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Abstracts on Field Beans
[*Phaseolus vulgaris* L.]

Centro Internacional de Agricultura Tropical

ABSTRACTS ON FIELD BEANS

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Information Specialists:
Francy González V.
Tito L. Franco

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

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INTRODUCTION

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

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

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

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

COMPONENTS OF AN ABSTRACT

Accession number (for photocpy requests)

Authors

Year of publication

Sequential number in the journal (for use of indices)

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

Original title

Additional notes

Author address

Source

Pages

Language of paper

Language of summary

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

Descriptors

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

Abstract

Abstractor and/or translator

HOW TO USE THE INDEXES

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

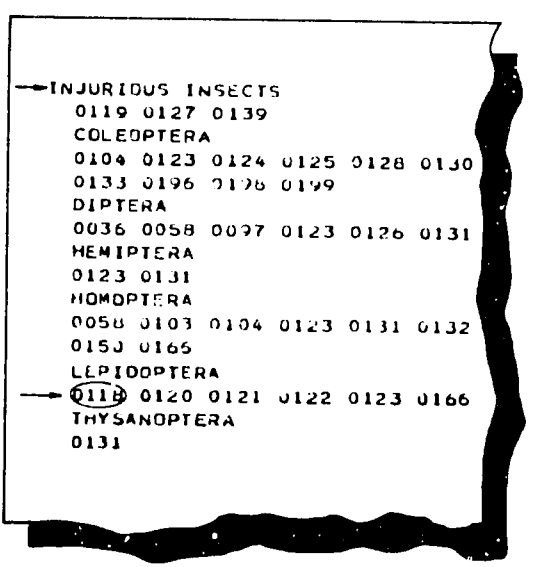
The last issue of the year contains cumulative author and subject indexes for the year.

Author Index

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

Subject Index

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

A00 BOTANY, TAXONOMY AND GEOGRAPHICAL DISTRIBUTION

0001

27259 ACOSTA G., J.A. ; MURUAGA M., J.S.; CARDENAS R., F. 1983. Distribución de especies del género Phaseolus en el Estado de Durango. (Distribution of Phaseolus species in the state of Durango). Agricultura Técnica en México 9(1):13-22. Es., Sum. Es., 11 Ref. [Campo Agrícola Experimental Valle del Guadiana, Inst. Nacional de Investigaciones Agrícolas, 06600 México, D.F. México]

Phaseolus vulgaris. Plant geography. Phaseolus acutifolius. Phaseolus coccineus. Maps. México.

A total of 153 wild populations representing 11 Phaseolus spp. were collected in Durango, Mexico, from 1978 to 1981. Of these, the most common was P. acutifolius var. acutifolius and the most important, P. vulgaris var. silvestre mexicanus, P. coccineus var. silvestre, and P. acutifolius var. acutifolius. Distribution maps are presented and discussed. (AS (extract))

0002

27377 GEPTS, P. ; BLISS, F.A. 1985. Usefulness of phaseolin as an evolutionary marker. Bean Improvement Cooperative. Annual Report 28:60-61. En., 10 Ref. [Dept. of Botany & Plant Sciences, Univ. of California, Riverside, CA 92521, USA]

Phaseolus vulgaris. Phaseollin. Analysis. Genotypes. Adaptation. USA.

The characteristics of the phaseollin trait that make it a good indicator of evolutionary events in common beans are briefly analyzed. (CIAT)

0003

27327 SMARTT, J. 1985. Evolution of grain legumes. 4. Pulses in the genus Phaseolus. Experimental Agriculture 21(3):193-207. En., Sum. En., 27 Ref. [Dept. of Biology, Building 44, The Univ., Southampton S09 5NH, England]

Phaseolus vulgaris. Phaseolus lunatus. Phaseolus coccineus. Phaseolus acutifolius. Centre of origin. Hybridizing. Cultivation. United Kingdom.

