseolus vulgaris. Pods. Colletotrichum lindemuthianum. Inoculation. Plant injuries. Mexico.

The structural changes that occur in the seed tissue of bean var. Puebla 224, due to the invasion of Colletotrichum lindemuthianum, were studied. 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. The pod was put in a moist chamber for 48 h. The seeds were collected every 24 h, cross sections were made and stained, mainly with PAS (periodic acid-Schiff reagent) and naphthol blue black. It was found that in the beginning of the invasion there were no structural changes apparent in the host tissues; these appeared when the infection was quite advanced, 6 days after inoculation; the cells disorganized, collapsed, increased their content of condensed tannins, and the limits between individual host cells were not visible. Small seeds (2-7 mm) were more susceptible to the invasion than large ones (9-15 mm). (Author's summary) E03

0091

20608 ECHEVERRY V., R.; PLAZA C., M.A. 1964. Reacción de algunas variedades y líneas de fríjol (Phaseolus vulgaris L.) a los principales patógenos que originan pudriciones de la raíz, en las condiciones de Palmira. (Reaction of some bean varieties and lines to major pathogens producing root rot under the conditions of Palmira, Colombia). Tesis Ing.Agr. Palmira, Universidad Nacional de Colombia. 74p. Span., Sum. Span., Engl., 55 Refs., Illus.

Phaseolus vulgaris. Cultivars. Resistance. Sclerotium rolfsii. Rhizoctonia solani. Fusarium oxysporum. Macrophomina phaseoli. Isolation. Inoculation. Pathogenicity. Colombia.

To identify sources of resistance to root rots, 15 bean materials which included the collections Venezuela 54, Antioquia 6, Antioquia 8, Antioquia 10, and Antioquia 26, improved var. Diacol Andino, Diacol Calima, Diacol Catío, Diacol Nima, and Diacol Nutibara, and the promissory lines 11, 13, 14, 15, and 16 were assessed in relation to the 4 most important fungal pathogens causing root rot in Palmira, Colombia: Sclerotium rolfsii, Rhizoctonia solani, Fusarium oxysporum f. phaseoli, and Macrophomina phaseoli. After the reaction tests were completed with the strains chosen as the most pathogenic, it was found that none of the materials were resistant except for the collection Venezuela 54, which showed some resistance in the test with Sclerotium rolfsii. None of the materials tested showed resistance to Rhizoctonia solani, Macrophomina phaseoli, Fusarium oxysporum f. phaseoli, and their complexes. A substantial variation in the response to the different pathogens tested were observed. (Author's summary) E03

19026 GALINDO, J.J. 1982. Epidemiology and control of web blight of beans in Costa Rica. Ph.D. Thesis. Ithaca, N.Y., Cornell University. 141p. Engl., Sum. Engl., 108 Refs., Illus.

Phaseolus vulgaris. Rhizoctonia solani. Epidemiology. Etiology. Disease control. Isolation. Inoculation. Pathogenicity. Costa Rica.

Epidemiological studies were conducted to identify the main source of inoculum for web blight of beans caused by Thanatephorus cucumeris in Costa Rica, and to evaluate selected chemicals and cultural practices as control measures for the disease. In addition, 73 isolates of T. cucumeris causing web blight were collected from the different bean growing areas of Costa Rica and characterized by growth rate, color of mycelium, production of sclerotia, and anastomosis grouping, and by pathogenicity to bean tissues of cv. Mexico 27. These isolates were all pathogenic to bean leaf and hypocotyl tissues, but their virulence varied significantly. There was a positive correlation between the growth rate of an isolate and its virulence to bean leaves and hypocotyls. To determine the main source of inoculum, plots were planted at Esparza, in a field which had a relatively high inoculum density (2 propagules of T. cucumeris/g of soil) and a history of severe web blight incidence. Both the perfect and the imperfect state of the fungus Rhizoctonia solani were produced in this field. Five replicate plantings were established throughout 2 growing seasons in 1980 during which environmental conditions were favorable for disease development. Black-seeded bean cv. Mexico 27 and Porrillo 70, previously identified as susceptible and tolerant, resp., to web blight were planted in 4-row plots, rows being 4 m long. Data on the incidence and severity of web blight and on the site of initial infection were collected weekly from the 80 bean plants in the 2 central rows of each plot. Sclerotia and mycelium of T. cucumeris free in soil or in the form of colonized debris were found to be the main source of inoculum for web blight of beans. Inoculation of beans occurred mainly by splashing rain drops containing infested soil. Rain-splashed soil and debris samples were collected from randomly selected bean plants from the plot areas and analyzed for the presence of T. cucumeris and for their ability to cause web blight under greenhouse conditions. All samples processed contained propagules of T. cucumeris and caused typical symptoms when sprayed onto greenhouse-grown bean plants. First symptoms appeared under field conditions about 14 days after planting, generally on primary leaves. Trifoliolate leaves were also infected by splashing of infested soil, but more often by mycelium of T. cucumeris growing from previously infected tissue. A large no. of small sclerotia were produced within 3 days on rain-splashed soil and debris on bean tissues prior to host infection, on newly infected tissues, and on detached bean tissues on the soil surface. These sclerotia function as new sources of inoculum which will be splashed again onto bean tissues. To determine the importance of basidiospores as source of inoculum, bean plants grown in the greenhouse were transported to the field and placed on benches to avoid splashing of infested soil. Plants were removed weekly and incubated in the greenhouse. The hymenial layers of T. cucumeris were 1st observed on the lower stem tissues in field plots approx. 28 days after planting. The initial small, circular, necrotic lesions caused by basidiospores on bean leaves were not observed during the 3 planting dates of the 1st growing season (May-Aug.) either in the field plots or in the plants on the benches. This was probably due to the dry weather that prevailed during basidiospore availability. In the 2nd growing season (Sept.-Dec.) lesions caused by basidiospores appeared about 8 days after the hymenial layer of the fungus was observed on the bean plants. These lesions, however, remained restricted and did not cause extensive necrosis of the foliage. Three chemicals were evaluated for web blight control: pentachloronitrobenzene (PCNB) applied as a soil drench at 40 kg/ha;

benomyl applied as a seed coat treatment at 1 g/kg of seed; and paraquat, a dessicant herbicide, applied 1 day after planting at 1 kg a.i./ha. None of these chemicals reduced disease incidence and severity. However, mulching (2.5-cm thick) with rice husks greatly reduced splashing of inoculum and notably lowered disease incidence and severity. At harvest, web blight incidence on cv. Porrillo 70 was 100 and 13%, and seed yield was 0 and 655 kg/ha for the nontreated and the mulched plots, resp. Similar results were obtained with cv. Mexico 27. The local production practice of covered bean in which bean seeds are broadcast in vegetation that is later cut and left as a mulch, was as effective as rice husks in reducing disease incidence and severity, but yields were lower. (Author's summary) E03

0093

19420 GOLATO, C.; MEOSSI, E. 1982. Una grave infezione fogliare del fagiolo (Phaseolus vulgaris L., Papilionaceae) in Etiopia. (Serious bean leaf infection in Ethiopia). Rivista di Agricoltura Subtropicale e Tropicale 66(4/9):135-138. Ital., 8 Refs., Illus.

Phaseolus vulgaris. Cercospora columnaris. Symptomatology. Etiology. Ethiopia.

A serious fungal disease of bean leaves in the region of Caffa and the Awash Valley, Ethiopia, is described. Based on symptomatology and morphological characteristics, the pathogen was identified as Cercospora columnaris. (Summary by J.L.S.) E03

0094

19840 GOMEZ V., G.A.; MAYA A., L.F. 1978. Evaluación del Benomyl 50 en el control de damping off y pudrición radicular en plántulas de fríjol (Phaseolus vulgaris L.). (Effectiveness of benomyl in controlling damping-off and root rot in bean seedlings). Tesis Ing.Agr. Medellín, Universidad Nacional de Colombia. 67p. Span., Sum. Span., 21 Refs., Illus.

Phaseolus vulgaris. Rhizoctonia solani. Fusarium. Seed treatment. Disease control. Chemical control. Nodulation. Colombia.

A trial was conducted at La Selva exptl. station in the municipality of Rionegro, Antioquia (Colombia) under greenhouse conditions to evaluate different treatments with benomyl (concn. of 0.25, 0.5, 1.0 g/l) and to determine the most adequate immersion time (1, 2, 3, 6, 12, and 24 h) of bean seed to prevent losses due to damping-off and root rot caused by Rhizoctonia solani and Fusarium sp. The formation of lesions on the stems caused by R. solani is related to the time of seed immersion and the concn. of benomyl. Aqueous suspensions of 1.0, 0.5, and 0.25 g/l during 24 h of seed immersion, 0.5 for 12 h, and 0.5 for 6 h showed a satisfactory control over R. solani. Likewise, concn. of 0.5 and 1.0 g/l during 3 h were efficient in preventing losses due to Fusarium sp. Benomyl did not affect the germination of bean seed or the formation of nodules. The fungus Fusarium sp. reduced the degree of nodulation in plants. (Author's summary. Trans. by L.M.F.) E03

0095

19705 JOHNSON, K.B.; POWELSON, M.L. 1983. Analysis of spore dispersal gradients of Botrytis cinerea and gray mold disease gradients in snap beans. Phytopathology 73(5):741-746. Engl., Sum. Engl., 21 Refs., Illus. [Dept. of Botany, Oregon State Univ., Corvallis, OR 97331, USA]

Phaseolus vulgaris. Botrytis cinerea. Snap beans. Flowering. Epidemiology. USA.

Spore dispersal, spore incidence on blossoms, and pod rot disease gradients from point inoculum sources of Botrytis cinerea were measured over time in 2 snap bean fields. Lab.-grown inoculum was placed at ground level in a 30 x 30-cm square at bloom initiation and removed at full bloom. Dispersal of inoculum, assessed by quantifying the no. of viable spores washed from bean foliage, was limited to within 3 m from the inoculum source during bloom. At harvest, the spore populations on plants were 20-30 times higher than populations at full bloom due to production of secondary inoculum. During the bloom period, incidence of B. cinerea on senescing blossoms averaged 70% at a distance of 0.9 m from the inoculum source, but less than 25% at distances greater than 4 m. In 1 expt., the incidence of pod rot at harvest averaged 7.2% at 0.9 m from the inoculum source, but only 1.3% at 4.5 m. Spore dispersal gradients (log spore no. vs. log distance) showed significant flattening at harvest compared with full bloom, whereas gradients for pod rot incidence at harvest did not flatten compared with incidence of B. cinerea on blossoms at full bloom. Because senescing blossoms are the primary infection court for infection of the pods, the nonsignificant flattening of the pod rot gradient suggests that early arrival of inoculum of B. cinerea on blossoms was important in pod rot development. (Author's summary) E03

0096

19441 MARTINEZ M., S. 1983. Principales enfermedades fungosas del fríjol. (Major fungal diseases of bean). In Curso Intensivo de Postgrado en la Producción de Fríjol, 4o., Matanzas, Cuba, 1983. Conferencias. Cuba, Ministerio de Agricultura. pp.12-32. Span.

Phaseolus vulgaris. Etiology. Epidemiology. Symptomatology. Disease control. Resistance. Uromyces phaseoli. Colletotrichum lindemuthianum. Isariopsis griseola. Macrophomina phaseoli. Sclerotium rolfsii. Rhizoctonia solani. Fusarium solani phaseoli. Fusarium oxysporum. Cuba.

The etiology, biological cycle, epidemiology, infection mechanisms, symptomatology, and control methods (cultural, chemical, and use of resistant var.) of the following pathogens are described: Uromyces phaseoli var. typica, Colletotrichum lindemuthianum, and Isariopsis griseola. The control measures, epidemiology, and symptoms of the root rots caused by Macrophomina phaseolina, Sclerotium rolfsii, Rhizoctonia solani, Pythium spp., Fusarium solani, F. phaseoli, and F. oxysporum f. phaseoli are also given. A brief review of the results of research carried out in Cuba on major diseases, in particular rust (U. phaseoli var. typica) and ashy stem blight (M. phaseolina), is included. (Summary by EDITEC. Trans. by L.M.F.) E03

0097

11194 PROCESSORS & GROWERS RESEARCH ORGANISATION. (ENGLAND). 1977. Seed treatments for peas and beans. Thornhaugh, England. The Research Station. Information Sheet no.66. 2p. Engl.

Phaseolus vulgaris. Pythium. Fusarium. Ascochyta. Disease control. Chemical control. Delia platura. Insect control.

Different chemical treatments are recommended to control diseases that cause damping-off (Pythium and Fusarium) in beans and peas and the Ascochyta disease of peas, which causes seedling death. Seed treatments for bean with thiram, drazoxolon, and captan control Pythium and Fusarium.

Damping-off and Ascochyta in peas are controlled with benomyl and thiram. To control the bean seed fly, Delia platura, in beans, the combinations pirimiphos-ethyl + drazoxolon or chlorphyrifos-captan or thiram are recommended. These materials should be applied by the seed merchant. (Summary by EDITEC. Trans. by L.M.F.) E03

0098

19702 STAVELY, J.R. 1983. A rapid technique for inoculation of Phaseolus vulgaris with multiple pathotypes of Uromyces phaseoli. Phytopathology 73(5):676-679. Engl., Sum. Engl., 15 Refs., Illus. [Agricultural Research Service, U.S. Dept. of Agriculture, Beltsville, MD 20705, USA]

Phaseolus vulgaris. Inoculation. Uromyces phaseoli. Plant breeding. Resistance. Genetics.

A readily available, inexpensive, hand-held, pressurized spraying device was modified by attaching a 5-cm-long, 12-mm-diameter, section of Plexiglas tubing over the spray nozzle to be able to inoculate bean plants with each of many pathotypes of Uromyces phaseoli. Negligible differences in no. of uredinia among pathotypes were obtained by standardizing the concn. of viable urediniospores. Each unifoliolate leaf was inoculated with 4 pathotypes/leaf 6-8 days after seeding and the 1st trifoliolate leaf was inoculated with up to 6 pathotypes 6-8 days later. Resistant and susceptible host reactions to specific pathotypes were not affected by simultaneously or sequentially inoculating other leaf areas with other pathotypes. The rapid technique described is potentially useful for determining linkage relationships among host resistance genes and in breeding beans for resistance to multiple pathotypes of U. phaseoli. (Author's summary) E03

0099

19935 STEADMAN, J.R. 1983. White mold: a serious yield-limiting disease of bean. Plant Disease 67(4):346-350. Engl., 9 Refs., Illus. [Univ. of Nebraska, Lincoln, NB, USA]

Phaseolus vulgaris. Whetzelinia sclerotiorum. Etiology. Disease control. Chemical control. Resistance.

The life cycle of the Phaseolus pathogen, Sclerotinia sclerotiorum, is described followed by recommendations for its control by fungicides, modifications of cultural practices, and use of resistant cv. (Summary by Review of Plant Pathology) E03

0100

19406 TANAKA, M.A.S.; CORREA, M.U. 1982. Efeito do tratamento de sementes de feijao de diferentes qualidades sanitárias com fungicidas e antibiótico sobre a emergencia e stand. (Effect of bean seed treatment of different sanitary conditions with fungicides and antibiotics on the emergence and stand). Fitopatologia Brasileira 7(3):339-347. Port., Sum. Port., Engl., 11 Refs. [Empresa de Pesquisa Agropecuária de Minas Gerais, Caixa Postal 351, 38.100 Uberaba-MG, Brasil]

Phaseolus vulgaris. Seed. Seed treatment. Disease control. Chemical control. Mycoses. Germination. Emergence. Brazil.

Seeds of bean cv. Carioca-1030 of 2 different sanitary conditions (good quality seeds with 90% germination and low microorganism incidence; poor quality seeds with 57% germination and high microorganism incidence) were treated with PCNB 30% + captafol 30%, carbendazim 60%, PCNB 75%, benomyl

50%, thiram 70%, streptomycin 20%, and the mixture of each one with streptomycin 20%. The efficacy of the different treatments was determined by germination tests carried out in the lab., emergence trials in the greenhouse, and initial and final stand assessments in the field. Results showed a benefic effect of the mixture PCNB + captafol for all tests and both classes of seed. For poor quality seed the mixture carbendazim + streptomycin increased significantly the % of germination and emergence compared with the control. The treatments with benomyl, PCNB, carbendazim, and PCNB + streptomycin also showed good results. For high quality seed thiram, carbendazim, carbendazim + streptomycin, benomyl, and PCNB + streptomycin gave a significantly higher % of emergence compared with the control and other treatments. (Author's summary) E03

0101

19405 TANAKA, M.A.S.; JUNQUEIRA NETTO, A. 1982. Efeito de fungicidas sistemicos sobre a intensidade de doencas na parte aérea e a qualidade sanitária da semente de feijao (Phaseolus vulgaris L.). (Effect of systemic fungicides on the severity of foliar diseases and the healthiness of bean seeds). Fitopatologia Brasileira 7(3):381-386. Port., Sum. Port., Engl., 10 Refs. [Empresa de Pesquisa Agropecuária de Minas Gerais, Caixa Postal 351, 38.100 Uberaba-MG, Brasil]

Phaseolus vulgaris. Colletotrichum lindemuthianum. Isariopsis griseola. Uromyces phaseoli. Chemical control. Seed characters. Brazil.

A study was carried out to evaluate the efficacy of several systemic fungicides (methyl thiophanate, benomyl, thiabendazole, pyracarbolid, and carboxin) in controlling foliar diseases in bean cv. Carioca 1030 and their effect on seed healthiness. Fungicides were hand-sprayed 28, 42, and 62 days after planting. Disease severity was assessed using a 1 to 5 scale: absence of disease, slight, moderate, severe, and very severe incidence. Methyl thiophanate was most efficient in controlling diseases on leaves and seeds. All the fungicides showed a good disease control; treated plots produced healthier plants and seeds than those of untreated plots. (Author's summary) E03

0102

18748 WOODWARD, M.D. 1979. Phaseoluteone and other 5-hydroxyisoflavonoids from Phaseolus vulgaris. Phytochemistry 18(2):363-365. Engl., 26 Refs., Illus.

Phaseolus vulgaris. Snap beans. Phytoalexins. Phaseollin. Analysis. Mycoses.

The isolation and identification of a new isoflavone, phaseoluteone 3, and the isolation of 3 additional isoflavonoids which may be precursors of kievitone and or phaseoluteone are described. The new phytoalexins were isolated from several unidentified phenolic compounds, detected in the interaction between French bean pod tissue and the fungus Monilinia fructicola. The co-occurrence of the compounds isoflavone genistein 1, 2'-hydroxygenistein 2, phaseoluteone 3, isoflavanone dalbergioidin 5, and kievitone 5, in bean tissue, together with the relative amounts of each compound obtained, have particular significance for biosynthetic studies. The formation of phaseoluteone 3 probably follows the sequence 1-2-3. Similarly, the most direct route to kievitone would be 1-2-4-5. Although other pathways may be postulated for the formation of phaseoluteone and kievitone, the failure to detect any other 5,7-dihydroxylated isoflavone or

isoflavanone tends to support the proposed pathways. (Summary by EDITEC. Trans. by L.M.F.) E03

See also 0037 0038 0041 0043 0087 0135 0140 0144 0154 0166 0168

E04 Viroses

0103

19499 ALDANA DE LEON, L.F. 1981. Estudio comparativo del efecto de la resistencia genética y el control químico del vector sobre la incidencia del mosaico dorado del fríjol (Phaseolus vulgaris L.). (Comparative study of the effect of genetic resistance and chemical control of the vector on the incidence of the bean golden mosaic virus). Tesis Ing.Agr. Guatemala, Universidad de San Carlos. 81p. Span., Sum. Span., 59 Refs.

Phaseolus vulgaris. Cultivars. Bean golden mosaic virus. Chemical control. Disease control. Bemisia tabaci. Vectors. Yields. Guatemala.

In SE Guatemala a study was conducted during the 2nd semester of 1979 to determine the interaction between genetic and chemical control of the BGMV vector, Bemisia tabaci. Four expt. were established, 3 in the dept. of Jutiapa in the municipalities of Quesada, Jutiapa, and Asunción Mita, and one in the dept. of Jalapa in the municipality of Monjas. A randomized block design with split plots was used. The main plot included the var. ICTA-Jutiapán, Suchitán, and Rabia de Gato, and the subplots the insecticide treatments (carbofuran 5 G, applied at planting at 20 and 40 kg/ha; carbofuran 4 F, applied to the seed at 50 cc/kg seed; and 20 kg carbofuran 5 G + 5 applications of methamidophos at 1 l/ha) and 5 applications of cow milk. The parameters yield in kg/ha at 14% MC, no. of BGMV-diseased plants/m^2 total plot area, counted at weekly intervals were evaluated. At 3 of the 4 sites and in combined analysis there was a significant difference for var. and treatments. The interaction var./yield was not significant at any site. Improved var. ICTA-Jutiapán and Suchitán outyielded local var. Rabia de Gato significantly. In Quesada, Jutiapa, and Monjas, ICTA-Jutiapán outyielded the local var. by 1757, 288, and 1081 kg/ha, resp. In Quesada and Monjas, areas under high BGMV pressure, var. ICTA-Jutiapán (without chemical control) outyielded the local var. (with the best insecticide treatment) by 173 and 603 kg/ha, resp. The seed treatment with carbofuran was statistically equal to the application of 20 kg carbofuran/ha, thus reducing application costs. The application of milk gave results similar to those of the check. The lowest no. of diseased plants occurred in var. ICTA-Jutiapán and with the treatment 20 kg carbofuran/ha + 5 applications of methamidophos. This data clearly shows the gain achieved with improved var. regarding BGMV-tolerant genes. It was concluded that in Guatemala there are var. that tolerate BGMV better than local var. and that the application of insecticides helps increase yields by controlling B. tabaci. (Extracted from author's summary. Trans. by L.M.F.) E04

0104

19442 BLANCO S., N. 1983. Las enfermedades virales y el cultivo del fríjol. (Viral diseases and bean cultivation). In Curso Intensivo de Postgrado en la Producción de Fríjol, 4o., Matanzas, Cuba, 1983. Conferencias. Cuba, Ministerio de Agricultura. pp.33-40. Span.