The genus Phaseolus as currently recognized contains 4 pulses: P. vulgaris, P. coccineus, P. lunatus, and P. acutifolius. Although these all have their origins in tropical and subtropical latitudes, they have evolved in different ecological zones. P. coccineus has evolved at higher alt., P. vulgaris at intermediate levels, and P. lunatus at lower alt. P. acutifolius has a specialized desert-annual life form. The occurrence of day neutral genotypes in all species has permitted their spread into cool and warm temperate zones (P. coccineus and P. vulgaris) and the warm temperate zone (P. lunatus). It is possible therefore to grow one or other Phaseolus species in most areas of the world where cultivation can be practised. P. vulgaris has evolved the widest range of growth forms, seed and pod sizes, pod forms and textures, and seed and pod colors. Worldwide an enormous primary gene pool has been produced. The P. vulgaris gene pool is the secondary gene pool for P. coccineus and vice versa, since partially fertile interspecific hybrids can be produced between them. Other interspecific hybrid combinations of the 4 species produce sterile or inviable F1 hybrids so that potential for interspecific gene transfer is limited. Thus no known secondary gene pools exist for Phaseolus species other than P. vulgaris and P. coccineus. (AS)

0004

27338 BIGOT, J. ; BINET, P. 1984. Etude comparative, par titrage, de quelques caractéristiques électrochimiques de parois isolées des racines de Cochlearia anglica et de Phaseolus vulgaris. (Comparative study, by pH titration, of some electrochemical characteristics of cell walls isolated from roots of Cochlearia anglica and Phaseolus vulgaris). Physiologie Végétale 22(1):83-92. Fr., Sum. Fr., En., 28 Ref., Il. [Laboratoire de Physiologie Végétale, Unité d'enseignement et de Recherche de Sciences, Université de Caen, 14032 Caen Cedex, France]

Phaseolus vulgaris. Cell walls. Roots. France.

Electrochemical properties of root cell walls from Cochlearia anglica (halophyte) and Phaseolus vulgaris (glycophyte) were examined by pH titration of isolated parietal material. The resultant curves showed that exchange and neutralization equilibria are largely obtained after 2 h. The shapes of curves depended on the nature of the titration base cation and of the medium's anionic strength. By using the Morvan-Demarty-Thellier model, estimate of the affinity coefficient for Na was obtained for a 10 millimolar NaCl solution; there was no major difference between the 2 species. The total cation capacity of the cell walls of C. anglica was always greater than that of P. vulgaris. For both the glycophyte and the halophyte, the density of electronegative sites in the cell walls was not modified by increasing NaCl concn. in the culture medium. (AS)

0005

27214 BOLWELL, G.P. ; ROBBINS, M.P.; DIXON, R.A. 1985. Elicitor-induced prolyl hydroxylase from French bean (Phaseolus vulgaris). Localization, purification and properties. Biochemical Journal 229(3):692-699. En., Sum. En., 37 Ref., Il. [Dept. of Biochemistry, Royal Holloway College, Univ. of London, Egham Hill, Egham, Surrey TW20 OEX, England]

Phaseolus vulgaris. Snap beans. Colletotrichum lindemuthianum. Cell walls. Analysis. Enzymes. Proteins. United Kingdom.

The enzyme prolyl hydroxylase, induced in suspension-cultured cells of French bean by treatment with an elicitor preparation from the phytopathogenic fungus Colletotrichum lindemuthianum, was investigated. The enzyme, which catalyses the hydroxylation of poly-L-proline with the stoichiometric decarboxylation of 2-oxoglutarate, was shown to be localized mainly in smooth endoplasmic reticulum. After solubilization from microsomal membranes, the hydroxylase was purified by ion-exchange chromatography and affinity chromatography on poly-L-proline-Sepharose 4B. The subunit Mr, as assessed by SDS/polyacrylamide-gel electrophoresis, was 65,000, the subunit apparently being recovered as a doublet; the subunits associate under nondenaturing conditions to give at least a tetramer. The bean hydroxylase has kinetic properties and cofactor requirements similar to those previously reported for the enzyme from other plants. Elicitor treatment of suspension-cultured bean cells leads to a rapid induction of prolyl hydroxylase activity concomitant with induction of a protein:arabinosyl-transferase and increased levels of an arabinosylated hydroxyproline-rich protein. (AS)