Phaseolus vulgaris. Disease transmission. Vectors. Bean golden mosaic virus. Bean yellow stipple virus. Bean common mosaic virus. Bemisia tabaci.

Myzus persicae. Aphis craccivora. Diabrotica balteata. Cultivars. Resistance. Cuba.

Several investigations carried out on viral diseases and their distribution and transmission in bean are briefly reviewed. Results of research carried out in Cuba are given. Trials on mechanisms of transmission of insect vectors were carried out including aphids (Myzus persicae and Aphis craccivora), whiteflies (Bemisia tabaci), and chrysomelids (Diabrotica balteata and Cerotoma ruficornis). In order of importance, the viruses that most affect bean crops in Cuba are: BGMV, bean yellow stipple virus, BCMV, and the cowpea mosaic. Var. Velasco with red-colored grain is the most used in Cuba and is susceptible to the group of viruses as well as Bolita 42, Jicotea, and Selección II. No sources of resistance to BGMV and the bean yellow stipple virus were found; however, other var. such as CC-25-9, Bolita 41 and 42, Holguin 20, Victor 8, ICA Pijao, BAT 24, Guira 50, and VMI-48 are resistant to BCMV. (Summary by EDITEC. Trans. by L.M.F.) E04

0105

19456 GHOSH, A.; RUTGERS, T.; KE-QIANG, M.; KAESBERG, P. 1981. Characterization of the coat protein mRNA of southern bean mosaic virus and its relationship to the genomic RNA. Journal of Virology 39(1):87-92. Engl., Sum. Engl., 22 Refs., Illus. [College of Agricultural & Life Sciences, Univ. of Wisconsin-Madison, Madison, WI 53706, USA]

Phaseolus vulgaris. Southern bean mosaic virus. RNA. Proteins. Isolation.

RNA isolated from southern bean mosaic virions contains, in small amount, a subgenomic RNA (mol. wt., 0.38 x 10^6) that serves in vitro as an mRNA for BSMV coat protein. The RNA has a 5'-linked protein indistinguishable from the protein linked to the 5' end of full-length genomic RNA. Its base sequence, determined to 91 bases from the 3' end, is identical to the 3'-terminal sequence of the genomic RNA. The results suggest that the coat protein messenger sequence exists as a silent cistron near the 3' end of the genomic RNA. (Author's summary) E04

0106

19486 GRIFFIN, D.E.; BASSI JUNIOR, A.; McGUIRE, J.M. 1982. Peanut stunt virus in Arkansas. Plant Disease 66(12):1194-1196. Engl., Sum. Engl., 13 Refs. [Univ. of Arkansas, Fayetteville, AR 72701, USA]

Phaseolus vulgaris. Peanut stunt virus. Isolation. Inoculation. Symptomatology. USA.

Peanut stunt virus (PSV) was found in beans in a breeding nursery in Fayetteville, Arkansas (USA), and in white clover surrounding the bean and cowpea breeding nurseries. Virus was recovered on both bean and cowpea from 7 of 40 bean plants selected from the breeding nursery. Two plants with mild mosaic symptoms and 5 stunted plants with severe mosaic symptoms yielded virus. PSV was not recovered from white clover or other perennial plants from 3 other locations in Arkansas. (Author's summary) E04

0107

19706 VERHOYEN, M. 1983. Les virus des végétaux au Burundi. (Viral diseases in plants in Burundi). Tropicultura 1(1):21-22. Fr., Sum. Fr., Engl. [Faculté des Sciences Agronomiques, Place Croix du Sud, 3, 1348 Louvain la Neuve, Belgique]

Phaseolus vulgaris. Viroses. Disease control. Bean common mosaic virus. Symptomatology. Burundi.

Viral diseases observed on different plant species (maize, cassava, beans, cyphomandra, potato, etc.) in Burundi are described. Further inspections are needed to complete this inventory and pathogens should be examined under specialized laboratory conditions to perfect their identification. Conclusively, the following control measures are proposed: correct identification of the pathogen, prevention of virus diffusion outside the plant multiplication and selection sites, crop rotations, knowledge of vectors and their biology. Estimations of crop losses should indicate research priorities. (Author's summary) E04

See also 0037 0087 0137 0138 0144 0147 0152 0166 0175

E05 Nematodes

0108

19973 SAKA, V.W. 1982. International Meloidogyne Project Report in Malawi. In Research Planning Conference on Root-Knot Nematodes, Meloidogyne spp., 3rd., Regions IV and V, Ibadan, Nigeria, 1981. Proceedings. Ibadan, International Institute of Tropical Agriculture. pp.31-36. Engl., 6 Refs. [Bvumbwe Research Station, Box 5748, Limbe, Malawi]

Phaseolus vulgaris. Meloidogyne javanica. Malawi.

Root-knot nematodes (Meloidogyne javanica) were 1st identified on Phaseolus vulgaris, tomato, celery, banana, and cotton. Pathogenicity tests were then conducted on pigeon pea, Chloris gayana, cowpea, Pisum sativum, maize, cotton, and cassava. Results show that all cotton var., C. gayana var. Katambora, and cassava var. Masangwi are immune to M. javanica and therefore can be used in crop rotations. (Summary by L.M.F.) E05

0109

19737 SANTACRUZ DE LA ROSA, E. 1983. Estudios sobre nemátodos fitoparásitos en cultivos asociados de café y fríjol. (Studies on plant parasite nematodes in coffee/bean intercropping). Tesis Mag.Sc. Bogotá, Universidad Nacional. Instituto Colombiano Agropecuario. 74p. Span., Sum. Span., Engl., 44 Refs., Illus.

Phaseolus vulgaris. Intercropping. Coffea arabica. Meloidogyne incognita. M. arenaria. Helicotylenchus dihystera. Pathogenicity. Cultivars. Colombia.

The damage caused by different plant parasite nematodes occurring on coffee and bean when planted in association is identified and evaluated in 3 zones of Valle del Cauca, Colombia: a coffee-growing region in the municipality of Sevilla (1540 m.a.s.l.; av. temp., 19°C) and 2 areas considered as marginal coffee-growing areas located in the municipalities of Restrepo (1360 m.a.s.l.; av. temp., 20°C) and Darien (1460 m.a.s.l.; av. temp., 19°C). Population dynamics of the different nematode genera detected was not important for either crop. There was a higher multiplication of species of the Meloidogyne genus in coffee and of Helicotylenchus dihystera in bean; however, their low population levels did not constitute any risk for either crop. This indicates that coffee is not affected by nematode populations when planted in association with bean, until the new coffee

trees begin to produce. Pathogenicity tests were applied to 5 promissory bean lines when parasitism by Meloidogyne incognita and M. arenaria was confirmed. BAT-1230 and 1297 had the best performance and var. Diacol Calima was the most susceptible. (Author's summary. Trans. by L.M.F.) E05

E06 Physiological Disorders

0110

19716 ENDRESS, A.G.; KITASAKO, J.T.; TAYLOR, O.C. 1978. Ultracytopathological characterization of leaves following short-term exposures of hydrogen chloride gas. Atmospheric Environment 12(6-7):1383-1390. Engl., Sum. Engl., 18 Refs., Illus.

Phaseolus vulgaris. Leaves. Cytology. HCl. Plant injuries. Cell structure. Plant physiological disorders. Symptomatology.

An ultrastructural investigation was conducted to determine the cells and structures in leaves of Phaseolus vulgaris that were affected by short-term exposures to gaseous HCl. Primary leaf tissues, sampled 24 h after exposure to approx. 25 mg gaseous HCl/m^3 for 20 min, showed alterations in mitochondria and chloroplasts, cytoplasmic membrane disruption and vesiculation, accumulation of a particulate electron dense material in vacuoles and vesicles, and the elaboration of densely staining globules within fumigated tissues. Most of the severely or totally disrupted cells were confined to the abaxial epidermis. (Author's summary) E06

0111

19715 EVANS, L.S.; TING, I.P. 1974. Effect of ozone on ^{86}Rb-labeled potassium transport in leaves of Phaseolus vulgaris L. Atmospheric Environment 8(8):855-861. Engl., Sum. Engl., 12 Refs., Illus.

Phaseolus vulgaris. Leaves. Ozone. Nutrient absorption. Plant injuries. Plant physiological disorders. K. Nutrient transport. USA.

O_3 is thought to affect plant cell membranes adversely causing water leakage, solute leakage, and the water logging appearance of smog injury. K transport, measured with the use of ^{86}Rb as a tracer, lends itself to investigations of membrane injury to leaf tissues of Phaseolus vulgaris. At low K concn. (below 0.2 mM) in the light, O_3 decreased K uptake of bean leaf discs mimicking the effect of dark and dinitrophenol. At high K concn. (from 0.4 mM to 0.1 M) in the light, O_3 caused a more marked uptake reduction than dark treatment. Thus the reduced uptake did not parallel or mimick dark treatments at low K levels. O_3 possibly reduced the energy sources for uptake at low K concn.; however, at high K concn. a general K and possibly a general cation leakage may be present. In general, low levels of O_3 (0.5 ppm for 1 h which do not cause visible injury) result in reduced K uptake and accumulation in bean leaf discs. (Author's summary) E06

0112

19713 FONG, F.; HEATH, R.L. 1981. Lipid content in the primary leaf of bean (Phaseolus vulgaris) after ozone fumigation. Zeitschrift fuer Pflanzenphysiologie 104(2):109-115. Engl., Sum. Engl., 27 Refs., Illus. [Dept. of Plant Science, Texas A&M Univ., College Station, TX 77843, USA]

Phaseolus vulgaris. Leaves. Ozone. Fat content. Air pollution. Plant physiological disorders. Plant injuries. USA.

Phospholipid composition was monitored in the primary leaves of 15-day-old pinto bean plants (age of max. sensitivity) after exposure to O_3. At threshold doses (0.3 microliter/l for 1 h), which produce spotting and flecking over 15-20% of leaf surface area, no significant losses of total lipid phosphate or individual fatty acids occurred for up to 24 h. No change in phospholipid composition (based upon mole %) was noted for up to 5 h after treatment. After 5 h, there is relatively less phosphatidyl glycerol (PG) and more phosphatidyl ethanolamine (PE) in O_3-treated leaves. The molar ratio of galactolipids remained unchanged throughout the 24-h period. Exposure of leaves to 0.5 microliter O_3/l, which induces necrotic regions covering greater than 50% of the leaf surface area, caused no initial change in phospholipid composition. After 3-5 h, however, loss in PG and gain in PE exceeded the changes produced by the lower O_3 doses. There is a significant decrease in the monogalactosyl diglyceride: digalactosyl diglyceride molar ratio by 24 h. Thus, exposure of bean leaves to O_3 causes only small alterations in PE and PG lipids, alterations which occur several hours after exposure. Such lipid changes are consistent with the loss of general cellular function, but are not the initial result of O_3 exposure. (Author's summary) E06

0113

19701 LEE, E.H.; WANG, C.Y.; BENNETT, J.H. 1981. Soluble carbohydrates in bean leaves transformed into oxidant-tolerant tissues by EDU treatment. Chemosphere 10(8):889-896. Engl., Sum. Engl., 11 Refs., Illus. [Plant Stress Laboratory, Plant Physiology Inst., Science & Education Administration, Agricultural Research, USDA, Beltsville, MD 20705, USA]

Phaseolus vulgaris. Leaves. Seedlings. Ozone. Plant injuries. Analysis. Sugars. Snap beans. Carbohydrate content.

Improved GLC techniques were used to evaluate the effects of EDU [N-[2-(2-oxo-1-imidazolidinyl)ethyl]-N'-phenylurea] on soluble leaf carbohydrates in snap bean cv. Bush Blue Lake 290, normally sensitive to O_3 but slightly tolerant when treated systemically with EDU. Less than 24 h is required to induce the resistance. Standardized trifoliate leaves from EDU-treated and control plants were sampled 48 h after treatment. Additional plants were sampled 48 h after treatment and exposed to O_3 1 day after EDU soil application to assess the plant tolerance induced. The optimal dose required to enhance oxidant tolerance was 50 mg/pot. Major sugars in both EDU-treated (O_3-tolerant) and untreated (O_3-sensitive) leaves were glyceraldehyde, erythritol, fructose, glucose, and sucrose. Myo-inositol, ribose, and arbitol were present in lesser or trace amounts. EDU-treatment resulted in significant increases (35-62%) in all soluble carbohydrates except glyceraldehyde and myo-inositol. Implications relating to plant tolerance, oxidants, and stress-induced senescence are discussed. (Author's summary) E06

0114

19734 MUSSELMAN, R.C.; OSHIMA, R.J.; GALLAVAN, R.E. 1983. Significance of pollutant concentration distribution in the response of Red Kidney beans to ozone. Journal of the American Society for Horticultural Science 108(2):347-351. Engl., Sum. Engl., 26 Refs., Illus. [Statewide Air Pollution Research Center, Univ. of California, Riverside, CA 92521, USA]

Phaseolus vulgaris. Ozone. Plant injuries. Growth. Yields. Plant physiological disorders. Air pollution.

Bean plants of cv. Red Kidney exposed to O_3 with a simulated ambient concn. distribution showed significantly more injury, less growth, and lower yield than those exposed to an equivalent dose of O_3 with a uniform concn. distribution. The concn. distribution did not alter the type of biological response of Red Kidney beans to O_3, an indication that uniform concn. distribution fumigations are appropriate for investigations of mode of action of pollutants on plants. However, research using a uniform concn. distribution of pollutants may underestimate the magnitude of growth and yield responses to ambient pollutants. (Author's summary) E06

0115

19047 SAXE, H. 1983. Long-term effects of low levels of SO_2 on bean plants (Phaseolus vulgaris). 1. Immission-response pattern of net photosynthesis and transpiration during life-long, continuous measurements. Physiologia Plantarum 57(1):101-107. Engl., Sum. Engl., 29 Refs., Illus. [Royal Veterinary and Agricultural Univ., Thorvaldsensvej 40, DK-1871, Copenhagen V, Denmark]

Phaseolus vulgaris. SO_2. Photosynthesis. Transpiration. Leaves. Stomata. Leaf area. Growth. Plant physiological disorders.

The immission-response effect of 5 low levels of SO_2 on net photosynthesis and transpiration was studied during continuous measurements in near-complete life cycles of whole bean plants of cv. Processer grown in a controlled environment. Sixteen plants were grown in individual water cultures in each of 5 100-l glass assimilation chambers with a new type of exposure system with separate root aeration. SO_2 immission ranged from 10 to 950 micrograms/m^3 during 12-h day-time exposure periods, 5 days a wk., while a low, natural background of NO_x was accepted. The SO_2-induced photosynthetic reductions were in the short term, but in particular on the long-term level very closely related with stomatal conductance (significance level better than 0.0005). However, a causal coherence was not inferred. Physiological inhibitions were composed of: (1) a reversible component (night and weekend recovery); and (2) an irreversible component (related to reduced green leaf area). The pattern of leaf growth was studied, with the conclusion that SO_2 reduced leaf area by promoting senescence, rather than by interfering with leaf emergence and development. (Author's summary) E06

0116

19086 TOIVONEN, P.M.A.; HOFSTRA, G.; WUKASCH, R.T. 1982. Assessment of yield losses in white bean due to ozone using the antioxidant EDU. Canadian Journal of Plant Pathology 4:381-386. Engl., Sum. Engl., Fr., 18 Refs., Illus. [Dept. of Environmental Biology, Univ. of Guelph, Ontario N1G 2W1, Canada]

Phaseolus vulgaris. Ozone. Plant injuries. Crop losses. Yields. Cultivars. Plant physiological disorders. Canada.

Yield losses in white bean cv. Seafarer, Sanilac, Kentwood, and Fleetwood from O_3 were assessed during 2 growing seasons over the bean growing region of southern Ontario, Canada. Exptl. plots were established in growers' fields and treated with the antioxidant EDU, N-[2-(2-oxo-1-imidazolidinyl)] ethyl-N'-phenyl urea. In 1977 substantial bronzing occurred over most of the area. Yield losses reached about 35%. In 1978 a drought during midseason resulted in less bronzing even though O_3 levels were higher than in 1977. Sensitivity to O_3 for cv. Seafarer and Kentwood increased with increased crop vigor, but not for Sanilac. EDU was shown to be an

effective chemical tool in assessing yield losses from O_3 under differing environmental and cultural conditions. (Author's summary) E06

See also 0151

F00 PEST CONTROL AND ENTOMOLOGY

0117

19478 COTO A., T.D.; SAUNDERS, J.L.; PEARS, F.B. 1982?. Combate de babosas (Soleolifera:Veronicellidae) con extractos de plantas. [Controlling slugs (Soleolifera:Veronicellidae) with plant extracts]. Turrialba, Costa Rica, Centro Agronómico Tropical de Investigación y Enseñanza. 10p. Span., 8 Refs. [Centro Agronómico Tropical de Investigación y Enseñanza, Turrialba, Costa Rica]

Phaseolus vulgaris. Pest control. Toxicity. Slugs. Biological control. Costa Rica.

Research was carried out in 3 different phases at a lab. level to study the toxic or repellant effect of some plants on slugs of the family Veronicellidae at the Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), Turrialba, Costa Rica. During the 1st phase, slugs were fed 2 x 2 cm-pieces of leaves, fruits, and stems of more than 40 plants, among which Phaseolus vulgaris was included as a check. Both consumption and mortality were examined. During the 2nd phase, 2 x 2 cm-pieces of bean leaves treated with extracts of the same plants (10 g plant in 50 ml H_2O) were supplied. During the 3rd phase extracts selected from the 2nd phase were applied on common bean seedlings. Among the tested plants, the species Blighia sapida, Crotalaria retusa, Mammea americana, and Anacardium occidentale were phytotoxic for bean seedlings. Plants with the best performance during the trial and that maintained a low level of leaf and stem consumption and defoliation in seedlings were Canavalia ensiformis (seed), Nerium oleander (leaves-stem), and Thevetia peruviana (leaves). (Summary by EDITEC. Trans. by L.M.F.) F00

See also 0027

F01 Injurious Insects, Mites and their Control

0118

19421 ABATE, T.; NEGASI, A. 1981. 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]

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

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. (Author's summary) F01

0119

20045 BLICKENSTAFF, C.C. 1983. Dispersal of western bean cutworm larvae from egg masses as measured by damage to beans. Environmental Entomology 12(3):902-904. Engl., Sum. Engl., 5 Refs., Illus. [Snake River Conservation Research Center, ARS, USDA Kimberly, ID 83341, USA]

Phaseolus vulgaris. Loxagrotis albicosta. Plant injuries. Insect biology. USA.

Beans were infested with masses of 50, 100, and 200 eggs of the western bean cutworm, Loxagrotis albicosta, and the dispersal of larvae was measured in terms of damage. Linear regression indicated dispersal of 3.05-3.66 m in the release row and 2.45-3.05 m across rows. At the higher egg levels, dispersal across rows was also indicated as up to 3.66 m. However, 72% of the damage occurred within a smaller area, 1.83 m (3 rows) wide and 3.66 m long. This confirms general observations of spotty damage in the field and has implications for sampling. (Author's summary) F01

0120

19751 BURNETT, G.F.; LEE, C.W.; PARK, P.O. 1966. Aircraft applications of insecticides in East Africa. 15. Very-low-volume treatment of a seed-bean crop with DDT in oil solution. Bulletin of Entomological Research 56(4):701-714. Engl., Sum. Engl., 8 Refs.

Phaseolus vulgaris. Heliothis armigera. Acanthomia horrida. Chemical control. Insect control. Tanzania.

Expt. on the aerial application of very low vol. (0.5 gal/ac) of oil solutions of DDT to control 2 pests, Heliothis armigera and Acanthomia horrida, of beans in northern Tanzania are described. The method was compared with an improved variant of the standard commercial method of aerial control, in which DDT emulsion is applied at 1.85 gal/ac. This improved variant was also compared with a standard commercial treatment. Very-low-vol. (solution) treatments were made with rotary atomizers, normal-vol. (emulsion) treatments with boom-and-nozzle equipment. The results were assessed by measuring the amount of DDT deposited on filter papers and on the leaves of the crop and by estimating pest mortality from counts made immediately before and 48 h after spraying. A direct comparison of very-low- and normal-vol. treatments under identical conditions was not possible, but it was established that under similar conditions the proportion of DDT emitted that was deposited at crop level (% recovery) was much the same for the 2 methods, varying between 41-62% according to conditions. The lower leaves of a fairly young crop of an open var. received about 60% of the deposit on the upper leaves, but in a mature crop of a tall dense var. this % fell to 35. Standard commercial practice, with the aircraft flying very close to the crop, gave a recovery of about 55% in moderately good conditions but with a variation in deposit density across the swath of over 7:1. An identical application from 10 feet above crop, gave in better conditions a recovery of 62%, with the deposit:density variation reduced to 2:1. This performance was much the same as that

achieved by the type of emulsion application used in the other expt. In similar conditions, both very-low- and normal-vol. treatments gave very similar mortalities of Heliothis. Acanthomia was present in only 1 expt. and was less readily controlled; it required deposits at crop level of about 0.4 lb/ac to give satisfactory mortality, whereas in the same expt. 0.25 lb/ac gave 96% mortality in a relatively young Heliothis population containing only 10% of 6th-instar larvae. Older Heliothis larvae required higher dosages, 0.4 lb/ac at crop level killing only 53% of a population containing 62% of 6th-instar larvae. It was shown that there is a regular decrease in the kill inflicted by a given dosage on the successively later instars (from 92% of the 3rd to 66% of the 6th) with a recorded deposit of 0.63 lb DDT/ac. Except in the 1st expt., mortalities were below those claimed for commercial treatments, even at lower rates of DDT/ac. The reasons for this are discussed, together with the advantages to be expected from a change to the very-low-vol. technique with solutions. (Author's summary) F01

0121

20065 COMMONWEALTH AGRICULTURAL BUREAUX. 1978. Biological control of major pests of legumes: pod borers and beanflies. Farnham Royal, Slough, Commonwealth Institute of Biological Control. Status Paper no.12. 11p. Engl., Sum. Engl., 20 Refs.

Phaseolus vulgaris. Biological control. Etiella zinckenella. Maruca testulalis. Lampides boeticus. Cydia nigricana. Africa.

The biological control possibilities of major pests of legumes, namely pod borers and beanflies, are briefly evaluated. Significant developments are highlighted. More important pod borers are Etiella zinckenella, Maruca testulalis, Lampides boeticus, and Cydia nigricana. The results of attempts at their biological control have been variable, and reflect the level of research input. Parasites (Opius spp.) of beanflies from East Africa have achieved effective control of Ophiomyia phaseoli in Hawaii and Brunei. Further studies are required on both groups of pests. Large areas of Africa, Asia, and South America have not been adequately surveyed as sources of natural enemies of pod borers. The discovery of promising new parasites is likely. Other beanfly species need to be studied to ascertain if suitable parasites for biological control trials exist. (Author's summary) F01

0122

19464 CONTI, L.; WADDILL, V. 1982. Development of velvetbean caterpillar, Anticarsia gemmatalis (Lepidoptera:Noctuidae), on several winter hosts. Environmental Entomology 11(5):1112-1113. Engl., Sum. Engl., 10 Refs. [Univ. of Florida Agricultural Research & Education Center, 18905 SW 280 St., Homestead, FL 33031, USA]

Phaseolus vulgaris. Anticarsia gemmatalis. Insect biology. Plant injuries. USA.

Larvae of Anticarsia gemmatalis were reared on the following potentially important overwintering hosts in southern Florida, USA: Lablab purpureus (Dolichos lablab), Galactia speciformis, soybean, Indigofera hirsuta, Melilotus alba, Macroptilium lathyroides (Phaseolus lathyroides), snap bean, Rhynchosia minima, and Vigna luteola. Development time, no. of instars, pupal wt., and foliage consumed were used to evaluate host suitability. Based on the 1st 3 categories, I. hirsuta, R. minima, M. lathyroides, V. luteola, L. purpureus, and Melilotus alba were at least as good as soybean for larval development. Percent mortality, pupal wt.,

development time, no. of instars, and leaf consumption of A. gemmatalis on snap bean were, resp., 73%, 163 ± 24.8 mg, 20.0 ± 3.2 days, 7.8 ± 0.7, 73.8 ± 12.6 cm^2. Snap bean was the poorest host. (Author's summary) F01

0123

17385 DAVIES, J.C. 1970. Pests of beans. In Jameson, J.D., ed. Agriculture in Uganda. London, Oxford University Press. pp.242-243. Engl.

Phaseolus vulgaris. Hedylepta indicata. Maruca testulalis. Heliothis armigera. Spodoptera litura. Alcidodes leucogrammus. Coryna apicicornis. Mylabris amplectens. Melanagromyza phaseoli. Melanagromyza. Homoptera. Uganda.

Major insects recorded in Uganda are: tissue eating ones such as Hedylepta indicata, Maruca testulalis, Heliothis armigera, Spodoptera litura, Alcidodes leucogrammus, Coryna apicicornis, Mylabris amplectens, Melanagromyza phaseoli, and Melanagromyza sp.; sucking insects such as Nezara viridula, Acanthomia horrida, Anoplocnemis curvipes, and aphids. (Summary by F.G. Trans. by L.M.F.) F01

0124

19836 DOMARCO, R.E. 1981. Efeitos da dieta irradiada sobre a longevidade e prolificidade em geracoes sucessivas de Zabrotes subfasciatus (Boheman, 1833) (Coleoptera, Bruchidae). [Effects of irradiated diet on longevity and prolificity of successive generations of Zabrotes subfasciatus (Coleoptera, Bruchidae)]. Tese Doutor Agron. Piracicaba-SP, Brasil, Escola Superior de Agricultura Luiz de Queiroz da Universidade de Sao Paulo. 78p. Port., Sum. Port., Engl., 23 Refs., Illus.

Phaseolus vulgaris. Irradiation. Zabrotes subfasciatus. Diets. Brazil.

The effect of irradiated beans of cv. Rosinha on the longevity and prolificity of Zabrotes subfasciatus was studied under lab. conditions at the Centro de Energia Nuclear na Agricultura in Piracicaba, SP, Brazil. Preliminary testing involved the rearing of 5 generations of Z. subfasciatus, fed with irradiated beans (0, 10, 20, 100, and 200 krad, with a dose rate of approx. 70 krad/h). During the 2nd part of the study, 7 generations of the weevil were grown on irradiated beans (0, 100, 500, 1500, and 3000 krad, with a dose rate of approx. 54 krad/h). The data obtained through daily countings of insect birth and death rates indicated that irradiation modified the nutritional quality of bean, and thus affected insect development. Insect longevity and prolificity were altered in comparison with the check (0 krad), being relatively higher for the doses of 1500 and 3000 krad. (Author's summary) F01

0125

19735 GONZALEZ, R.; CARDONA, C.; SCHOONHOVEN, A. VAN 1982. Evaluación de los daños causados en fríjol por larvas y adultos de los crisomélidos Diabrotica balteata LeConte y Cerotoma facialis Erickson. (Evaluation of damage to beans by larvae and adults of the chrysomelids Diabrotica balteata and Cerotoma facialis). Turrialba 32(4):433-439. Span., Sum. Span., 11 Refs., Illus. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Diabrotica balteata. Cerotoma facialis. Plant injuries. Yields. Yield components. Colombia.

Damage to common beans by feeding of larvae and adults of Diabrotica balteata and Cerotoma facialis was evaluated under greenhouse and field

conditions. Second and third instar larvae were more damaging than first instars. Stand losses due to larval attack were in some cases as high as 100%. Both species caused significant reductions in leaf area in plants infested when 1, 4, and 7 days old. No significant reduction in leaf area was found when 14-day-old or older plants were infested with 10 larvae/plant. Mixed and pure adult populations of these species at the rate of 2 and 4 adults/plant caused yield losses of up to 60% during the initial period of plant growth (8-15 days) and to a lesser extent during flowering. No significant effect was detected by such infestation levels at other stages of the growth cycle. Adult damage to flowers and pods was also considered; however, no yield reduction was detected probably because adults prefer feeding on the foliage. When maize and beans were planted in association, adults of C. facialis caused more damage to the beans than those of D. balteata. (Author's summary) F01

0126

8436 GOULD, H.J.; MAYOR, J.G. 1975. Alternative seed treatments to dieldrin for the control of bean seed fly (Delia spp.). Plant Pathology 24:245-246. Engl., Sum. Engl., 6 Refs.

Phaseolus vulgaris. Seed treatment. Chemical control. Delia platura. Insect control.

Alternative seed treatments to dieldrin were compared in field trials in southwestern England in 1972-73. Chlorfenvinphos, chlorpyrifos, methiocarb, or pirimiphos-ethyl gave a control of bean seed fly on climbing beans equivalent to dieldrin. Treatment with 40% chlorfenvinphos was phytotoxic to the white-seeded cv. Harvester. (Author's summary) F01

0127

19755 MATERU, M.E.A.; MAKUSI, R.A. 1973. Toxicity of synergized pyrethrum to Acanthomia spp. 1. Acanthomia tomentosicollis Stal. East African Agricultural and Forestry Journal 39(2):141-143. Engl., Sum. Engl., 5 Refs., Illus.

Phaseolus vulgaris. Acanthomia tomentosicollis. Toxicity. Chemical control. Insect control. Tanzania.

Toxicity tests were conducted to determine the effectiveness of synergized pyrethrum applied topically to Acanthomia tomentosicollis in a constant vol. of 1 microliter between meso- and metathoracic legs. The mortality of the bugs 24 h after treatment was lower than that caused by endosulfan. Pyrethrum is therefore not recommended at the present for field control of bean pests. (Author's summary) F01

0128

20046 MELLORS, W.K.; BASSOW, F.E. 1983. Temperature-dependent development of Mexican bean beetle (Coleoptera:Coccinellidae) immatures on snap bean and soybean foliage. Annals of the Entomological Society of America 76(4):692-698. Engl., Sum. Engl., 11 Refs., Illus. [Dept. of Entomology, Univ. of Maryland, College Park, MD 20742, USA]

Phaseolus vulgaris. Snap beans. Epilachna varivestis. Insect biology. Temperature.

Developmental periods and survival were determined for immature stages of the Mexican bean beetle (Epilachna varivestis) at constant temp. of 11, 15, 20, 25, and 30°C. Rearings were conducted on greenhouse-grown snap bean

foliage and soybean foliage, and field-grown soybean foliage. Comparisons between rearings on greenhouse snap bean and greenhouse soybean foliage indicated that larval developmental periods for individual instars did not differ between host plants, but larval survival was different depending on temp. Comparisons between rearings on greenhouse and field soybean foliage indicated no differences in larval developmental periods or survival. The constant temp. developmental rates for eggs and larvae permitted satisfactory simulation of egg and larval development under changing temp. regimes in the lab. For each stage, a fitted equation for the developmental rate - temp. relationship on snap bean and on soybean foliage was determined. (Author's summary) F01

0129

19447 PENDAS M., F. 1983. Principales insectos que afectan el cultivo del fríjol en Cuba. (Major insects affecting beans in Cuba). In Curso Intensivo de Postgrado en la Producción de Fríjol, 4o., Matanzas, Cuba, 1983. Conferencias. Cuba, Ministerio de Agricultura. pp.98-107. Span.

Phaseolus vulgaris. Bemisia tabaci. Diabrotica balteata. Anticarsia gemmatalis. Systena basalis. Cerotoma ruficornis. Typophorus nigritus. Hedylepta indicata. Maruca testulalis. Acanthoscelides obtectus. Zabrotes subfasciatus. Empoasca fabae. Insect control. Plant injuries. Insect biology. Integrated control. Cuba.

The taxonomic classification, the common name, damage caused, and chemical control methods of Bemisia tabaci, Diabrotica balteata, Systena basalis, Cerotoma ruficornis, Typophorus nigritus, Anticarsia gemmatalis, Hedylepta indicata, Agromyza spp., Maruca testulalis, Acanthoscelides obtectus, and Zabrotes subfasciatus are given. The leafhopper Empoasca fabae was studied in particular; host plants, geographic distribution, insect biology, and genetic, chemical, and biological control methods are also described for this pest. (Summary by IDITEC. Trans. by L.M.F.) F01

0130

19068 PIMBERT, M.P.; PIERRE, D. 1983. Ecophysiological aspects of bruchid reproduction. 1. The influence of pod maturity and seeds of Phaseolus vulgaris and the influence of insemination on the reproductive activity of Zabrotes subfasciatus. Ecological Entomology 8:87-94. Engl., Sum. Engl., 22 Refs., Illus. [Inst. of Biocénotique Expérimentale des Agrosystemes, Univ. F. Rabelais, Tours, France]

Phaseolus vulgaris. Zabrotes subfasciatus. Insect biology. Pods. Seed.

The influence of pods at different stages of maturity and seeds of Phaseolus vulgaris and the influence of insemination on the reproductive activity of Zabrotes subfasciatus were examined. Female fecundity, insemination, and ovarian production were studied under lab. conditions approximating as closely as possible to the thermal and photoperiodic regimes of the Costa Rican region from which the exptl. strain originated. The 3 stages of pod maturity used in expt. (fresh green, fresh yellow, and dry yellow pods, all nondehiscent) induced copulation and significantly stimulated oogenesis. Fecundities of females in the presence of pods were low and did not differ from controls. The influence of bean seeds on female reproductive activity was more pronounced than that of pods. Contact with seeds led to a marked increase in the no. of sexual meetings, ovarian production, and egg-laying activity. Under these conditions, eggs are laid directly on the larvae's food. Insemination alone stimulated oogenesis but did not induce egg-laying. Possible additive or synergistic interactions between host plant information perceived by females, the effects of

egg-laying, and insemination are suggested to explain the observed results. The adaptive value of this form of reproductive regulation by host plant seeds and pods is discussed in terms of the natural history and oviposition behavior of Z. subfasciatus. (Author's summary) F01

0131

18579 RUPPEL, R.F. 1978. Insects and their control. In Robertson, L.S.; Frazier, R.D., eds. Dry bean production—principles and practices. East Lansing, Michigan State University. Cooperative Extension Service. Agricultural Experiment Station. Extension Bulletin E-1251. pp.158-171. Engl., Illus.

Phaseolus vulgaris. Delia placura. Thysanoptera. Epilachna varivestis. Homoptera. Nezara viridula. Empoasca kraemeri. Tetranychus sp. Vaginulus plebeius. Apion godmani. Zabrotes subfasciatus. Acanthoscelides obtectus. Insect control. USA.

Recommendations on how to establish effective insect control programs are given. Bean pests found in Michigan, USA, are described for their identification in the field as well as recommended control measures. The following pests are included: cutworms (Agrotis, Feltia, and Spodoptera), white grubs, seedcorn maggot (Delia platura), thrips (Frankliniella sp., Sericothrips sp., and Caliothrips braziliensis), bean aphids (Aphis sp.) Mexican bean beetle (Epilachna varivestis), leafhoppers (Empoasca kraemeri), two-spotted spider mite (Tetranychus telarius sp.), slugs, green cloverworm (Plathypena scabra), wireworms, and bruchids (Zabrotes subfasciatus and Acanthoscelides obtectus). (Summary by EDITEC. Trans. by L.M.F.) F01

0132

19407 SINGH, D.S.; DHINGRA, S.; SRIVASTAVA, V.S.; SIRCAR, P.; LAL, R. 1980. Relative susceptibility of Aphis craccivora Koch. to pesticides in relation to different hosts. Indian Journal of Entomology 42(4):746-756. Engl., Sum. Engl., 8 Refs.

Phaseolus vulgaris. Aphis craccivora. Chemical control. Predators. India.

Thirty-one pesticides were tested as contact poisons against the adult females of Aphis craccivora infesting bean. Out of these, 29 pesticides (phosphamidon, dimethoate, fenthion, dichlorvos, thiodemeton, phenthoate, fenitrothion, ethyl parathion, leptophos, methyl parathion, malathion, formothion, orthodibrom, carbaryl, phorate, pyrethrins, quinalphos, trichlorfon, morphothion, aphidan, chlorpyrifos, phoxim, diazinon, lindane, endosulfan, mecarbam, rotenone, EPN, and tetrachlorvinphos) were found to be more toxic than p,p' DDT and only nicotine sulphate was found to be less toxic than p,p' DDT. Aphids infesting pea as compared with those infesting bean were more resistant to phenthoate, trichlorphon, mecarbam, phosphamidon, dichlorvos, formothion, endosulfan, aphidan, p,p' DDT, malathion, and carbaryl. The aphids infesting cowpea when compared with those infesting bean were more resistant to ethyl parathion, malathion, lindane, and p,p' DDT. The order of toxicity of 12 insecticides were similar for aphids infesting bean and pea. Actual LD_{50} values for aphids infesting different hosts were almost similar as in the case of carbaryl, lindane, and p,p' DDT (bean, pea, and cowpea); dimethoate, malathion, aphidan, and endosulfan (bean and pea). Keeping in view the LD_{50} value for the pest and safety margin for the predator, any one out of aphidan, lindane, and endosulfan may be selected for effective control of the pest. (Author's summary) F01

0133

19844 WILSON, K.G. 1981. Aspects of the physiological ecology of the Mexican bean beetle, Epilachna varivestis Mulsant. Ph.D. Thesis. Raleigh, North Carolina State University at Raleigh. 81p. Engl., Sum. Engl., 74 Refs., Illus.

Phaseolus lunatus. Epilachna varivestis. Insect biology.

As part of an effort to model the population dynamics of the Mexican bean beetle (Epilachna varivestis), 2 aspects of its physiological ecology were studied in order to better estimate the impact of stresses due to weather and host nutritional quality. A comparison of water loss rates and ingestion rates for larvae fed on lima or soybean foliage indicates that loss rates are higher and ingestion rates lower for individuals feeding on the soybean host. In addition, recuperation of partially desiccated individuals was more rapid on the lima host. The 2nd study suggests that the major storage form of N in N-fixing legumes is not readily available as a nutrient resource for some herbivores, including E. varivestis. (Summary by Dissertation Abstracts International) F01

See also 0051 0058 0097 0104 0139 0150 0159 0166 0196 0197 0198 0199

G00 GENETICS AND PLANT BREEDING

See 0027

G01 Breeding, Selection and Germplasm

0134

20042 ACOSTA, M.A.; ALFARO, R.; MASAYA, P.; GARCIA, C.M.; RAMOS, F.T.; LLANO, A. 1983. Vivero centroamericano de adaptación y rendimiento VICAR 1982. (Central American yield and adaptation nursery, VICAR 1982). In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 29a., Panamá, 1983. Informe presentado. Panamá. 43p. Span., Sum. Span.

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Technology evaluation. Seed color. Selection. El Salvador. Nicaragua. Costa Rica. Honduras.

A report of 24 Central American yield and adaptation nurseries, located at 11 sites in 5 countries of the area and grouped in 2 trials by grain color (red and black) is given. The improved var. and promissory lines that were proposed by countries in the area and developed at CIAT and/or by national programs are compared. Results confirm the superiority of improved var. that have been released in recent years over most of the older improved lines and traditional checks. However, var. performance differs over different sites, more markedly in trials of red-seeded var. Among these, BAT 789, Revolución 81, and Acacias 4 with av. yields of 1200 kg/ha in the 1st season planting, and 1300 kg/ha in the 2nd season planting should be mentioned. Rojo 70 (growth habit IV) occupied the 1st place in 2nd season plantings. Its yield potential should be used advantageously in cross-breeding programs and its noted deficiencies should be corrected, namely photosensibility and nonacceptable grain for the consumer. In trials with black-seeded var. CENTA TAZUMAL and TALAMANCA yielded, on an av., up to

1800 kg/ha for 1st season plantings, but in 2nd season plantings, yields were 1200 kg/ha. Negro Huasteco 81 (D 145) and ICTA Tamazulapa were comparatively more stable regarding both plantings. During 2nd season plantings, combinations of physical mixtures were included; their mean yields were above av. indicating a tendency to stability. In some cases, the combination was superior in performance to its components. (Author's summary. Trans. by L.M.F.) G01

0135

20050 ALBERINI, J.L.; KRANZ, W.M.; OLIARI, L.; BIANCHINI, A. 1983. IAPAR 5-Rio Piquiri e IAPAR 7-Rio Vermelho, novas variedades de feijoeiro para o Estado do Paraná. (IAPAR 5-Rio Piquiri and IAPAR 7-Rio Vermelho, new dry bean varieties for the state of Paraná). Pesquisa Agropecuária Brasileira 18(4):393-397. Port., Sum. Port., Engl., 4 Refs. [Instituto Agronomico do Paraná, Caixa Postal 1331, 86.100 Londrina-PR, Brasil]

Phaseolus vulgaris. Cultivars. Crossbreeding. Selection. Resistance. Colletotrichum lindemuthianum. Yields. Adaptation. Uromyces phaseoli. Plant breeding. Brazil.