0006

27282 CHAPPELL, J. ; CHRISPEELS, M.J. 1986. Transcriptional and posttranscriptional control of phaseolin and phytohemagglutinin gene expression in developing cotyledons of Phaseolus vulgaris. Plant Physiology 81(1):50-54. En., Sum. En., 23 Ref., Il. [Agronomy Dept., N-212 Agriculture Science Center-North, Univ. of Kentucky, Lexington, KY 40546, USA]

Phaseolus vulgaris. Cultivars. Phytohemagglutinins. Phaseolin. Genes. Cotyledons. USA.

The expression of phaseolin and phytohemagglutinin in the developing cotyledons of a normal (Greensleeves) and a phytohemagglutinin-deficient (Pinto 111) cv. of Phaseolus vulgaris was investigated. Phaseolin mRNA translational activity and abundance were present at similar levels in both cv. In contrast, phytohemagglutinin mRNA translational activity and abundance in Pinto 111 were less than 1 percent of the levels measured in Greensleeves. Using nuclear runoff assays, the transcription rate of phaseolin gene sequences was similar in both cv. The transcription rate of phytohemagglutinin gene sequences in Pinto 111 was only 20 percent of that measured in Greensleeves. Comparison of the transcription rates with the relative mRNA amounts measured in RNA blot hybridizations indicated that the normally expressed storage protein gene mRNAs were very stable with half-lives greater than several days. Because a low level of phytohemagglutinin gene transcription in Pinto 111 was measurable but no phytohemagglutinin mRNA accumulated, these results suggest that the phytohemagglutinin deficiency in Pinto 111 is due to a reduced transcription rate and possibly an instability of the mRNA. (AS)

0007

27380 CHRISPEELS, M.J. 1985. UDP-GlcNAc:glycoprotein GlcNAc-transferase is located in the Golgi apparatus of developing bean cotyledons. Plant Physiology 78(4):835-838. En., Sum. En., 14 Ref., Il. [Dept. of Biology, C-016, Univ. of California, San Diego, La Jolla, CA 92093, USA]

Phaseolus vulgaris. Cotyledons. Phytohemagglutinins. Proteins. Enzymes. USA.

The transport and accumulation of phytohemagglutinin in developing bean cotyledons are accompanied by the transient presence of N-acetylglucosamine (GlcNAc) residues on the oligosaccharide sidechains of this glycoprotein. These peripheral GlcNAc residues can be distinguished from those in the chitobiose portion of the oligosaccharide sidechains by their sensitivity to removal by the exoglycosidase beta-N-acetylglucosaminidase. GlcNAc residues sensitive to removal by beta-N-acetylglucosaminidase are present not only on phytohemagglutinin, but also on other newly synthesized proteins. The enzyme UDP-GlcNAc:glycoprotein GlcNAc-transferase which transfers GlcNAc residues to glycoproteins was 1st described by Davies and Delmer. The data presented here show that this enzyme is associated with the Golgi complex of developing cotyledons. (AS)

0008

27254 CHRISPEELS, M.J. ; VITALE, A.; STASWICK, P. 1984. Gene expression and synthesis of phytohemagglutinin in the embryonic axes of developing Phaseolus vulgaris seeds. Plant Physiology 76(3):791-796. En., Sum. En., 29 Ref., Il. [Dept. of Biology C-016, Univ. of California, San Diego, La Jolla, CA 92093, USA]

Phaseolus vulgaris. Phytohemagglutinins. Cotyledons. Embryo. USA.