After 3 screening cycles under controlled conditions and 3 screening cycles under natural conditions in segregating populations that resulted from crosses of Cornell 49-242 (source of resistance to 6 physiological races of the fungus Colletotrichum lindemuthianum) with the var. Aroana and Roxo Minas, the promising lines RAI 12, RAI 46, and RAI 53 were created. Results of 3 yr of trials with these lines compared with var. Carioca in 14 localities in the state of Paraná, Brazil, are presented. Based on data of yield, adaptation, and reaction to rust (Uromyces phaseoli) and anthracnose (C. lindemuthianum), RAI 46 and RAI 53 were mixed and released under the name of IAPAR 5-Rio Piquiri; the new var. has a lusterless light-brown seed coat with purplish halo; the av. wt. of 1000 seeds is approx. 265 g. RAI 12 was released under the name of IAPAR 5-Rio Vermelho and its seeds have a dull, purple seed coat; the av. wt. of 1000 seeds is approx. 255 g. The new bean var. are recommended for planting in northern Parana and their main characteristics are presented. (Author's summary) G01

0136

19471 ALVARADO A., D. 1981. Evaluación de rendimiento y características agronómicas de líneas de fríjol con tolerancia y resistencia a altas temperaturas en siembras de primavera. (Evaluation of yield and agronomic characteristics of bean lines tolerant and resistant to high temperatures in spring plantings). In Centro de Investigaciones Agrícolas del Norte. Informe de investigación agrícola: fríjol y soya 1976-1978. México, Instituto Nacional de Investigaciones Agrícolas. pp. 43-55. Span., Sum. Span., Illus. [Inst. Nacional de Investigacion Agrícolas, Campo Agrícola Exptl., Zacatecas, Apartado Postal No. 18, Calera de V.R., Zac., México]

Phaseolus vulgaris. Cultivars. Yields. Resistance. Temperature. Agronomic characters. Mexico.

Sixty-two beans lines were tested with var. Delicias 71 and Matamoros as checks in 2 expt. (subprojects F.1.1.1. and F.1.1.2.) to identify one or more bean lines resistant or tolerant to high temp. in spring plantings in the Comarca Lagunera, Mexico. A simple 8 x 8 lattice design with 4 replications was used. In subproject F.1.1.1., Line II-F x Pinto Nacional 4-719 produced max. yields (3081 kg/ha). Seeds of lines Mantequilla x Matamoros 64-36-17 and Canario 101 x Jamapa 1-14-30 should be multiplied for good yield, grain type, tolerance or resistance to high temp. In

subproject F.1.1.2., line Jamapa x C-107-5-7-14 produced the highest yields (2989 kg/ha). (Extracted from author's summary. Trans. by L.M.F.) G01

0137

20026 BAUDOIN, J.P. 1982. Essais d'evaluation du haricot de Lima (Phaseolus lunatus L.) en vue de l'amelioration de sa culture en régions tropicales de basse altitude. [Evaluation trials of the lima bean (Phaseolus lunatus) to improve its cultivation in the lowland tropical regions]. Bulletin des Recherches Agronomiques de Gembloux (Bélgica) 17(1):3-15. Fr., Sum. Fr., Engl., 10 Refs. [Faculté des Sciences Agronomiques, Gembloux, Belgium]

Phaseolus lunatus. Plant breeding. Cultivars. Adaptation. Dwarf beans. Climbing beans. Selection. Resistance. Bean golden mosaic virus.

A lima bean improvement program in the humid tropics carried out several evaluation trials with a collection including mainly African cultivated forms. Results obtained clearly demonstrated the poor agronomic values of the bush types. Among the climbing material, numerous introductions were selected for their high productivity and their resistance to diseases. Golden mosaic is certainly the major constraint to the intensification of this crop in the forest areas. All the sources of resistance to this disease were exclusively found within the cultigroup Big Lima. This latter must then be integrated in the future breeding works even though those forms appear not well adapted in this ecological zone of the tropics. (Author's summary) G01

0138

20025 BAUDOIN, J.P. 1982. Etude des premieres descendances d'hybrides intraspécifiques en vue de l'amelioration du haricot de Lima (Phaseolus lunatus L.) dans les régions tropicales humides de basse altitude. [Studies of the first progenies of intraspecific hybrids to improve the lima bean (Phaseolus lunatus L.) in the lowland regions of the humid tropics]. Bulletin des Recherches Agronomiques de Gembloux (Bélgica) 17(2):105-117. Fr., Sum. Fr. Engl., 4 Refs. [Faculté des Sciences Agronomiques, Gembloux, Belgium]

Phaseolus lunatus. Crossbreeding. Hybrids. Genotypes. Bean golden mosaic virus. Genes. Resistance. Genetics.

Numerous intraspecific hybrids were realized in a lima bean improvement program in the humid tropics. Crosses between the cultivated forms themselves and between the cultivated and wild forms showed, from the 1st generations, real potentialities for obtaining climbing cv. better adapted to the ecological zone. Genes of resistance to golden mosaic found within the cultigroup Big Lima, not fitted to the region concerned, can be incorporated into several elite lines of the cultigroup Sieva. The transfer of this character is not accompanied by too many unfavorable attributes, such as the lateness in flowering. If the hybrids with the wild form show a good vegetative vigor and a high degree of fecundity, they are, however, very susceptible to the golden mosaic. (Author's summary) G01

0139

19062 BOSQUE-PEREZ, N.A.; LEIGH, T.F.; FOSTER, K.W. 1982. Oviposition, survival, growth, and observed population increase of Lygus hesperus (Heteroptera:Miridae) on selected bean cultivars. Journal of Economic Entomology 75(6):997-1001. Engl., Sum. Engl., 19 Refs. [Dept. of Entomology, Univ. of California, Davis, CA 95616, USA]

Phaseolus vulgaris. P. lunatus. Cultivars. Resistance. Lygus hesperus. Insect biology. Selection.

Twenty cv. of 3 bean species (Phaseolus lunatus, P. vulgaris, Vigna unguiculata) were evaluated for resistance to Lygus hesperus, the principal pest of beans in California, USA. Their effect on no-choice ovipositional preference, survival, growth rate, and observed gross rate of increase by the insect was assessed. Common bean var. were preferred by lygus bugs over lima bean and cowpea var. as an ovipositional site. Lygus bug gross increase was greatest on cowpea cv., intermediate on common bean, and least on lima bean. Significant differences in the no. of eggs laid by lygus bugs were found among lima bean var. Nymphal survival and gross increases were greatest on common bean cv. Aurora and Black Turtle Soup 39 and least on Sutter Pink. These differences suggest that breeding bean cv. resistant to lygus bugs is feasible. (Author's summary) G01

0140

14249 CANDAL NETO, J.F.; MARTINAZZI, A. 1977. Introducao e avaliacao do comportamento de cultivares de feijoeiro (Phaseolus vulgaris L.) no Espírito Santo. (Introduction and evaluation of performance of bean cultivars in Espírito Santo) Cariacica-ES, Brasil, Empresa Capixaba de Pesquisa Agropecuária. Série Indicacao da Pesquisa no.1. 8p. Port.

Phaseolus vulgaris. Cultivars. Yields. Seed color. Flowering. Resistance. Colletotrichum lindemuthianum. Fromyces phaseoli. Adaptation. Selection. Brazil.

Results are given of 2 expt. carried out in 1976 during the dry and rainy seasons to evaluate the performance of local and introduced bean cv. regarding productivity, commercial aspects, and resistance to major bean diseases in the state of Espirito Santo, Brazil. Ricopardo 896, Cornell 49-242, Rio Tibagi, Manteigao Fosco 11, Manteigao 977, and Ricobaio 1014 were outstanding among the tested cv. The most important agronomic characteristics (seed color and wt., days to flowering, disease resistance) of the best cv. are described. Ricopardo 896 was found to be the highest producing cv., followed by Ricobaio 1014, Manteigao Fosco 11, and Manteigao 977, in adaptation analysis. (Summary by EDITEC. Trans. by L.M.F.) G01

0141

19834 CARDONA P., F.L.; ARIAS H., J.E. 1978. Adaptación de variedades de fríjol (Phaseolus vulgaris L.) en la zona de Santa Fé de Antioquia. (Adaptation of bean varieties in the zone of Santa Fé de Antioquia). Tesis Ing.Agr. Medellín, Universidad Nacional de Colombia. 101p. Span., Sum. Span., 13 Refs., Illus.

Phaseolus vulgaris. Cultivars. Germplasm. Adaptation. Yields. Plant habit. Colombia.

During the 1st semester of 1978, 250 bean materials which included the 4 growth habit types were evaluated to measure var. adaptability to the area of Santa Fé de Antioquia, Colombia. Most of the materials belonged to the promissory group of CIAT's bean germplasm bank, several to CIAT's general collection, and several advanced breeding lines. Most of the materials had good plant growth with excellent leaf area development. The length of the vines of some of the type I materials was excessive. The best adapted var. of the 4 growth habit types were: type I, none; type II, P 209 (PI 201 333), P 518 (S-315-N I-957), P 723 (Brasil 1096 I 113), P 738 (Línea 29), P 757 (Porrillo 1), FF 0036-3; type III, P 311 (PI 310 522 Moro); and type IV, P 589 (PI 313 624), G 02161. Var. P 518 and P 589 gave the highest

yields with 221.6 and 223 g/m^2, resp., and appeared to be the best adapted to the region. Yields fluctuated between 0-223 g/m^2. Var. Cargamanto (type IV) gave yields of 2 g/m^2 and its seed did not agree with its regular pattern. (Author's summary. Trans. by L.F. G01

0142

19827 CARDONA R., C.A. 1978. Prueba regional de rendimiento de veinticinco variedades de fríjol (Phaseolus vulgaris L.) en la finca Cotove. (Regional yield trial of twenty-five bean varieties on the Cotove farm). Tesis Ing.Agr. Medellín, Universidad Nacional de Colombia. 32p. Span., Sum. Span., 8 Refs., Illus.

Phaseolus vulgaris. Cultivars. Adaptat'on. Yields. Technology evaluation. Flowering. Colombia.

Twenty-five bean var. were evaluated under the conditions of Santa Fe de Antioquia, Colombia, to determine their yield and ability to adapt to different conditions. The var. used were: S-630-B-C-63, Diacol Calima, Línea 17, Redkloud, Pompadour 2, Diacol Catío, Porrillo Sintético, Jamapa, Puebla 152, Venezuela 2, ICA Tui, PI 309-804, 51051, Porrillo 1, S166-A-N, ICA-Pijao, Ex-Rico 23, Nep-2, Sanilac, Bico de Ouro or Brasil 2, Puebla 152, Diacol Nutibara, ICA Toné, Uribe Redondo, and ICA Huasanó. A 5 x 5 lattice dsign was used with 4 replications and a plant density of 250,000/ha. The highest yielding var. (Brasil 2, Sanilac, Pompadour 2, Ex-Rico 23) were found to be those with less days to flowering since drought occurred 50 days after planting and thus did not affect the plants. Late-maturing and semi late-maturing var. could possibly give high yields if timely and sufficient irrigation is given. (Summary by F.G. Trans. by L.M.F.) G01

0143

19871 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1981. International cooperation. Outreach projects. In _____. Bean Program. Annual Report 1980. Cali, Colombia. pp.79-83,81-83. Engl. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Also in Spanish.

Phaseolus vulgaris. Transfer of technology. Adaptation. Cultivars. Yields. Seed production. Selection. Resistance. Bean golden mosaic virus. Plant habit. Central America. Colombia. Peru.

A cooperative project between Central American countries and CIAT to increase bean production in the region was initiated in 1980. The following activities were stimulated: (1) Interinstitutional technology transfer by distribution through CIAT yield and adaptation nurseries and national programs; black-seeded var. ICTA-Jutiapán, ICTA-Quetzal, and Talamanca, and red-seeded var. Acacías-4 and Revolución 79 had a good performance throughout the region. (2) Seed production, by strengthening seed programs in Guatemala, Honduras, Costa Rica, and Nicaragua. National programs in El Salvador, Cuba, Honduras, and Nicaragua received seed from the Bean Program and the CIAT seed unit. (3) Training, 25 bean researchers in the region received postgraduate training at CIAT and technical and organizational assistance was provided for a short course on bean production held in Cuba. (4) Screening for BGMV, which resulted in several promising BGMV-tolerant materials. The project in Peru completed its 2nd yr of operation. Regional trials are carried out with materials from the International Bean Yield and Adaptation Nursery (IBYAN) at CIAT and with local materials. Two appendixes are included: (I) detailed description of Phaseolus vulgaris growth habits

and (2) list of CIAT accessions of Phaseolus referred to in this report, including CIAT no. of accession, identification, local register, and source. (Summary by F.G. Trans. by L.M.F.) G01

0144

19870 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1981. Validation of technology in farm trials. In _____. Bean Program. Annual Report 1980. Cali, Colombia. pp.69-77,81-83. Engl., Illus. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Also in Spanish.

Phaseolus vulgaris. Technology evaluation. Transfer of technology. Cultivars. Resistance. Bean common mosaic virus. Intercropping. Zea mays. Colletotrichum lindemuthianum. Fertilizers. Rhizoctonia solani. Empoasca kraemeri. Disease control. Chemical control. Spacing. Yields. Income. Colombia.

The principal objective of on-farm trials is to provide feedback to the technology generation/var. improvement process. The trials carried out by CIAT and the Instituto Colombiano Agropecuario on farms in the Colombian regions of Huila, (10 farms in 1980 A), Antioquia (14 farms in 1979 A and 1980 B) and the marginal coffee regions of Restrepo and Darién in the Valle del Cauca (5 and 7 farms in 1980 B, resp.) are described in detail. The bush bean trials with new var. ICA-L-24 and BAT 332 in Huila indicated that a disease resistance strategy to BCMV could increase farmers' yields with or without spraying. Moreover, with the improved maize price and the doubling of maize yields with the new var. Suwan 1, the maize/bean association was much more profitable than any of the other monoculture systems. In the coffee zone the multiple disease resistance of var. BAT 332 was impressive; only this var. responded to fertilization. In Antioquia rapid diffusion of improved control of anthracnose (Colletotrichum lindemuthianum) with benomyl is taking place. Farmers with their local var. Cargamanto can increase yields up to 0.5 kg/ha by using higher densities and artificial support to reinforce maize stalks. The relative performance of new selections with respect to Cargamanto in the farm trials improved substantially from 1979 to 1980; however, the absolute income performance of all new technologies decreased drastically with the abrupt price decline of Cargamanto. Two appendixes are included: (1) detailed description of Phaseolus vulgaris growth habits and (2) a list of CIAT accessions of Phaseolus referred to in this report, including CIAT accession no., identification, local register, and source. (Summary by F.G. Trans. by L.M.F.) G01

0145

19564 CHAVES, L.J. 1982. Um modelo nao-linear aplicado ao estudo das interacoes de genótipos com ambientes. (A nonlinear model applied to the study of genotype-environment interactions). Tese Mag.Sc. Piracicaba-SP, Brasil, Escola Superior de Agricultura Luiz de Queiroz da Universidade de Sao Paulo. 117p. Port., Sum. Port., Engl., 47 Refs.

Phaseolus vulgaris. Genetics. Genotypes. Ecology. Statistical analysis. Plant breeding. Colombia.

The analysis of genotype-environment interaction was based on a nonlinear model, which is multiplicative in genetic and environmental parameters, under the assumption that the environment acts multiplicatively on genotypes. Mathematical deductions provided the basis for verifying some implications of the multiplicative action of the environment and genotypes

on some plant breeding aspects. Yield data of soybean, wheat, cassava, maize, and common bean cv. were analyzed to determine the applicability of the nonlinear model to genotype-environment interaction studies. For soybean, cassava, and wheat, results showed that the multiplicative model was similar to the linear model. For maize and common bean data, the nonlinear model fitted better than the linear model; for opaque maize, normal maize, and common bean data, the nonlinear model accounted for 16.9, 9.8, and 10.1% of the interaction sum of squares, resp. The model transformed to logarithmic scale was less efficient than the others, as far as the power of fitness is concerned. The application of the residual sum of squares of the nonlinear model in measuring the similarity of locations, with respect to genotype-environment interaction, was investigated. Such sum of squares was compared with that due to interaction in the linear model and also with part of the interaction sum of squares that is due to lack of correlation of the cv. means between locations. Such comparison showed no apparent differences between the statistics for measuring the distance between locations in agglomerations studies. (Author's summary) G01

0146

20624 DELGADO DE LA FLOR, L.F. 1972. Cambios de color del episperma mediante inducción de mutaciones en diferentes estados de germinación en fríjol (Phaseolus vulgaris L.). (Changes in seedcoat color following the induction of mutations at different stages of germination in bean). Anales Científicos 10(1-2):76-79. Span., Sum. Span., Engl., 7 Refs.

Phaseolus vulgaris. Seed coat. Seed color. Mutation. Germination. Peru.

Two bean cv., Turrialba 1 and Porrillo, both with red hypocotyl, violet flowers, and black episperm, were used to induce changes in the color of seminal integuments from black to any other color by mutagenic agents such as ethyl methanesulfonate, and by gamma radiations applied at different stages of germination of bean seeds. Changes were observed in episperm color from black to white and bay, using ethyl methanesulfonate to induce the mutations. With gamma radiations there was no change in episperm color. (Author's summary. Trans. by L.M.F.) G01

0147

5991 DICKSON, M.H.; NATTI, J.J. 1966. Breeding for halo blight and virus resistance in snap beans. Farm Research 32(3):4-5. Engl., Illus.

Phaseolus vulgaris. Cultivars. Crossbreeding. Resistance. Pseudomonas phaseolicola. Bean yellow mosaic virus. Snap beans. USA.

Breeding for resistance to halo blight (Pseudomonas phaseolicola) and BYMV in snap bean carried out in Wisconsin, USA, included crossbreeding several materials that differed in their degree of resistance. P.I. 181954 has showed better tolerance to halo blight in the field and greenhouse than P.I. 150414; it also appears to be resistant to BYMV. Resistance is controlled by a single recessive gene and segregation is observed in crossbreeding. A table is included on segregation for resistance to halo blight and BYMV. (Summary by FDITEC. Trans. by L.M.F.) G01

0148

20015 FDJE, O.T. 1980. Bean research programme in Malawi. Lilongwe. University of Malawi. Bunda College of Agriculture. 64p. Engl., 47 Refs.

Phaseolus vulgaris. Germplasm. Cultivars. Plant habit. Planting. Timing. Irrigation. Spacing. Soil fertility. N. Intercropping. Zea mays. Growth. Plant breeding. Malawi.

A bean improvement program was initiated in Malawi in 1969. The objectives and research areas, namely germplasm collection and evaluation, breeding, agronomy (production systems), crop protection (diseases, pests, and weeds), and crop physiology, are included. Results of several expt. conducted during 1970-77 are analyzed. A total of 557 determinate and 1501 indeterminate materials have been assessed for yield and various agronomic characteristics. Agronomic aspects studied included: var. trials, time of planting, irrigation, plant density (bush and climbing beans), size of ridge, soil fertility (NPKS), N sources and rates, split application of N, seed inoculation, plucking of leaves for use as vegetable, method of support for climbing beans, crop rotation, time of planting intercrops, genotype x var. interaction, fertilizer requirements and plant density in maize/bean intercropping, simultaneous polycropping, relay cropping, disease and pest control. Physiological studies included growth analysis, shading expt., sink source relationship, apical and lateral bud removal, and breeding. Resulting data are included in table form. (Summary by F.G. Trans. by L.M.F.) G01

0149

19448 FAURE A., B.; PONCE B., M. 1983. Algunas consideraciones sobre el mejoramiento genético del fríjol común (Phaseolus vulgaris L.). (Considerations on genetic breeding of bean). In Curso Intensivo de Postgrado en la Producción de Fríjol, 4o., Matanzas, Cuba, 1983. Conferencias. Cuba, Ministerio de Agricultura. pp.86-97. Span., 6 Refs.

Phaseolus vulgaris. Genetics. Selection. Crossbreeding. Hybridizing. Backcrossing. Adaptation. Cuba.

Fundamental aspects of genetics and improvement of bean in Cuba are discussed. Some genotypic characteristics, the different stages of breeding (introduction, selection, crossing, and selection), most common techniques for hybridization and climatic factors and plant characteristics that affect it, taxonomic position and cultivated species of the genus Phaseolus, methods of selection in natural populations (individual and mass) and hybrids are described. Methods of selection in autogenous plants are indicated and the modified pedigree (genealogical) method and backcrossing are defined. Main activities of bean improvement carried out at the El Tomeguin Potato and Grain Exptl. Station are given. A large no. of lines and advanced generations from CIAT's breeding program are introduced each year through an agreement between the Ministry of Agriculture and CIAT. (Summary by EDITEC. Trans. by L.M.F.) G01

0150

19395 GALWEY, N.W.; EVANS, A.M. 1982. The inheritance of resistance to Empoasca kraemeri Ross and Moore in the common bean, Phaseolus vulgaris L. Euphytica 31(3):933-952. Engl., Sum. Engl., 14 Refs., Illus. [Dept. of Applied Biology, Univ. of Cambridge, Cambridge, CB2 3DX, England]

Phaseolus vulgaris. Genotypes. Empoasca kraemeri. Inheritance. Resistance. Crossbreeding. Chemical control. Yields. Genetics. Plant injuries. Selection.