The biosynthesis of phytohemagglutinin, the major seed lectin of common bean, in the axes was studied as well as the posttranslational modifications which the oligosaccharide sidechains undergo. The results indicate that the site of synthesis of phytohemagglutinin and the posttranslational modifications of phytohemagglutinin are the same in the embryonic axes as in the cotyledons. Since in the cotyledons these modifications take place in the endoplasmic reticulum, the Golgi, and the protein bodies, it appears that the transport pathway and the site of accumulation of phytohemagglutinin in the axes are similar to those in the cotyledons. It is suggested that the subcellular localization of phytohemagglutinin in the axes should be reexamined. (AS (extract))

0009

27297 DE MOURA, R.L. ; FOSTER, K.W. 1986. Spatial distribution of seed yield within plants of bean. Crop Science 26(2):337-341. En., Sum. En., 12 Ref., Il. [Nor-Cal Wild Rice, P.O. Box 940, Woodland, CA 95695, USA]

Phaseolus vulgaris. Plant architecture. Flowering. Yields. Cultivars. Yield components. Plant anatomy. USA.

A study was initiated to determine the spatial and temporal distribution pattern in terms of main stem and branch node positions of seed yield in 4 dry bean cv. (Red Kidney, Sacramento, Sutter Pink, and T-39). These cv. were planted in Davis (California, USA) in the summer of 1983. Beginning at 1st flower, each flower that opened each day was tagged daily over the next 20 days. The spatial distribution pattern (a result of pods being set at various main stem and branch nodes) of yield showed approx. 70 percent of the total yield to be in the lower portion of the canopy, i.e., branches and main stem nodes 1-3 in Red Kidney, Sacramento, and Sutter Pink, and nodes 1-5 in T-39. Considering the branches only, 70 percent of the total yield was produced on branch nodes 1-3 in Red Kidney, Sacramento, and Sutter Pink, and branch nodes 1-5 in T-39. The main stem yield varied among cv., ranging from 7 to 23 percent of total yield. Distribution of pods at nodes along the main stem varied among cv., with those of Red Kidney and Sacramento concentrated at node 5 or 6 while Sutter Pink and T-39 had pods distributed over a greater portion of the stem and had max. main stem pod production at node 6 (Sutter Pink) or 9-10 (T-39). Combining spatial and temporal data showed that the percentage of early pods set at a single location was greatest near the main stem and decreased at more distant nodes. The majority of pods produced on the main stem were set during the 1st 11 days of the reproductive period. Present architecture of the 4 cv. tested shows that a large percentage of the yield is located on the lowest branches. Therefore, the development of new cv. for direct combining or higher planting densities will require plant types with more pods on the main stem and/or a major portion produced on the higher branches. (AS)

0010

27230 GREENWOOD, J.S. ; KELLER, G.A.; CHRISPEELS, M.J. 1984. Localization of phytohemagglutinin in the embryonic axis of Phaseolus vulgaris with ultrathin cryosections embedded in plastic after indirect immunolabeling. Planta 162(6):548-555. En., Sum. En., 25 Ref., Il. [Dept. of Biology, C-016, Univ. of California at San Diego, La Jolla, CA 92093, USA]

Phaseolus vulgaris. Phytohemagglutinins. Seed. Cotyledons. Lectins. Cytology. Biochemistry. USA.

Properties and subcellular localization of phytohemagglutinin, the major lectin of Phaseolus vulgaris, in the axis cells of nearly mature and imbibed mature seeds were examined. On a protein basis the axis contained about 15 percent as much phytohemagglutinin as the cotyledons. Localization of phytohemagglutinin was done with an indirect immunolabeling method on ultra-thin cryosections, which were embedded in plastic on the grids after the immunolabeling procedure. The embedding greatly improved the visualization of the subcellular structures. The small (4nm) colloidal gold particles, localized with the electron microscope, were found exclusively over small vacuoles/or protein bodies in all the cell types examined (cortical parenchyma cells, vascular-bundle cells, epidermal cells). The matrix of these vacuoles-protein bodies appears considerably less dense than that of the protein bodies in the cotyledons, but the results confirm that in all parts of the embryo phytohemagglutinin is localized in similar structures. (AS)

0011

27228 HOFFMAN, L.M. ; DONALDSON, D.D. 1985. Characterization of two Phaseolus vulgaris phytohemagglutinin genes closely linked on the chromosome. European Molecular Biology Organization Journal 4(4):883-889. En., Sum. En., 38 Ref., Il. [Agrigenetics Advanced Research Division, 5649 East Buckeye Road, Madison, WI 53716, USA]

Phaseolus vulgaris. Phytohemagglutinins. Lectins. DNA. Genes. USA.