Thirty-eight homozygous Phaseolus vulgaris genotypes were grown in small plots with and without insecticidal protection, and also in simulated F_2 populations containing 1 plant of each genotype to determine whether the

differences in their level of resistance to Empoasca kraemeri can be detected using a single plant of each genotype and whether the inheritance of resistance is predominantly additive. In addition, the F_2 and F_3 generations of crosses were studied. Both generations of a 13 parent diallel were grown with and without insecticidal protection. Six crosses, involving some of the parents in the diallel and 2 additional genotypes, were studied in more detail. Protected and unprotected F_2 plants from these crosses were harvested individually, and the resulting F_3 families were grown with and without protection. In all the expt. the level of damage to the unprotected plants and the vigor of the protected plants was assessed visually by means of a numerical score, and the seed yield was measured. The performance of a single homozygous plant was a reasonable predictor of the performance of the same genotype in a small plot, but in the 6 crosses studied in detail, the correlations between F_2 and F_3 performance were low. In the analysis of the diallel cross, the significant differences among crosses were due to specific combining ability and not general combining ability. These results indicate that the genetic control of resistance is largely nonadditive, and that F_2 selection will probably be ineffective. However, F_3 selection should be effective, and transgressive segregants for resistance should be obtainable. In some of the 6 crosses, the F_3 families differed both in general vigor and in narrow sense resistance to E. kraemeri. The visual assessment of damage symptoms in each plot was related to the subsequent seed yield of the plot, but was more heritable than yield. The relationship between these 2 variables was investigated by the genetic correlation coefficient and by an alternative method, and was found to be partly genetically determined, but partly due to the influence of environmental factors on both variables. This indicates that screening for E. kraemeri resistance should be done by means of a visual damage score in a carefully chosen, uniform environment. (Author's summary) G01

0151

19841 GURI, A.Z. 1981. Genetics and the mechanism of ozone tolerance in selected cultivars of Phaseolus vulgaris L. Ph.D. Thesis. East Lansing, Michigan State University. 84p. Engl., Sum. Engl., 83 Refs.

Phaseolus vulgaris. Cultivars. Ozone. Genetics. Resistance. Inheritance. Stomata. Plant physiological disorders. Selection. USA.

The genetic background of differences in response to O_3 in 2 tolerant and 2 sensitive bean cv. was established and a physiological mechanism for the observed differences which would be consistent with the results from the genetic analysis was suggested. The 2 O_3-tolerant var., Nep-2 and FH, and the 2 O_3-sensitive var., PHR and 0669, were selected from among 12 initially screened. The genetic study suggested that at least 2 major interacting dominant alleles at different loci and an undetermined no. of genes of minor effect control the expression of tolerance to O_3 in these var. Measurements of stomatal conductivity (prior to and after 4 h of O_3 fumigation) and stomatal density revealed that the 2 tolerant var. exhibited a significantly higher capacity for gaseous conductivity (both abaxial and adaxial) than the 2 sensitive var. Similar results were obtained in regard to stomatal density. Production of ethane, due mainly to ozonation of linolenic acid, was similar in all 4 var., suggesting that the content of linolenic acid is identical in all var. Ethylene production, however, was higher in the O_3-injured leaves of the sensitive var. Production of ethylene due to O_3 injury can be used in the future for standardization of visual injury determinations. The measurements of glutathione (GSH) and ascorbic acid (AA), which might be involved in repair of O_3 injury, showed that leaves of tolerant var. Nep-2 had a higher GSH concn. (on the basis of fresh wt.) than the other 3 var. immediately following O_3 fumigation. No

such difference was detected in AA concn. Further research has revealed that the activity of GSSG (oxidized GSH) reductase, was significantly higher in the 2 tolerant var., both before and after O_3 fumigation. The inconsistency of high enzymatic activity and low GSH concn. after fumigation in the tolerant var. FH is not understood and can be interpreted in different ways. The fact that GSSG reductase in plants is composed of 2 polypeptide subunits, could be related to the 2 major genes deduced from the genetic study. (Author's summary) G01

0152

19498 GUZMAN A., M.E. 1981. Evaluación de rendimiento, tolerancia al virus del mosaico dorado y estabilidad del rendimiento de 14 genotipos de fríjol común (Phaseolus vulgaris L.) en 11 ambientes del suroriente y parcelamiento La Máquina en la República de Guatemala. (Evaluation of 14 bean genotypes regarding yield and yield stability, and tolerance to the bean golden mosaic virus over 11 sites in SE Guatemala and the parceled lands of La Máquina area). Tesis. Ing.Agr. Guatemala, Universidad de San Carlos. 50p. Span., Sum. Span., 21 Refs.

Phaseolus vulgaris. Genotypes. Yields. Resistance. Bean golden mosaic virus. Selection. Guatemala.

Fifteen bean genotypes were evaluated over 11 environments of the Guatemalan lowlands to identify high-yielding genotypes, tolerant to BGMV, and with high yield stability. Of the 11 environments studied, 10 belonged to bean-growing areas of SE Guatemala and the remaining environment belonged to a locality of the parceled land area of La Máquina on the southern coast, considered as an area with economic potential for bean cultivation. Tested genotypes showed differences among themselves regarding yield potential and degree of tolerance to BGMV. The studied environments varied widely, reflecting a differential performance among genotypes according to the environment. La Campana was the site most affected by BGMV incidence in both the May and Aug. plantings. In the 1st planting local var. Pecho Amarillo was outyielded by lines D-30 and D-83 by 55 and 64%, resp.; in the 2nd planting, Pecho Amarillo was outyielded by these same 2 lines by 86 and 51%, resp. Var. Pecho Amarillo gave good yields in environments where BGMV incidence was low. Lines D-83 and D-30 were identified as high yielding, tolerant to BGMV, and with satisfactory agronomic characteristics and broad adaptability to the prevalent conditions in the SE and La Máquina area. The parceled land area of La Máquina was found to have high potential for bean cultivation. (Author's summary. Trans. by L.M.F.) G01

0153

19843 JACOBS, T.W. 1981. Development of somatic cell genetics systems in Vigna radiata and Phaseolus vulgaris. Ph.D. Thesis. East Lansing, Michigan State University. 222p. Engl., Sum. Engl., 374 Refs., Illus.

Phaseolus vulgaris. Genetics. Plant tissues. Genotypes. Culture media. Mutation. Crossbreeding. Radiation. Genes.

A somatic cell genetic system by which the sexually incompatible genera of Vigna and Phaseolus might ultimately be mutually introgressed was developed. Grain legume cell lines were subjected to 3 positive selections in an attempt to generate a system of complementing biochemical markers for protoplast fusion hybridization. In developing a mutagenesis protocol for Vigna radiata cells in vitro, photoreactivation of UV induced growth inhibition was demonstrated. A V. radiata cell line was UV mutagenized and selected for resistance to the folic acid analog, methotrexate (MTX). Among many surviving colonies, several clones showed a stable low level of

drug resistance. Variant frequency was enhanced by mutagenesis. To better design further selections for higher level MTX resistance, the effects of the drug on 5 cell lines were studied. Natural interspecific variation in MTX tolerance spanned a 200-fold concn. range and drug sensitivity was directly proportional to intrinsic growth rate. Folinic acid reversed MTX toxicity wherever tested. Stoichiometric inhibition of dihydrofolate reductase (DHFR) by MTX was demonstrated in crude extracts of cultured V. radiata and Nicotiana tabacum. DHFR's from these cell lines were shown to be kinetically indistinguishable although their pH optima were 7.6 and 6.8, resp. DHFR exhibits exponential phase induction in batch cell cultures of tomato, tobacco, and V. angularis. The level of peak DHFR specific activity is proportional to the intrinsic growth rate of the cell line. The enzyme could not be induced with folic acid, MTX, or folinic acid. The implications of these findings for in vitro uses of MTX in plant cell systems are discussed. Cultured Phaseolus vulgaris cell populations were screened for ethionine-resistant and galactose-utilizing mutants. Although no variants were recovered from these selections, characterization of the selective systems revealed some relevant aspects of amino acid and carbohydrate metabolism. An anthocyanin pigmented variant cell line of a complex Vigna species hybrid was fortuitously recovered. Synthesis of the pigment, a vacuolar anthocyanin tentatively identified as a malvidin derivative, is enhanced by media sucrose supplementation, but not by light. (Author's summary) G01

0154

19743 KENYA. MINISTRY OF AGRICULTURE. 1977. Bean Research Project. Thika, General Report. Short Rain Trials 1973-74. 13p. Engl., Illus.

Phaseolus vulgaris. Seed production. Germplasm. Crossbreeding. Cultivars. Resistance. Colletotrichum lindemuthianum. Fertilizers. K. Yields. Weeding. Kenya.

Results of the short-rain trials, carried out in Kenya during 1973-74 in close collaboration with the Ministry of Agriculture and the Bean Research Project, are reported. Approx. 200 ac of bean were planted in the Nakuru area for bean seed production. New materials were also added to the germplasm collection. Satisfactory screening of cv. for disease resistance was difficult due to drought conditions. Several crosses were made among cv. to introduce resistance to anthracnose (Colletotrichum lindemuthianum). In K fertilization trials in Thika and Njoro significant differences were found between treatments (P = 0.05 and P = 0.01, resp.) and in Embu, there were no significant differences among treatments. When N was applied and/or Rhizobium was inoculated, there were no significant differences in yield among treatments. Higher yields can be obtained with adequate cultural practices (early planting, application of 40 kg each of N and P/ha, use of 50 kg certified seed/ha, and weed control). (Summary by F.G. Trans. by L.M.F.) G01

0155

16413 KENYA. MINISTRY OF AGRICULTURE. 1982. Germplasm collection. Thika, National Horticultural Research Station. Grain Legume Project. 77p. Engl. [National Horticultural Research Station, P.O. Box 220, Thika, Kenya]

Phaseolus vulgaris. Germplasm. Seed characters. Cultivars. Kenya.

The bean germplasm collection gathered by the Grain Legume Project at the National Horticultural Research Station in Thika, Kenya, during 1972-82 is listed. The list is divided into 2 parts, the 1st containing 1680 accessions and the 2nd, 1123. The identification no., year, name of introduc-

tion, country of origin, and formulas for describing seed characteristics are given for each one. (Summary by EDITEC. Trans. by L.M.F.) G01

0156

19736 LYMAN, J.M. 1983. Adaptation studies on lima bean accessions in Colombia. Journal of the American Society for Horticultural Science 108(3):369-373. Engl., Sum. Engl., 22 Refs. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus lunatus. Adaptation. Cultivars. Climbing beans. Yields. Colombia.

Thirty-six climbing accessions of lima bean (Phaseolus lunatus) were grown on trellises with min. chemical inputs in 5 trials at 4 Colombian sites. Mean dry seed yield of all accessions at all 4 sites was 2.6 MT/ha. Mean yield at the least favorable site was 1.7 MT/ha; at the most favorable site it was 4.8 MT/ha. Although growth was affected adversely on a soil with pH 4.2, the mean yield was 2.5 MT/ha. Mean daily dry seed productivity rates of all accessions ranged from 15.1 to 44.1 kg/ha/day for the several locations, in some cases exceeding rates reported for common beans and other legumes at the same location. Mean yield and no. of pods/plant varied significantly among sites, dependent upon temp. and soil differences. Days to flower and to dry seed harvest were relatively stable traits. No relationship was found between yield and seed coat color. Production constraints were rainfall distribution and acid, P-deficient soils. These studies demonstrated high productivity of lima beans under adverse and favorable climatic and soil conditions in Colombia. (Author's summary) G01

0157

19034 MEJIA, H.; DURON A., E.; LOPEZ, R.; MAZIER, C. 1982. Efecto en la interacción variedad por densidad en fríjol rojo (Phaseolus vulgaris) en el Depto. de Olancho. (Effect of the interaction variety/plant density in red beans in the department of Olancho). Honduras, Programa de Investigación, Region Nor-Oriental, Catamas. 10p. Span. [Región Nor-Oriental, Catacamas, Olancho, Honduras]

Paper presented at Reunión Anual del PCCMCA, 28a., San José, Costa Rica, 1982.

Phaseolus vulgaris. Cultivars. Spacing. Yields. Planting. Adaptation. Honduras.

Six. expt. were carried out at farm level and at the Raul Rene Valle exptl. station in the department of Olancho, Honduras, to determine the adaptability and the effect of plant populations on bean production. A split plot design was used with 3 and 4 replications depending on the site under study. Main plots corresponded to the var. (Cincuenteño, Acacias-4, Zamorano, and Danlí-46) and the subplots to plant density (160,000, 200,000, 240,000, and 400,000 plants/ha). Var. Acacias-4 gave av. yields of 1.09 and 1.35 t/ha with populations of 240,000 and 400,000 plants/ha, resp., whereas var. Danlí-46 had its highest yield (1.06 t/ha) with a population of 240,000 plants/ha. Var. Cincuenteño and Zamorano gave yields of 0.86 and 0.93 t/ha with populations up to 200,000 plants/ha. In general, there was a better response to the factor var. than to the factor density, Acacias-4 showing more consistency and yield stability than the other var. Var. performance differed with the different densities only at Ulua and Siguaté due to the genotype x environment interaction. (Author's summary. Trans. by L.M.F.) G01

0158

16974 NYABYENDA, P. 1982. Synthese des resultats de recherche sur haricot au Rwanda durant les 20 dernieres annees. (Synthesis of bean research results in Rwanda during the past 20 years). Rwanda, Institut des Sciences Agronomiques du Rwanda. 43p. Fr., 21 Refs. [Institut de Sciences Agronomiques du Rwanda, B.P. 138, Butare, Rwanda]

Phaseolus vulgaris. Selection. Cultivars. Planting. Spacing. Dwarf beans. Climbing beans. Irrigation. Intercropping. Zea mays. Agricultural projects. Rwanda.

Results of research carried out in Rwanda on var. selection in bean (hybridization and induced mutation), spacing and planting, use of stakes (types, length, distance), irrigation, intercropping, inoculation, and fertilization are summarized. For intermediate alt. regions var. C10, Urunvumba, Bataaf, Var. 11, NI 572, and Actoran are recommended; for highlands, var. Urunyumba 3 and 6, C10, Bataaf; and Inyumba, and for lowlands, Var. 54, Bayo 158, Var. 11, and Var. 1/2. Var. P 637 and Kalima (CIAT) have good perspectives. In a multilocal comparative trial carried out in collaboration with CIAT, new var. BAT 1297, Línea 22, and BAT 1230 were outstanding. Bean productivity potential during the 1st planting season (mid-Sept.-Jan.) is 2340 kg/ha in Rubona and 3950 kg/ha in Rwerere, and in Karama during the 2nd planting season (Feb.-July), it is 3790 kg/ha. The use of ethyl methane sulfonate permitted the mutation of the black tegument of var. Wulma, along with a small increase in bean wt. For determinate bean types, continuous lines may be used, spaced at 40 or 30 cm with 15-20 seeds/m. In trials using stakes, climbing bean var. were superior to bush bean. The best stakes were those of wood (1 stake/4 plants), spaced at 40 x 20 cm. Banana tree cords or maize stumps were also used. Branches of Pennisetum purpureum would reduce the cost of using stakes. Coefficients were established to determine bean water stress. Irrigated bean var. Amarillo gave an av. yield of up to 212% compared with the upland var. Bean/sweet potato and bean/sweet potato/maize associated cropping gave good yields (up to 10.8 t/ha). The incidence of anthracnose (Colletotrichum lindemuthianum) was lower in bean intercropped with maize. Research program objectives are included. (Summary by I.B. Trans. by L.M.F.) G01

0159

19497 OCHOA O., H.E. 1981. Factores que intervienen en la producción de fríjol (Phaseolus vulgaris L.) en cinco localidades de Jutiapa, en siembras de relevo. (Factors affecting bean production at five sites of Jutiapa in relay cropping systems). Tesis Ing.Agr. Guatemala, Universidad de San Carlos. 41p. Span., Sum. Span., 31 Refs., Illus.

Phaseolus vulgaris. Cultivars. Fertilizers. N. P. Pest control. Chemical control. Technology evaluation. Guatemala.

Two trials were conducted at each one of the sites of Agua Blanca, Yupiltepeque, and Asunción Mita (Guatemala) to evaluate factors affecting bean yields (var., fertilization, and pest control) by comparing the technology developed by the Instituto de Ciencia y Tecnología Agrícolas (ICTA) with that used by the farmer. An exptl. design with a combinatorial arrangement distributed in randomized blocks with 4 replications was used. Var. used were ICTA-Quetzal D-30, ICTA-Tamazulapa D-83, and Rabia de Gato. Fertilization treatments were 30 and 40 kg N and P/ha (ICTA technology) and 75 kg 16-20-0 fertilizer/0.7 ha (farmers' technology). Pest control consisted in the application of 30 kg carbofuran 5-G and 1 l oxydemeton methyl/ha (ICTA) and 1 l parathion/0.7 ha (farmers). Treatments that included farmers' seed with ICTA technology gave the best yields. Var.

ICTA-Quetzal D-30 and ICTA-Tamazulapa D-83, with farmers' technology and ICTA's technology, had the highest cost-benefit ratios. Var. ICTA-Quetzal D-30, with ICTA's technology, had the highest net incomes (178.03 quetzals/ha). Farmers are recommended to plant var. ICTA-Quetzal D-30 and ICTA-Tamazulapa D-83 in this region to increase yields without increasing costs. (Summary by F.G. Trans. by L.M.F.) G01

0160

18720 POEY, F. 1981. Descripción varietal. (Varietal description). In Curso Intensivo de Adiestramiento Post-Grado en Investigación para la Producción de Fríjol en el Perú, La Molina, 1981. Trabajos presentados. Lima, Instituto Nacional de Investigación y Promoción Agropecuaria. pp.1-20. Span. [Ministerio de Agricultura, Inst. Nacional de Investigación y Promoción Agropecuaria, Apartado 11660, Lima 11, Perú]

Phaseolus vulgaris. Agronomic characters. Genetics. Maturation. Flowering. Resistance. Pests. Yields.

Genetic, statistical, and descriptive aspects that are necessary for var. description in bean seed production and industry are listed. To describe a var., the genetic component as well as the qualitative and quantitative phenotypic variations are considered important. Quantitative characteristics are more affected by environmental conditions and to estimate their variability statistical measures of dispersion such as standard deviation (SD) and C.V. are used. Data for the description are recorded during plant growth and development. The var. description should be complete at release. A model format for data recording is included, consisting of 2 parts: the 1st describes aspects such as planting date and place, and agronomic and ecological conditions of the crop and the 2nd is a list of descriptive parameters (morphological characteristics) for a min. of 20 plants. Quantitative characteristics are averaged and the SD and C.V. are calculated. The most important parameters that should be measured are: (a) for seedlings, the hypocotyl color; (b) at flowering: days to anthesis; duration; lodging; color of flowers, leaves, and main stem; growth habit; type of branching; length and width of the leaf; and leaf area; (c) at physiological maturity: days to maturity, duration, and pod color; (d) at harvest: days to harvest, pod distribution and color, form of pod apex, no. of seeds/pod, no. of pods/plant, seed color and brilliance, seed size and form, and wt. of 100 seeds; (e) reaction to diseases and pests; and (f) var. that is most similar regarding the characteristics of flower and seed color, seed wt. and form, growth cycle, growth habit, and disease resistance. Each one of the descriptive parameters of the bean plant is explained to facilitate the comparison among var. (Summary by EDITEC. Trans. by L.M.F.) G01

0161

19703 QUAGLIOTTI, L.; LEPORI, G.; BALDI, A. 1983. Problemas de la producción de semilla en especies trepadoras de Phaseolus. (Seed production problems in climbing Phaseolus species). In Hebblethwaite, P.D. Producción moderna de semillas. Montevideo, Uruguay, Hemisferio Sur. v.2, pp.676-690. Span., 24 Refs., Illus. [Inst. of Plant Breeding and Seed Production, Univ. of Turin, Via Pietro Giuria, 15, 10126, Torino, Italy]

Phaseolus vulgaris. Seed production. Germplasm. Seed characters. Flowers. Pollination. Hybridizing. Bean common mosaic virus. Pseudomonas phaseolicola. Xanthomonas phaseoli. Colletotrichum lindemuthianum. Heat treatment. Crossbreeding. Italy.

The variability of climbing bean germplasm (Phaseolus vulgaris and P. coccineus) in Italy is analyzed regarding seed size and wt., flower color, insect pollination, interspecific hybridization, seed-borne diseases, heat treatment, and multiplication of disease-free seed. There are marked differences among genotypes in the wt. of 100 seeds (628-1540 g). The total no. of flowers does not necessarily represent the productive capacity of the legumes and seeds; this depends on the no. of flowers completing their cycle. Seedbeds of these 2 species are frequently cultivated in adjacent or nearby plots. A higher % of compatible crosses (37%) was observed when P. vulgaris was used as female progenitor than when P. coccineus was used (11%). The symptomatology, etiology, damage caused to the plant, and control methods of major seed-borne diseases, namely BCMV, halo blight (Pseudomonas phaseolicola, common blight (Xanthomonas phaseoli), and anthracnose (Colletotrichum lindemuthianum), are described. Heat treatments used to treat diseased seeds (hot water, saturated water vapor, and hot dry air) are briefly explained. Recommendations for the multiplication of disease-free seed are included. (Summary by F.G. Trans. by L.M.F.) G01

0162

19719 RABAKOARIHANTA, A.; BAGGETT, J.R. 1983. Inheritance of a leaf distortion tendency in bush lines of beans, Phaseolus vulgaris L., of Blue Lake background. Journal of the American Society for Horticultural Science 108(2):351-354. Engl., Sum. Engl., 5 Refs., Illus. [II P 134 Avaradoha, Tananarive, Madagascar]

Phaseolus vulgaris. Cultivars. Dwarf beans. Crossbreeding. Leaves. Inheritance. Plant breeding. USA.

Gallatin 50, a bush cv. not of Blue Lake background, and Oregon 1604, a bush cv. of Blue Lake type, were crossed with distortion susceptible lines of Blue Lake type. Environment affected distortion expression; the best expression was obtained in the greenhouse while expression was much reduced in the field. Ratios obtained suggested distortion is primarily controlled by a single dominant gene, designated Ld. Oregon 1604 carries the recessive allele for normal. Gallatin 50 carries a major dominant gene, designated Ds, that supresses the expression of the dominant gene Ld for leaf distortion tendency. Results also suggested that modifying factors are involved and are responsible for levels of susceptibility among parents and progenies. Additional crosses between susceptible lines showing severe to mild distortion indicated that these lines carried the same major genes for distortion, but differed in modifying factors. (Author's summary) G01

0163

19033 REYES N., G.A.; AESCHLIMANN, J.; RITTENHOUSE, H. 1982. Evaluación de seis variedades de fríjol en cuatro zonas del Valle de Comayagua, Honduras 1981 B. (Evaluation of six bean varieties in four zones of the Valle de Comayagua, Honduras, 1981 B). Honduras, Programa Regional de Investigación Agropecuaria. 7p. Span., 2 Refs.

Paper presented at Reunión Anual de PCCMCA, 28a., San José, Costa Rica, 1982.

Phaseolus vulgaris. Cultivars. Yields. Agronomic characters. Maturation. Flowering. Timing. Honduras.

Four commercial bean var., one exptl. var., and one local var. were assessed at 4 sites (Flores, El Sifón, El Taladro, and Palo Pintato) in the Valle de Comayagua, Honduras, to determine yield performance and agronomic

characteristics of each. Var. Desarrural, Zamorano, Danlí-46 Acacia-4, Comayagua-25, and the local var. (all with red-colored grain) were planted in a randomized block design with 3 replications in five 5-m-long rows with 0.5 m interrow and 0.1 m between plants. At all sites var. Desarrural had the best performance, and the less no. of days to flowering (32), followed by Comayagua-25 and the local var. with 34 and 35 days, resp. Av. yields at all sites of var. Desarrural, Acacia-4, Danlí-46, and the local var. used as check were 1.74, 1.51, 1.57, and 1.50 MT/ha, resp. Highest yields were obtained in Flores. Tables are included with the exptl. results and characteristics of plant height and days to flowering for all var. at all sites. (Summary by EDITEC. Trans. by L.M.F.) G01

0164

19458 STILWELL, M.R. 1982. Breeding dry beans for processing. Proceedings of the Nutrition Society 41(1):83-89. Engl., 25 Refs., Illus.

Phaseolus vulgaris. Genotypes. Canned beans. Processing Plant breeding. Yields. Seed characters. Cultivars.

Processing characteristics of the different bean genotypes have a great influence on appearance and acceptability of the final product. Breeding is currently directed toward the production of high yielding genotypes over a wide range of environmental conditions and the preservation of 3 characteristics that the grain must have in order to meet specific quality standards (appearance, flavor, and texture). Processing characteristics of high yielding bean genotypes selected from the CIAT bean germplasm collection and characteristics of adaptability to different environments are given. The latter were assessed by parameters such as mean yield of the var., regression coefficient (b), and mean square deviations from regression. Among the selected materials are Seafarer (1034 kg/ha, b = 0.77), Ex Rico 23 (1453 kg/ha, b = 1.03), S-630 (1704 kg/ha, b = 1.23), Jamapa (1627 kg/ha, b = 1.05), PI 309804 (1760 kg/ha, b = 1.22), and San Fernando (1552 kg/ha, b = 1.09), among others. (Summary by EDITEC. Trans. by L.M.F.) G01

0165

19847 SULLIVAN, J.G. 1981. Recurrent selection for increased seed yield and percentage seed protein in the common bean (Phaseolus vulgaris L.) using a selection index; and isolation and analysis of major genes controlling phaseolin. Ph.D. Thesis. Madison, University of Wisconsin. 114p. Engl., 107 Refs., Illus.

Phaseolus vulgaris. Cultivars. Backcrossing. Selection. Plant breeding. Yields. Protein content. Seed. Phaseollin. Genes. USA.

Recurrent mass selection based on a desired gain index was employed to simultaneously increase seed yield and seed protein % in bean. Seed protein % was increased from 21.9 to 24.6% after 2 cycles of selection. Of particular interest was the family 2-4-1, which had seed yields as high as those of the highest yielding parent and a seed protein % which exceeded that of all parental lines in both years in which the expt. was conducted. An inbred-backcross technique was employed to isolate and analyze major genes for % seed protein and phaseolin. Two populations were developed by 2 successive backcrosses of 2 high-protein lines, BBL240 and PI229815, to Sanilac, followed by selfing to near homozygosity. In one population, 3 lines which had high amounts of phaseolin are thought to have received a major gene for increased phaseolin from BBL240. Evidence is presented for possible linkage between this gene and a gene controlling the electrophoretic banding pattern of phaseolin. (Summary by Plant Breeding Abstracts) G01

0166

20012 UNIVERSITY OF DAR ES SALAAM. FACULTY OF AGRICULTURE, FORESTRY AND VETERINARY SCIENCE. 1983. Breeding beans (Phaseolus vulgaris) for disease and insect resistance and determination of economic impact on subsistence for families. Morogoro, Tanzania. Title XII Bean-Cowpea Cooperative Research Support Programme. Annual Progress Report 1981-1982. 7p. Engl. [Univ. of Dar es Salaam. Faculty of Agriculture, Forestry and Veterinary Science, P.O.B. 35091, Dar es Salaam, Morogoro, Tanzania]

Phaseolus vulgaris. Germplasm. Agronomic characters. Selection. Resistance. Bemisia tabaci. Heliothis armigera. Ootheca bennigseni. Maruca testulalis. Colletotrichum lindemuthianum. Bean common mosaic virus. Cultivars. Adaptation. Yields. Nodulation. Nitrogen fixation. Uromyces phaseoli. Economics. Tanzania.

In 1981 a bean improvement program was started at the Faculty of Agriculture, Forestry, and Veterinary Science, U. of Dar es Salaam, Morogoro, Tanzania, to: (1) collect bean germplasm and evaluate its agronomic characteristics; (2) develop screening procedures for disease and pest resistance; (3) determine economic losses due to diseases and pests; (4) study inputs, timing of production, consumption, and marketing of smallholders; (5) collect and maintain in pure culture isolates of major pathogens; and (6) train Tanzanian students and staff. Currently there are over 300 accessions at the Faculty, approx. 2500 at the Uyole Agricultural Centre (Mbeya), and about 1000 accessions in Lyamungu (Moshi). At Mbeye the most important pests and diseases were the whitefly (Bemisia tabaci), Heliothis sp., and anthracnose (Colletotrichum indemuthianum); in Lyamungu they were Ootheca bennigseni, anthracnose, and BCMV; and at Morogoro they were O. bennigseni, thrips, pod borers (Maruca testulalis), and Heliothis armigera. Among the CIAT bean var. tested under trials of the International Bean Yield and Adaptation Nursery (IBYAN), Línea 22 has the best overall performance regarding yield and insect resistance. In addition, BAT 1297 seems to be a promising var. for further investigation. In Lyamungu, var. Canadian Wonder selection No. 19 gave the highest yield; in Morogoro, the highest yield was obtained with a local var. A total of 119 lines from Morogoro accessions were assessed for nodulation and nitrogenase activity; only 2 showed the presence of nodulation and 17 showed root knot infection (Meloidogyne sp.). Expt. conducted in Morogoro indicated that yield increased by 10.3% due to rust (Uromyces phaseoli) control. Damage due to O. bennigseni ranged between 18-31% in different bean var. (Summary by F.G. Trans. by L.M.F.) G01

0167

19738 VALLADARES-SANCHEZ, N.E.; COYNE, D.P.; MUMM, R.F. 1983. Inheritance and associations of leaf, external, and internal pod reactions to common blight bacterium in Phaseolus vulgaris L. Journal of the American Society for Horticultural Science 108(2):272-278. Engl., Sum. Engl., 27 Refs. [Univ. de Oriente, Núcleo Monagas Campus, Maturin y Jusepín, Monagas, Venezuela]

Phaseolus vulgaris. Crossbreeding. Inheritance. Pods. Xanthomonas phaseoli. Genetics. Cultivars. Resistance. Selection. Genotypes. Ecology. USA.

A 6-parent Phaseolus vulgaris diallel cross was produced to determine the inheritance of leaf, external, and internal pod reactions to the bacterial pathogen Xanthomonas campestris pv. phaseoli Nebraska isolate EK-11. The parents and F_1 generations were grown in the greenhouse, whereas the F_2, along with parents, were also grown in the field at 2 locations (Lincoln and Scottsbluff, Nebraska, USA). The Gardner and Eberhart (1966) model,

Analysis II, was used to obtain estimates of the genetic effects for the reactions to the pathogen in the different plant parts. C.V. were high in the greenhouse expt. and low in both field expt. The increased precision of the field expt. allowed more genetic effects to be detected as being significant. The leaves of Great Northern (GN) Nebraska no.1 sel. 27 and Plant Introduction (PI) 207262 were resistant, Tacarigua moderately susceptible, and PI 163117, GN 1140, and Guali were highly susceptible. The pods of the 1st 3 entries, along with GN 1140, showed moderate resistance, but the internal reaction of the pods of GN Nebraska no.1 sel.27 showed more susceptibility than the external reaction. The reaction to X. campestris pv. phaseoli was quantitatively inherited in all expt. Additive effects were primarily involved in the genetic control of the leaf, external, and internal pod reactions to X. campestris pv. phaseoli. Heterosis effects for leaf reaction were detected under field conditions. External and internal pod reactions were highly correlated, but little association between leaf and pod reaction was observed. It is therefore necessary to select for resistance simultaneously in both plant parts since correlated responses are not expected to be present. Large positive correlations were detected between the reactions of genotypes observed in the greenhouse with those in the field expt. and between the field expt., indicating that greenhouse tests should adequately predict field performance. A significant genotype x location interaction for leaf reaction was detected, with Guali and Tacarigua being more susceptible at Lincoln, under higher night temp., than at Scottsbluff, indicating the importance of evaluating the reaction of germplasms to this pathogen in different environments. (Author's summary) G01

0168

19469 VARGAS A., L.A. 1981. Características agronomicas de la línea de fríjol Canario 101 x Pinto Nacional 34-24 - variedad Pinto Laguna 80. (Agronomic characteristics of the bean line Canario 101 x Pinto Nacional 34-24, variety Pinto Laguna 80). In Centro de Investigaciones Agrícolas del Norte. Informe de investigación agrícola: fríjol y soya 1976-1978. México, Instituto Nacional de Investigaciones Agrícolas. pp.119-120. Span. [Centro de Investigaciones Agrícolas del Norte, Apartado Postal 247, Torreon, Coahuila, México]

Phaseolus vulgaris. Agronomic characters. Flowers. Seed color. Resistance. Pseudomonas phaseolicola. Xanthomonas phaseoli. Uromyces phaseoli. Mexico.

The agronomic characteristics, color of flower, plant type, grain size and color, susceptibility to the diseases halo blight (Pseudomonas phaseolicola), common blight (Xanthomonas phaseoli), and rust (Uromyces phaseoli) are described for the bean line Canario 101 x Pinto Nacional 34-24 as well as trials on planting time and density. (Summary by F.G. Trans. by L.M.F.) G01

0169

19472 VARGAS A., L.A. 1981. Evaluación de 25 líneas y cultivares de fríjol adaptadas al calendario de riegos del algodonero en la Comarca Lagunera. (Evaluation of 25 bean lines and cultivars adapted to the irrigation calendar of cotton in the Comarca Lagunera). In Centro de Investigaciones Agrícolas del Norte. Informe de investigación agrícola: fríjol y soya 1976-1978. México, Instituto Nacional de Investigaciones Agrícolas. pp.67-73. Span., Sum. Span., 2 Refs. [Centro de Investigaciones Agrícolas del Norte, Apartado Postal 247, Torreon, Coahuila, México]

Phaseolus vulgaris. Cultivars. Irrigation. Adaptation. Yields. Mexico.

Twenty-five bean lines and cv. were evaluated in the Ejido San José del Viñedo, municipality of Gómez Palacio (Mexico) to observe crop response to the irrigation calendar of cotton (0, 23, 19, and 21 days between waterings). A randomized block design was used with 4 replications. Yields were good regardless of water stress. The highest yield was obtained with var. Delicias 71 (check) with 2376 kg/ha, and the lowest yield, with line 11 F x P. Nacional 4-719 (1278 kg/ha). Tested lines and var. showed resistance to halo blight (Pseudomonas phaseolicola). Canario 191 x P. Matamoros 64-7-173, Dgo. 222 x AM 16-2-263, and Bayomex x Bayo 158-1-21-34-10 were resistant to common blight (Xanthomonas phaseoli). (Summary by F.G. Trans. by L.M.F.) G01

0170

19475 VARGAS A., L.A. 1981. Evaluación de 27 líneas y cultivares de fríjol adaptadas al calendario de riegos del algodonero en la Comarca Lagunera (Sn. Pedro y Sta. Teresa Coah). [Evaluation of 27 bean lines and cultivars adapted to the irrigation calendar of cotton in the Comarca Lagunera (San Pedro and Santa Teresa Coah)]. In Centro de Investigaciones Agrícolas del Norte. Informe de investigación agrícola: fríjol y soya 1976-1978. México, Instituto Nacional de Investigaciones Agrícolas. pp.95-104. Span., Sum. Span., 2 Refs. [Centro de Investigaciones Agrícolas del Norte, Apartado Postal 247, Torreon, Coahuila, México]

Phaseolus vulgaris. Cultivars. Adaptation. Irrigation. Yields. Mexico.

Twenty-five bean lines and 2 bean var. adapted to the irrigation calendar of cotton were assessed in the Comarca Lagunera at the sites of San Pedro and Santa Teresa. A randomized block design was used with 4 replications. In San Pedro, the highest yields were produced by the following lines: Pinto Matamoros 64 x Mantequilla 45 (1140 kg/ha), Bayomex x Bayo 158-2-8 (1081 kg/ha), Bayomex x Bayo 158-4-4 (1046 kg/ha), and Mantequilla x Pinto Matamoros 64-36-17 (1031 kg/ha). Var. Delicias 71 and Matamoros 64 yielded 976 and 849 kg/ha, resp. In Santa Teresa, the highest yields were produced by the following lines: Canario 101 x P. Matamoros 64-5-140 (809 kg/ha), Pinto Nacional x Canario 107-3-31-38-550 (761 kg/ha), and Canario 101 x P. Matamoros 64-23-4-2 (750 kg/ha). Lines and var. that had an outstanding performance in San Pedro had small-sized grains while in Santa Teresa, outstanding lines had medium- and large-sized grains. (Author's summary. Trans. by L.M.F.) G01

0171

19476 VARGAS A., L.A. 1981. Evaluación de 27 líneas y variedades de fríjol en la Comarca Lagunera. (Evaluation of 27 bean lines and varieties in the Comarca Lagunera). In Centro de Investigaciones Agrícolas del Norte. Informe de investigación agrícola: fríjol y soya 1976-1978. México, Instituto Nacional de Investigacines Agrícolas. pp.105-113. Span., Sum. Span., 5 Refs. [Centro de Investigaciones Agrícolas del Norte, Apartado Postal 247, Torreon, Coahuila, México]

Phaseolus vulgaris. Cultivars. Selection. Yields. Resistance. Xanthomonas phaseoli. Pseudomonas phaseolicola. Mexico.

Twenty-five bean lines and 2 var. were evaluated in La Laguna Agricultural Expt. Field, municipality of Matamoros, Mexico. A randomized block design was used with 4 replications. Small-seeded lines and var. that had outstanding yields were Matamoros CH 64 (3.2 t/ha) and Mantequilla 45 x P. Matamoros CH 64 (3.12 t/ha); Bayomex M x Bayo 158-8-8 and Canario 101 x P. Matamoros 64-7-173 M, both with middle-sized seeds, had outstanding yields

of 3.18 and 3.0 t/ha, resp. Most lines showed resistance to common blight (Xanthomonas phaseoli) and immunity to halo blight (Pseudomonas phaseolicola). (Summary by F.G. Trans. by L.M.F.) G01

0172

19477 VARGAS A., L.A. 1981. Evaluación de 27 líneas y cultivares de fríjol adaptadas al calendario de riegos del algodonero en la Comarca Lagunera. (San José del Viñedo). [Evaluation of 27 bean lines and cultivars adapted to the irrigation calendar of cotton in the Comarca Lagunera (San Jose del Viñedo)]. In Centro de Investigaciones Agrícolas del Norte. Informe de investigación agrícola: fríjol y soya 1976-1978. México, Instituto Nacional de Investigaciones Agrícolas. pp.114-118. Span., Sum. Span. [Centro de Investigaciones Agrícolas del Norte, Apartado Postal 247, Torreon, Coahuila, México]

Phaseolus vulgaris. Cultivars. Adaptation. Irrigation. Yields. Mexico.

A trial was carried out in the Ejido de San José del Viñedo of the municipality of Gómez Palacio, Mexico, to observe the performance of 25 bean lines and 2 var. (Delicias 71 and Matamoros 64), adapted to the irrigation calendar of cotton. A randomized block design with 4 replications was used. Line Bayomex x Bayo 158-8-8 gave the highest yield (2208 t/ha), followed by var. Delicias 71 (2198 t/ha) and lines Bayo 107 x Canario 107-2-16-20-7 (2177 t/ha), Pinto Nacional x Flor de Mayo 38-41 (2107 t/ha), and Canario 101 x Pinto Nacional 34-24 (2047 t/ha). (Summary by F.G. Trans. by L.M.F.) G01

0173

19473 VARGAS A., L.A. 1981. Observación a nivel semi-comercial de seis líneas de fríjol en la Comarca Lagunera. (Observation at a semi-commercial level of six bean lines in the Comarca Lagunera). In Centro de Investigaciones Agrícolas del Norte. Informe de investigación agrícola: fríjol y soya 1976-1978. México, Instituto Nacional de Investigaciones Agrícolas. pp.74-79. Span., Sum. Span., 3 Refs. [Centro de Investigaciones Agrícolas del Norte, Apartado Postal 247, Torreon, Coahuila, México]

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

An expt. was conducted at La Laguna Agricultural Exptl. Field of the Centro de Investigaciones Agrícolas del Norte in Matamoros (Mexico) to observe the response of several lines with characteristics superior to those planted in the region and to obtain an improved var. Lines used were Mantequilla 45 x Pinto Matamoros 64, Canario 107 x Pinto Matamoros 64-23-4-2, Pinto Nacional x Canario 3-31-38-550, Canario 101 x Pinto Nacional 34-24, 11 F x Pinto Nacional 4-719, Bayomex x Bayo 107-2-23-2, and Pinto Matamoros 64 (check var.). Mantequilla 45 x Pinto Matamoros 64-36-17 gave the highest yield with 2296.5 kg/ha; the check var. yielded 1726 kg/ha. These lines should be evaluated at a semicommercial level to determine more accurately which one of these lines is the best. (Summary by F.G. Trans. by L.M.F.) G01

0174

19480 VOYSEST, O.; GARCIA, J.; MARTINEZ, N.; ALZATE, B.; LEMA, G. 1983. Vivero internacional de rendimiento y adaptación de fríjol (Phaseolus vulgaris L.) IBYAN 1979. Fríjol arbustivo: con grano negro, con grano de diversos colores. (International Bean Yield and Adaptation Nursery IBYAN 1979. Bush bean: with black and different colored seed). Cali, Colombia, Centro Internacional de Agricultura Tropical. Serie CIAT

20SB(4)83. 266p. Span., Illus. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Adaptation. Cultivars. Yields. Dwarf beans. Seed color. Statistical analysis. Flowering. Maturation. Harvesting. Timing. Plant habit. Latin America. South Africa. Burundi.

Results of bush bean yield and adaptation trials carried out by CIAT during Jan. and July 1979 (IBYAN 1979 A) and Aug. 1979 and July 1980 (IBYAN 1979 B) are reported. The material is divided into 2 groups: one formed by black-colored grain (15 exptl. lines, 3 international checks, and 3 local checks) and the other by different-colored beans (25 exptl. lines, 3 internationaal checks, 3 local checks, and 1 line from the Instituto Colombiano Agropecuario). In the IBYAN 1979 B, 130 trials were conducted in 21 countries. For this report the results of the trials with a C.V. not exceeding 35% were taken into account and only those reported up to Dec. 1980. A randomized complete block design with 3 replications was used. Each plot consisted of four 4-m-long rows, spaced at 0.60 m. Useful plot area was 4.2 m^2. Data on bean yield, harvested plants, days to flowering, days to physiological maturity, harvesting date, growth habit, no. of pods/plant, wt. of 100 seeds, plant height, lodging, dehiscence, and reaction to diseases were recorded. In trials with black-colored grains the highest av. yields for the 18 most common materials were obtained in Samán Mocno, Venezuela, and in Santiago Ixcuintla, Mexico, with 2870 and 2645 kg/ha, resp. The lowest av. yields were recorded in Moca, Dominican Republic, and in La Molina, Peru, with 454 and 513 kg/ha, resp. In most of the localities, the best materials were the exptl. lines. In trials with different-colored grains the highest av. yield for the 26 lines and the 3 international checks were registered in Palmira, with 3345 kg/ha, and the lowest in Ahuachapán, El Salvador, with 356 kg/ha. Information is given in tables and figures. (Summary by EDITEC. Trans. by L.M.F.) G01

0175

20030 WALKEY, D.G.A.; INNES, N.L.; MILLER, A. 1983. Resistance to bean yellow mosaic virus in Phaseolus vulgaris. Journal of Agricultural Science 100:643-650. Engl., Sum. Engl., 23 Refs., Illus. [National Vegetable Research Station, Wellesbourne, Warwick, CV35 9EF, United Kingdom]

Phaseolus vulgaris. Cultivars. Selection. Resistance. Bean yellow mosaic virus. Isolation.

Accessions of green and dry-podded beans were tested for resistance to 7 isolates of BYMV originating from a wide geographical area. Based on their level of resistance, the beans could be divided into 4 groups: (1) accessions with a high level of resistance to most BYMV isolates; (2) accessions containing previously known sources of resistance in germplasm derived from the cv. Great Northern, which were mainly susceptible to the BOS 25 isolate, but had high levels of resistance to most other isolates; (3) and (4) groups showing increasing levels of susceptibility with the accession Red Mexican (common), the most susceptible bean tested. The 7 BYMV isolates induced distinct reactions when inoculated to a range of plant species, indicating that they possessed different pathogenicity genes. (Author's summary) G01

See also 0002 0019 0025 0026 0031 0036 0037 0038
0049 0067 0073 0084 0087 0089 0176 0198

G03 Polyploidy

0176

19747 PRENDOTA, K.; BAUDOIN, J.P.; MARECHAL, R. 1982. Fertile allopolyploids from the cross Phaseolus acutifolius x Phaseolus vulgaris. Bulletin des Recherches Agronomiques de Gembloux 17(2):177-189. Engl., Sum. Engl., Fr., 36 Refs. [Faculte des Sciences Agronomiques de L'Etat, 5800 Gembloux, Belgique]

Phaseolus vulgaris. P. acutifolius. Crossbreeding. Plant fertility. Hybrids. Hybridizing. Colchicine. Genotypes. Polyploidy.

Numerous reciprocal crosses between Phaseolus acutifolius and P. vulgaris produced completely autosterile hybrids. Allotetraploids with a reasonable degree of fertility were obtained after colchicine treatment of F_1 seedlings. The possible utilization of these fertile allotetraploid hybrids for the improvement of the common bean is discussed. (Author's summary) G03

H00 NUTRITION

0177

19724 GARCIA-LOPEZ, S.; WYATT, C.J. 1982. Effect of fiber in corn tortillas and cooked beans on iron availability. Journal of Agricultural and Food Chemistry 30(4):724-727. Engl., Sum. Engl., 30 Refs. [Dept. of Food Science, Univ. of Wisconsin, Madison, WI 53706, USA]

Phaseolus vulgaris. Fibre content. Fe. Animal nutrition.

Availability of Fe from a diet of corn tortillas and cooked beans with different levels of fiber was determined by hemoglobin repletion. Neutral detergent fibre (NDF) in corn tortillas and cooked beans and soluble, ionizable, and total Fe in the test foods were determined. Weanling male rats were fed an Fe-free diet until anemic and then divided into groups. The rats were fed diets with 6.5, 10, and 15% NDF and 25, 30, and 35 ppm of total Fe. Fe availability was significantly reduced by 15% NDF. The amount of Fe in the diet affected Fe repletion. A significant correlation between soluble Fe and pH 1.35 in vitro and % efficiency of hemoglobin repletion was obtained. Fe from corn tortillas and cooked beans is approx. 50% less available than $FeSO_4$. (Author's summary) H00

H01 Foods and Nutritive Value

0178

18782 DeFOUW, C.; ZABIK, M.E.; UEBERSAX, M.A.; AGUILERA, J.M.; LUSAS, E. 1982. Use of unheated and heat-treated navy bean hulls as a source of dietary fiber in spice-flavored layer cakes. Cereal Chemistry 59(3): 229-230. Engl., 12 Refs. [Dept. of Food Science and Human Nutrition, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Bean flour. Heat treatment. Uses. Dietary value. Nutritive value.

The use of navy bean hulls as an alternative source of dietary fiber in spice-flavored layer cakes was evaluated and hull flour from beans wit 10

heat treatment was compared with that from beans roasted for 2 min at 240°C. Unheated and roasted bean hulls were substituted for flour in the cake formula at a level of 15%. Characteristics such as color, tenderness, texture, flavor, and general acceptability were evaluated. The addition of 15% navy bean hulls resulted in a thicker batter due to the high water absorbancy of the hulls. Cakes prepared with the roasted navy bean hulls tended to be slightly more moist and tender than the control, although these results were not significant. Consequently, navy bean hulls are an acceptable source of dietary fiber in flavored cakes. (Summary by EDITEC. Trans. by L.M.F.) H01

0179

19717 McDANIEL, M.R.; DIAMANT, R.; LOEWEN, E.R.; BERG, D.H. 1981. Dangerous canning practices in Manitoba. Canadian Journal of Public Health 72(1):58-62. Engl., Sum. Engl., 15 Refs. [Dept. of Foods and Nutrition, Univ. of Manitoba, Winnipeg, Manitoba R3T 2N2, Canada]

Phaseolus vulgaris. Canned beans. Human nutrition. Canada.

In Aug. 1977, 457 Manitoba households were surveyed on their canning practices. Many incorrect and potentially dangerous practices were found including incorrect processing methods, use of improper containers and lids, and inadequate cooking procedures prior to serving. Beans were the most popularly canned low-acid vegetable, yet only 17% of the people canning beans used the proper pressure canning method recommended by Agriculture Canada, and proper processing instructions are not readily available. Large no. of respondents did not boil low-acid canned foods before eating to ensure destruction of botulism toxin (Clostridium botulinum). (Extracted from author's summary) H01

0180

19087 NAVARRETE, D.A.; BRESSANI, R. 1981. Protein digestibility and protein quality of common beans (Phaseolus vulgaris) fed alone and with maize, in adult humans using a short-term nitrogen balance assay. American Journal of Clinical Nutrition 34(9):1893-1898. Engl., Sum. Engl., 11 Refs. [Inst. de Nutrición de Centroamérica y Panamá, Apartado Postal 1188, Carretera Roosevelt, Zona 11, Guatemala, Guatemala]

Phaseolus vulgaris. Human nutrition. Digestibility. Proteins. N. Diets. Composition.

In different studies 36 men, 23-35 yr old, were given common beans alone and in different forms and with maize as tortillas to measure N digestibility and to evaluate protein quality using a short-term N balance assay. Digestibility of common bean protein was significantly lower than that of meat, and similar to that of a textured soybean protein. Forms of intake affected bean protein digestibility. Estimation of protein quality by the method of short-term multiple intake showed that with feeding on beans alone, N equilibrium was reached with a daily N intake of 114 mg/kg body wt., whereas on a diet with beans and maize (87:13), equilibrium was reached with N intake of 98 mg/kg. The difference was attributed to a complementary protein effect and an increase in protein digestibility of the mixture. (Author's summary) H01

0181

19727 PENZ JUNIOR, A.M.; EARL, L.; KRATZER, F.H.; TUCKER, C. 1983. Availability for chicks of tryptophan from autoclaved beans. Nutrition Reports International 27(1):161-169. Engl., Sum. Engl., 10 Refs. [Dept.

of Avian Sciences and Agronomy and Range Science, Univ. of California, Davis, CA 95616, USA]

Phaseolus vulgaris. Cultivars. Tryptophane. Chicks. Animal nutrition. Diets.

Samples of 4 bean cv. (small white-seeded cv. Chief and No. 7653, California Dark Red Kidney, Red Kidney) varied in tryptophan content from 0.211 to 0.335% or 1.01 to 1.29% of the protein. With Chief and No. 7653 fed at 39% of a diet for 1-day-old male Foster Farms chickens, with supplementary protein provided by maize, SBM, and meat and bone meal, growth was good and there was no response to the addition of tryptophan. With the basal diet made more deficient in tryptophan and Chief fed at 36% of the diet there was a response to the addition of 0.04% tryptophan, but when fed at 71% of the diet more total tryptophan was required. The 2 red kidney var. also responded to 0.04% tryptophan when they were fed at 36% of the diet. Results indicate that autoclaved beans are a good source of tryptophan and can be useful in supplementing a cereal such as maize when used up to 39% of chick diets. Tables are included on the effect of tryptophan on body wt. gain and feed efficiency of chickens 8-19, 8-15, and 8-16 days old. (Author's summary) H01

0182

19710 SHARIFF, G.; PENZ JUNIOR, A.M.; VOHRA, P. 1981. Nutritional improvement of beans (Phaseolus vulgaris) by autoclaving or water extraction for Tribolium castaneum larvae. Nutrition Reports International 24(6):1087-1091. Engl., Sum. Engl., 14 Refs. [Dept. of Avian Sciences, Univ. of California, Davis, CA 95616, USA]

Phaseolus vulgaris. Cultivars. Cooking. Nutritive value. Protein content.

Tribolium castaneum larvae were used to evaluate the improvements in some bean var. by autoclaving or water extraction. Larval wt. of T. castaneum fed diets containing 35% finely ground test beans, 5% brewers yeast, and 60% pearl corn starch from 6-16 days of age, reflected the nutritive value of the beans. Raw beans significantly depressed the growth of tribolium larvae and caused heavy mortality. The autoclaved beans and water-extracted beans significantly improved the growth of larvae, and caused no mortality. The autoclaved beans were, in general, significantly superior to water-extracted beans. T. castaneum larvae can be used in nutritional evaluation of Phaseolus vulgaris. (Author's summary) H01

100 MICROBIOLOGY

101 Rhizobium spp., Nitrogen Fixation and Nodulation

0183

19487 BETHLENFALVAY, G.J.; PACOVSKY, R.S.; BAYNE, H.G.; STAFFORD, A.E. 1982. Interactions between nitrogen fixation, mycorrhizal colonization, and host-plant growth in the Phaseolus-Rhizobium-Glomus symbiosis. Plant Physiology 70(2):446-450. Engl., Sum. Engl., 32 Refs., Illus. [United States Dept. of Agriculture, Agricultural Research Service, Western Regional Research Center, Berkeley, CA 94710, USA]

Phaseolus vulgaris. Inoculation. Rhizobium phaseoli. Mycorrhiza. Nitrogen fixation. Symbiosis. Nodulation. Fertilizers. P. Growth.

Bean cv. Dwarf roots were inoculated with Rhizobium phaseoli and colonized by vesicular-arbuscular mycorrhizal (VAM) fungus Glomus fasciculatum or left uncolonized as controls. The symbiotic associations were grown in an inert substrate using 0, 25, 50, 100, or 200 mg hydroxyapatite (HAP)/pot as a P amendment. Plant and nodule dry wt. and nodule activity increased for both VAM and control plants with increasing P availability, but values for VAM plants were significantly lower in all paramaters than for controls. Inhibition of growth and of N_2 fixation in VAM plants was greatest at the lowest and highest P regimes. It was smallest at 50 mg HAP, where available P at harvest (7 wk. after planting) was 5 micrograms P/g substrate. At this level of P availability, the association apparently benefited from increased P uptake by the fungal endophyte. Percent P values for shoots, roots, and nodules did not differ significantly ($P > 0.05$) between VAM and control plants. The extent of colonization, fungal biomass, and the fungus:association dry wt. ratio increased several fold as HAP was increased from 0 to 200 mg. It is concluded that intersymbiont competition for P and photosynthate was the primary cause for the inhibition of growth, nodulation, and nodule activity in VAM plants. Impaired N_2 fixation resulted in N stress which contributed to inhibition of host plant growth at all levels of P availability. (Author's summary) IOI

0184

20052 BOIARDI, J.L.; BALATTI, A.P.; MAZZA, L.A. 1983. Cultivos de Rhizobium phaseoli en sistema sumergido. (Rhizobium phaseoli cultures in immersed system). Revista de la Facultad de Agronomía (Argentina) 4(1):19-27. Span., Sum. Span., Engl., 9 Refs., Illus. [Centro de Investigación y Desarrollo de Fermentaciones Industriales, Facultad de Ciencias Exactas, Univ. Nacional de La Plata, Calle 47 y 115, (1900) La Plata, Buenos Aires, Argentina]

Phaseolus vulgaris. Rhizobium phaseoli. Culture media. Sugars. Strains. Nitrogen fixation. Argentina.

The development of a cell suspension of Rhizobium phaseoli strain F-45, used to prepare inoculants, was examined. The expt. were performed in shaker flasks and in conventional fermenters. The influence of C and N sources, growth factors, initial pH, inocula concn., and different aeration conditions on cell growth was studied. Using a medium which contained saccharose, peptone, yeast extract, and salts, and operated at 400 rpm, it is possible to obtain a cell concn. of 1.25×10^{10} cells/ml in 32 h. (Author's summary) IOI

0185

19828 LIMA, M.H. 1981. Eficiencia da fixacao simbiótica do nitrogenio x evolucao do H_2 x respiracao dos nódulos de feijoeiro (Phaseolus vulgaris L.) (Efficiency of symbiotic nitrogen fixation x H_2 evolution x respiration by bean nodules). Tese Mag.Sc. Piracicaba-SP, Brasil, Escola Superior de Agricultura Luiz de Queiroz da Universidade de Sao Paulo. 200p. Port., Sum. Port., Engl., 195 Refs., Illus.

Phaseolus vulgaris. Nitrogen fixation. Symbiosis. Cultivars. Rhizobium phaseoli. Dry matter. Mineral content. Canopy. Roots. Seeds. Pods. Brazil.

Four expt. were conducted at the Centro de Energía Nuclear na Agricultura, Piracicaba, SP, Brazil, in 1980 and 1981, to study the efficiency of symbiotic N fixation in bean cv. Carioca, Aroana, Moruna, Rio Tibagi, and

Venezuela-350. Rhizobium phaseoli strains C-05, C-29 (127 K 17), C-40 (CIAT 255), C-88 (SEMIA 487), and C-89 (CIAT 57) were used. In the 1st expt. plants were grown in Leonard jars and kept in a growth chamber. The other expt. were conducted under greenhouse conditions, and plants were grown in 2.5 l plastic pots. Wt. of DM and total N content during plant growth cycle were determined. The energetic cost of H_2 evolution was used as a parameter in the N fixation efficiency study, which analyzed nitrogenase activity (C_2H_2 reduction) and H_2 evolution by nodules. Nitrogenase activity was measured with intact plants and detached nodulated roots. The H_2 evolution was measured on intact plant systems and with detached root nodules. The relative efficiency (RE) of electron transfer to N_2 via nitrogenase was estimated. The possibility of the Rhizobium strain to present hydrogenase activity on a proper medium was also observed. The 3rd and 4th expt. measured the respiratory CO_2 efflux from freshly detached nodulated roots and from detached nodules to calculate the respiratory efficiency of N fixation systems. In the 4th expt. plants were supplied with low quantities of mineral N (7 and 35 ppm N as KNO_3) in order to evaluate the effect of this element on the efficiency of N fixation, since N is always present in soils and can inhibit plant nodulation and N fixation. Under these exptl. conditions, it was concluded that Phaseolus cv., the R. phaseoli strain, and the interaction cv. x strain affect DM wt. and total N content of aerial parts of the plant, root, nodules, pods, and seeds. Nitrogenase activity (C_2H_2 reduction), H_2 evolution, and the RE of nitrogenase system were also affected. The detection of hydrogenase uptake, ATP independent, fro. the strain was not always related to the higher efficiency of N fixation. The R. phaseoli hydrogenase failed to recycle all the H_2 produced via nitrogenase, and max. RE found was 0.89. The RE between cv., between strains, and between symbiotic system in the 1st stage of plant growth, were always positively related with the total plant N content. There was no relationship between wt. of nodules and N fixation, and wt. of nodules and C_2H_2 reduction. There was great variability in nodule N fixation efficiency, among both cv. and strains. Results obtained by the method of C_2H_2 reduction, analyzed by gas chromatography, and the N plant content were not related probably due to the loss of electrons (from 11 to 56%) used in H_2 evolution. The respiratory efficiency of detached nodulated roots and detached nodules was positively related to the dry wt. and N plant content, and to RE of nitrogenase system. Improved performance of the strains was positively related to higher RE and respiratory efficiency. The supply with low quantities of mineral N in the beginning of plant growth cycle favored the increase of DM and plant N content, and it was not disadvantageous to N fixation. This low supply of N did not affect the RE of the symbiotic systems, but increased the respiratory efficiency of nodulated roots. There are symbiotic systems where the main limitation to host plant growth in the beginning of the growth cycle is the deficiency of N, while in other systems the main limitation is probably the supply of C. The conduction of expt. in Leonard jars may limit plant growth and prejudice the research about Rhizobium selection under greenhouse conditions. (Author's summary) 101

0186

20066 PILLAY, N.M. 1979. Effects of plant protection chemicals, thiram, Dithane M45 and Azodrin on nodulation and nitrogen fixation by Phaseolus vulgaris L. Reduit, Mauritius, University of Mauritius. 67p. Engl., Sum. Engl., 58 Refs., Illus.

Phaseolus vulgaris. Nodulation. Nitrogen fixation. Rhizobium phaseoli. Insecticides.

The toxicity of thiram (400, 800, 1600, and 2400 ppm), mancozeb (4500, 9000, 18,000, and 27,000 ppm), and monocrotophos (2300, 4600, 9200, and

13,800 ppm) on Rhizobium phaseoli was investigated by an agar plate technique. The influence of these chemicals on the nodulation and growth of Phaseolus vulgaris was also determined. Thiram was found to be very toxic, mancozeb moderately toxic while monocrotophos had no inhibitory effect on Rhizobium phaseoli. A 2nd plate test was conducted in which the pesticide was homogeneously distributed throughout the medium. Levels used were thiram, 27, 53, 107, and 160 ppm; mancozeb, 300, 600, 1200, and 1800 ppm; monocrotophos, 153, 307, 613, and 920 ppm. Results of the 1st test were confirmed; however, there was no differential growth according to the concn. of the pesticide. Similar results were obtained when assessing the effects of the pesticides on nodulation of P. vulgaris in Leonard jars. Thiram inhibited nodulation while mancozeb reduced it significantly. Monocrotophos had no effect on nodulation. An attempt to repeat the expt. in soil failed to produce conclusive results. (Author's summary) I01

0187

19725 VENCATASAMY, D.R.; PEERALLY, M.A. 1981. Effects of certain environmental factors on nodulation and nitrogen fixation in Phaseolus vulgaris L. Revue Agricole et Sucriere de l'Ile Maurice 60(2):61-70. Engl., Sum. Engl., Fr., 9 Refs. [School of Agriculture, Univ. of Mauritius, Reduit, Ile Maurice]

Phaseolus vulgaris. Nodulation. Nitrogen fixation. pH. Growth. Rhizobium phaseoli.

Effect of shading, pH, and of certain pesticides on nodulation and N fixation in haricot bean was studied. Unshaded plants had the highest av. nodule fresh wt. Nodule development was severely curtailed in shade. Rhizobium phaseoli showed satisfactory growth between pH 5.8-8.7 in in vitro studies. Plant growth was not affected within the pH range 4.7-8.7, but highly significant differences in nodule tissue production were observed. Nodule formation and development were inhibited below pH 5.5 and above pH 6.8. Nodules were not produced at pH 7.9 and above. Thiram, mancozeb, benomyl, carbofuran, methomyl, tetrachlorvinphos, and linuron did not affect nodulation when applied at field rates. (Author's summary) I01

See also 0010 0019 0027 0028 0030 0031 0059

J00 ECONOMICS AND DEVELOPMENT

0188

14317 GOSS, J.R.; COPPOCK, R.H. 1980. Producing gas from crop residues. California Agriculture 34(5):4-6. Engl., Illus.

Phaseolus vulgaris. Industrialization. Gas production. Development.

Expt. testing energy recovery from timber and crop residues with down-draft gasifiers showed that straw from dry beans produces excess ash (above 5%), interfering with the operation of the pilot plant. Beans produce 10.2% ash. (Summary by EDITEC. Trans. by L.M.F.) J00

0189

19842 JONES, V.K. 1979. Relationships between climate and crop yields in Michigan. Ph.D. Thesis. East Lansing, Michigan State University. 117p. Engl., Sum. Engl., 70 Refs., Illus.

Phaseolus vulgaris. Yields. Production. Statistical analysis. Temperature. Rainfall data. Soil moisture. Evapotranspiration. USA.

Multiple regression models were developed for yields of maize, oat, soybean, and bean crops in 3 counties in southern Michigan, USA, where yield records were available for the specific crops. Long-term trends were removed by calculating piecewise linear regressions for specific periods. Departures from trend were used as the dependent variable in multiple regression analyses. Predicted yield departures from the regression analysis were added to trend values to obtain predicted annual yields. Two separate analyses were made. The 1st used monthly climate data for the April-Sept. growing season for 1892-1977 in Lenawee and Gratiot Counties and 1926-1977 in Gladwin County. Independent variables were temp., precipitation, soil moisture derived from soil water capacity, precipitation, and potential evapotranspiration, and the squares of each of these. The 2nd analysis used weekly temp. and precipitation for the growing season of each specific crop. For maize, soybean, and bean, the most important climate factors were July and Aug. precipitation. Use of a soil moisture availability index did little to improve the analysis. Analyses based on weekly data explained a larger portion of the variation in yields (higher R^2) than those based on monthly data. A truncated mid- to late-season weekly model may be useful in developing early estimates of yields for the current crop yr. Removal of time trends from crop data prior to multiple regression analysis lowers R^2 values. However, this allows the analysis to deal with short-term variations which are largely influenced by growing season weather conditions. (Author's summary) J00

0190

18061 MICHIGAN, UNITED States, and world dry bean statistics. 1982. Michigan Dry Bean Digest 6(4):16-19. Engl., Illus.

Phaseolus vulgaris. Production. Yields. USA. Argentina. France. Australia. Brazil.

Estimates of bean production in the USA, Argentina, Australia, France, and Brazil are analyzed. Tables with statistics on the following data are included: (1) area planted to bean and harvested in the USA during the period 1980-82; (2) bean production by different commercial classes in the different states of the USA (1979-81); (3) mean area harvested and yields at a world level by countries for the period 1969-71 and the years 1979, 1980, and 1981; (4) area, production, and yield by states in Brazil for 1981 and 1982. (Summary by EDITEC. Trans. by L.M.F.) J00

0191

19417 MORA L., J. 1971. Utilización de recursos en el cultivo de fríjol Diacol Calima en la parte plana del V. le del Cauca. (Use of resources in cultivating Diacol Calima bean on he level lands of the Valle del Cauca). Tesis Mag.Sc. Cali, Colombia, Universidad del Valle. 98p. Span., Sum. Span., 20 Refs., Illus.

Phaseolus vulgaris. Costs. Income. Mechanization. Technology evaluation. Statistical analysis. Labor. Prices. Production. Colombia.

During the 2nd semester of 1968 a survey was conducted on the level area of the Valle del Cauca (Colombia) to determine the use of agricultural inputs in the production of Diacol Calima bean. Main objectives were to determine a production function according to the conditions of cultivation of this var. in the region, determine the optimum theoretical bean cultivation and other economic measures on the basis of the estimated function to be

compared with the av. cultivation observed or with the type-cultivation observed among bean growers, and evaluate current profits. Forty-three bean growers, distributed in 20 municipalities, were initially interviewed; of these, 26 were selected to calculate the production function. These 26 bean crops used different agricultural inputs on a large scale. If this use was distributed normally, the av. farm size would be 27 ha, $24,750 would be used on variable inputs (pesticides, manures, packing), $13,500 on machinery, 312 and 190 day's work for temporary and permanent labor, resp., obtaining a total income of $192,870, a production of 1483 kg/ha, and a net profit of $4009/ha. The working capital, defined as the sum of all the expenditures made during the period, was calculated: an av. of $1522/ha. The functional analysis of production, based on 3 inputs (expenditures on machinery, pesticides, manures, and packing; use of permanent and temporary labor; total area planted), indicates that with the prices assigned to these factors in the study, the use of the 1st should be reduced and the use of labor and area planted should be increased. The study of production factors using functions requires an adequate quantification of the different variables to avoid problems of adjustment due to interrelationships among variables that impede precise appraisals. (Extracted from author's summary. Trans. by I.M.F.) J00

0192

17806 ROMO L., F.S. 1979. Factores asociados con el nivel de tecnología utilizada por colonos e indígenas del Valle de Sibundoy (Putumayo), en los cultivos de papa, maíz y fríjol. [Factors associated with the level of technology used by pioneer farmers and natives (Indians) in the Valle de Sibundoy (Putumayo) in potato, maize, and bean crops]. Tesis Mag.Sc. Bogotá, Colombia, Universidad Nacional. 183p. Span., Sum. Engl., Span., 43 Refs., Illus.

Phaseolus vulgaris. Technology evaluation. Cultivation. Pest control. Income. Colombia.

Between July 1978 and April 1979 a sample of 98 farmers (61 pioneer farmers and 37 natives) of the Valle de Sibundoy (Putumayo, Colombia) was taken to determine: (1) the level of technology used by the pioneer farmers and the natives in terms of cultural practices and the use of improved seed in potato, maize, and bean crops; (2) the source of information used by the farmer to obtain information on these cultural practices; and (3) the relationship of several socioeconomic factors with the level of technology used by the farmers. A survey using a precodified questionnaire was made and the data was tabulated and analyzed using statistical methods which included an ysis of frequencies, %, correlation, regression, and chi-square. Of the farmers sampled, 59.2% were less than 50 yr old; a higher rate of illiteracy exists among the natives (30%) than among farmers (15%). Most of the farmers (75.5%) own the land they work, with an av. of 4.6 and 13.5 ha/farm for natives and farmers, resp. Information on practices is adquired verbally by 65.4% of the farmers; only 4.1% of the farmers receive technical assistance. The level of technology used in bean cultivation is related to the size of crop. Total income of the farmers was related to the levels of technology used in the region and with potato and bean crops, not with maize. Capital affected the level of technology used in bean crops. Regarding socioeconomic factors, social factors had a greater influence on the level of technology used than economic factors. The questionnaire used, ponderated scores of each question corresponding to cultural practices for the 3 crops studied, and the relationship among the different parameters analyzed are annexed. (Summary by F.G. Trans. by L.M.F.) J00

0193

12665 SANDERS, J.H.; NICOLETI, G.H. 1979. A situacao do feijao (Phaseolus vulgaris e Vigna) no Brasil com algumas sugestoes para a politica. [The situation of beans (Phaseolus vulgaris and Vigna) in Brazil; several suggestions regarding policies]. Cali, Colombia, Centro Internacional de Agricultura Tropical. 32p. Port., 12 Refs., Illus.

Phaseolus vulgaris. Production. Yields. Prices. Agricultural projects. Brazil.

Bean production trends during the years of 1947-51 and 1973-77 were analyzed for the different states of Brazil and some marketing policies for surplus crops are suggested. The state of Paraná was the largest producer during 1947-51 and 1973-77 with 203,506 and 561,360 t, resp., representing 20.7 and 31.5% of the total national production. Bean yields decreased during the period 1973-77 with values ranging between 2.6% for Sao Paulo and 55.4% for Ceará. Bean production decreased with the introduction of other crops such as cotton and soybean, host plants of the whitefly (Bemisia tabaci), vector of BGMV, and therefore competing for area dedicated to bean production. Prices vary widely, especially for some var. due to consumer preferences. Suggestions include policies of bean storage to eliminate seasonal variation in price and protect both the consumer and the producer, development of disease-resistant var., and survey of consumer preferences of bean var. Tables and figures are included for analyzing the observed trends. (Summary by EDITEC. Trans. by L.M.F.) J00

0194

19412 ZAFFARONI, E.; BARROS, A.C.Q.T. DE; SOUZA, N.A. DE; ARAUJO, V.M. DE 1981. Avaliacao economica de agroecossistemas com milho e feijao no brejo paraibano. (Economical evaluation of maize and bean agroecosystems in the marsh microregion of Paraiba). Agropecuária Técnica 2(2):86-97. Port., Sum. Port., Engl., 19 Refs. [Univ. Federal da Paraíba, Campus III, Areia, 58.397 Areia-PB, Brasil]

Phaseolus vulgaris. Zea mays. Intercropping. Manures. Income. Costs. Brazil.

Three cropping systems (maize in monoculture, bean in monoculture, and maize/bean intercropping), with and without organic fertilization, were evaluated in Areia, PB, Brazil by: partial budgeting analysis, marginal analysis of net income, sensitivity analysis, and retribution to production factors. The highest gross margin and net income were found in bean in monoculture and maize/bean intercropping, both without fertilization. The highest marginal rate of return was found when passing from maize in monoculture to bean in monoculture without fertilization. Beans without fertilization showed the highest value when analyzing sensitivity and retribution to production factors. Maize/bean intercropping without fertilization followed bean without fertilization for all performed evaluations. The disadvantage in the application of manure could be due to its poor quality. (Author's summary) J00

See also 0027 0033 0061 0068 0069 0074 0144 0166

K00 FIELD PLOT TECHNIQUE

0195

19891 ZIMMERMANN, F.J.P. 1982. Tamanho e forma de parcela para pesquisa de feijao consorciado com milho [illegible]

of beans and maize as associated crops). Pesquisa Agropecuária Brasileira 17(5):741-743. Port., Sum. Engl., Port., 4 Refs., Illus. [Centro Nacional de Pesquisa de Arroz e Feijao-EMBRAPA, Caixa Postal 179, 74.000 Goiania-GO, Brasil]

Phaseolus vulgaris. Experiment design. Zea mays. Harvesting. Intercropping. Brazil.

A uniform trial of beans and maize as associated crops was carried out at the Centro Nacional de Pesquisa de Arroz e Feijao at Goiania, GO, Brazil. At harvest the area was divided into half, each half with 900 harvest units of 1 m^2. Fifty-two different combinations of plot size were made and for each the C.V. was determined. After that, the correlation between the C.V. and the no. of harvest units was studied through the model $CV = aX^b$, where X is the no. of harvest unit, CV the value of C.V., a and b the base or regression coefficient. It was determined, by the CV max. curvature method, that the ideal effective area of the plots for field research with these associated bean and maize crops is 18 m^2 (3 x 6 m). (Author's summary) K00

L00 GRAIN STORAGE

See 0027

L01 Stored Grain Pests

0196

19712 GOLOB, P.; KILMINSTER, A. 1982. The biology and control of Zabrotes subfasciatus (Boheman) (Coleoptera:Bruchidae) infesting red kidney beans. Journal of Stored Products Research 18(3):95-101. Engl., Sum. Engl., 13 Refs. [Tropical Stored Products Centre, Tropical Development and Research Institute, London Road, Slough SL3 7HL, United Kingdom]

Phaseolus vulgaris. Zabrotes subfasciatus. Insect biology. Chemical control. Insect control. Stored grain pests.

Expt. were set up to determine the pattern of development of a South American strain of Zabrotes subfasciatus infesting red kidney beans. The duration of the life cycle was 36 days from egg to adult and after a preoviposition period of less than 1 day females laid 50 eggs in their 13-day life. Most of the eggs were laid after 4 days and 90% hatched. Windows developed in the beans after 26 days. Dilute dust insecticides were admixed with beans containing young larvae and with beans with windows. The treatments did not prevent emergence of the adults but killed them thereafter. Survivors were found on tetrachlorvinphos- and bromophos-treated beans but not on any others. Adults put on treated beans at various intervals after treatment were initially killed by all insecticides. Malathion, however, lost its activity within 6 wk. and gamma-HCH was the most persistent being effective up to 24 wk. For the period for which farmers would require to protect their beans in storage, approx. 8 wk., iodofenphos or pirimiphos-methyl applied at 8 ppm would be good alternatives to gamma-HCH. (Author's summary) L01

0197

19958 POWERS, J.R.; CULBERTSON, J.D. 1982. In vitro effect of bean amylase inhibitor on insect amylases. Journal of Food Protection 45(7): 655-657. Engl., Sum. Engl., 14 Refs., Illus.

Phaseolus vulgaris. Inhibitors. Stored grain pests. Enzymes.

The activity of a bean amylase inhibitor against amylases extracted from several insects was tested. Amylases extracted from Mediterranean flour moth larvae (Anagasta kuehniella), red flour beetle adults (Tribolium castaneum), both adults and larvae of T. confusum (confused flour beetle) and yellow mealworm larvae (Tenebrio molitor) were inhibited while adult granary weevil (Sitophilus granarius) amylase was not inhibited by the bean inhibitor. The T. molitor amylase interaction with the bean inhibitor was studied further. Inhibition of the Tenebrio enzyme is expressed slowly at pH 5.4, but lowering the pH or raising the ionic strength of incubation media caused a marked increase in rate of expression of the inhibition. (Author's summary) L01

0198

20612 SOSA, H.M.; MAZZUFERI, V.; AUDISIO, R. 1982? Resistencia de cultivares de poroto al ataque de Acanthoscelides obtectus (Say., 1831) (Col.-Bruchidae) en almacenamiento. [Resistance of stored bean cultivars to the attack of Acanthoscelides obtectus (Col.-Bruchidae)]. Colombia, Universidad Nacional de Córdoba. 5p. Span., Sum. Span., Engl., 7 Refs. [Facultad de Ciencias Agropecuarias, Univ. Nacional de Córdoba, Montería, Colombia]

Phaseolus vulgaris. P. lunatus. P. coccineus. Cultivars. Acanthoscelides obtectus. Stored grain pests. Resistance. Selection. Storage. Deterioration. Colombia.

Trials were carried out to evaluate the resistance of the cv. Manteca (Phaseolus lunatus), Pallar (P. coccineus), and Alubia, Colorado, Triguito, Great Northern, Caballero, Bolita, and Negro (P. vulgaris), grown in Argentina, to the bruchid Acanthoscelides obtectus. The method consisted in a free choice trial in randomized blocks with 9 cv. and 10 replications. Equal-vol. samples were taken to measure the % of infestation and no. of exit holes for adult emergence. These data were analyzed using Tukey's test (P = 0.05). Bruchid attack on var. Manteca was significantly less than on the other var. Resistance of the cv. tested listed in decreasing order was Manteca, Pallar, Great Northern, Triguito, Colorado, Alubia, Caballero, Bolita, and Negro. (Author's summary. Trans. by L.M.F.) L01

0199

18755 THIERY, D. 1982. Conséquences d'un épuisement des larves néonates d'Acanthoscelides obtectus sur la fréquence de pénétration dans des graines stockées de Phaseolus vulgaris. (Consequences of stress factors on penetration frequency of neonate larvae of Acanthoscelides obtectus in stored Phaseolus vulgaris seeds). Entomologia Experimentalis et Applicata 32(2):195-197. Fr., Sum. Engl., 12 Refs. [Univ. F. Rabelais, Institut de Biocénotique Experimentale des Agrosystemes (L.A. CNRS 340), Avenue Monge, Parc Grandmont, 37200, Tours, France]

Phaseolus vulgaris. Acanthoscelides obtectus. Stored grain pests. Seed. Storage. Temperature. Relative humidity. Isolation.

When neonate larvae of the bruchid Acanthoscelides obtectus were subjected to stress to various temp., humidities, and degrees of isolation, the

frequency with which they penetrated seeds of Phaseolus vulgaris was affected. Penetration frequency was reduced by more than 50% for the most stressed larvae. Stress was greatest at high temp. and low humidities. Larval isolation had little effect on larval development on cotyledon powder of bean. (Author's summary) L01

ZOO GENERAL

0200

20674 LOPEZ S., J. 1983. Bibliography on bean research in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 177p. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Research. Africa.

A total of 813 bibliographic references on bean (Phaseolus vulgaris) research in Africa are given, organized by countries (Angola, Burundi, Cameroon, Cape Verde Islands, Egypt, Ethiopia, Ghana, Kenya, Libya, Malagasy Republic, Malawi, Mauritius, Morocco, Nigeria, Reunion, Rwanda, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Upper Volta, Zaire, Zambia, and Zimbabwe). Within each country, the references are arranged alphabetically by author. Abstracts are included for approx. half of the references in addition to an author index and a subject index, which includes records of cv., var., and lines, to facilitate the use of the bibliography. (Summary by F.G. Trans. by L.M.F.) Z00

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
CAMV	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
concd.	Concentrated
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
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
govt.	Government
govtl.	Governmental
h	Hour(s)
ha	Hectare(s)
HCN	Hydrocyanic acid
HDP	Hydroxypropyl distarch phosphate (modified cassava starch)
HI	Harvest index
IAA	Indoleacetic acid
IBA	Indolebutyric acid
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	Kilocaloric(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 from
NAR	Net assimilation rate
NCE	Net CO_2 exchange
NE	Northeast
NEP	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	Probability
Pa.	Pascal(s)
PAN	Peroxyacetic nitrate
PCNB	Pentachloronitrobenzene
PDA	Potato dextrose agar
PER	Protein efficiency ratio
pH	Hydrogen ion concentration
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
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	Tobbaco mosaic virus
TSH	Thyroid-stimulating hormone
UDPG	Uridine diphosphate glucose
UMS	Unmodified cassava starch
UV	Ultraviolet
var.	Variety(ies), varietal
VFA	Volatile fatty acids
vol.	Volume
VPD	Vapor pressure deficit
vpm	Volume per million
W	West
wk.	Week
WP	Wettable powder
wt.	Weight
YFEL	Youngest fully expanded leaves
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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0076 0161
DISEASE CONTROL
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0043 0085

DISEASE TRANSMISSION
0084
EPIDEMIOLOGY
0084
RESISTANCE
0037 0038 0084 0089 0147 0168 0171
SYMPTOMATOLOGY
0084

XANTHOMONAS PHASEOLI VAR FUSCANS
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0034
CHEMICAL CONTROL
0033 0035
DISEASE TRANSMISSION
0084
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DOCUMENTATION SERVICES

Susan C. Harris, MLS, Information Specialist, Communications and Information Support Unit, Head
Jorge López S., Documentalist, Supervisor of Documentation Center
Fabiola Amariles E., BA, Production Liaison
Marlene Cárdenas, Bibliographer
Manuelita Mena de Chacón, Typesetting
Francy González V., Agr. Eng., Documentalist-Beans
Mariano Mejía M., BA, Documentalist-Tropical Pastures
Lynn Menéndez F., Editing and Translation
Keyttel Gutiérrez de Prieto, Information input
Gladys Rodríguez de Ramos, Proofreader

BEAN PROGRAM

Aart van Schoonhoven, PhD, Entomology, Coordinator
David Allen, PhD, Plant Pathology (Visiting Scientist)
Stephen Beebe, PhD, Plant Breeding, Central America Bean Project (stationed in Guatemala)
Jairo Castaño, PhD, Plant Pathology (Visiting Scientist)
Jeremy H.C. Davis, PhD, Agronomy
Michael Dessert, PhD, Plant Breeding, Great Lakes Project (stationed in Rubone, Rwanda)
Guillermo E. Gálvez, PhD, Plant Pathology, Regional Coordinator, Central America Bean Project (stationed in San Jose, Costa Rica)
Guy Hallman, PhD, Entomology (Postdoctoral Fellow)
Guillermo Hernández-Bravo, PhD, Plant Breeding, Co-leader, Agricultural Extension and Research Project (INIPA), Peru
Francisco Morales, PhD, Virology
James Nienhuis, PhD, Plant Breeding (Postdoctoral Fellow)
Silvio H. Orozco, MS, Agronomy, Central America Bean Project (stationed in Guatemala)
Douglas Pachico, PhD, Economics
Marcial Pastor-Corrales, PhD, Plant Pathology
Nigel Sackville-Hamilton, PhD, Management Systems (Visiting Scientist)
Shree P. Sing, PhD, Plant Breeding
Steven R. Temple, PhD, Plant Breeding
Michael D. Thung, PhD, Agronomy (stationed at CNPAF, Goiania, Brazil)
Peter Trutman, PhD, Plant Pathology, Great Lakes Project (stationed in Rubone, Rwanda)
Joachim Voss, PhD, Anthropology, Great Lakes Project (Postdoctoral Fellow, stationed in Rwanda)
Oswaldo Voysest, PhD, Agronomy
Jeffrey White, PhD, Physiology (Visiting Scientist)
Jonathan Woolley, PhD, Agronomy, Cropping Systems