A lambda 1059 library of Phaseolus vulgaris cv. Tendergreen DNA was screened with a cloned lectin-like cDNA. Among the phages selected was clone lambda B10 containing 2 complete lectin genes in the same orientation approx. 4 kilobases apart. The DNA sequences of the lectin genes and their flanking regions were determined and their transcriptional initiation sites were located by S1 nuclease mapping. On the basis of the deduced amino acid sequences and compositions and the mol. wt. of their encoded glycoproteins, the genes, dlec1 and dlec2, are predicted to encode erythro- and leucoagglutinating phytohemagglutinins, resp. (AS (extract))

0012

27303 McCLENDON, J.H. 1984. The micro-optics of leaves. 1. Patterns of reflection from the epidermis. American Journal of Botany 71(10):1391-1397. En., Sum. En., 17 Ref., Il. [School of Biological Sciences, Univ. of Nebraska-Lincoln, Lincoln, NB 68588-0118, USA]

Phaseolus vulgaris. Leaves. Light. USA.

Quantitative data were obtained for both upper and lower surfaces of a var. of leaves, including snap beans, using light of 632.8 nm incident at 60 degrees from the normal. Light departing the leaf was detected in 2 directions: normal to the leaf (diffuse), and at 60 degrees (specular), and compared with the reflection from a standard white block. By this criterion, some leaves were quite shiny, conforming the visual impression, but others were not. In only 2 cases did the diffuse reflection exceed the specular (as would be expected from a true diffuse reflector); these were leaves with thick coatings of hairs. Less than 10 percent of the incident light is reflected by the cuticle of a glabrous leaf. (AS (extract))

0013

27292 ROBERTS, D.R ; DUMBROFF, E.B.; THOMPSON, J.E. 1986. Exogenous polyamines alter membrane fluidity in bean leaves: a basis for potential misinterpretation of their true physiological role. Planta 167(3):395-401. En., Sum. En., 42 Ref., Il. [Dept. of Biology, Univ. of Waterloo, Waterloo, Ontario N2L 3G1, Canada]

Phaseolus vulgaris. Cell structure. Leaves. Canada.

Changes in the rotational motion of paramagnetic and fluorescent lipid-soluble probes were used to assess the effects of putrescine, spermidine, and spermine on the fluidity of microsomal membranes from primary leaves of bean. Surface probes were more strongly immobilized by physiological concn. of the polyamines than probes that partitioned deep into the bilayer interior. Spermidine and spermine were more effective than putrescine at reducing membrane fluidity, and at equimolar concn., the polyamines and Ca had similar effects on the mobility of the membrane probes. Spermine had essentially equivalent effects on the fluidity of native membranes, heat-denatured membranes, and liposomes prepared from the total lipid extract of the membranes, indicating that polyamines associate with membrane lipid. These results raise the possibility that some of the physiological effects previously attributed to exogenously added polyamines could reflect membrane rigidification rather than a true physiological response. (AS)
See also 0126 0206

0014

27277 ALBERT, F.G. ; BENNETT, L.W.; ANDERSON, A.J. 1986. Peroxidase associated with the root surface of Phaseolus vulgaris. Canadian Journal of Botany 64(3):573-578. En., Sum. En., Fr., 33 Ref. [Dept. of Biology UMC 45, Utah State Univ., Logan, UT 84322, USA]

Phaseolus vulgaris. Roots. Enzymes. USA.

The surface of bean roots demonstrates an intense peroxidase activity, which was detected by hydrogen peroxide dependent formation of chromogen from chloronaphthol or dianisidine. Other peroxidase functions, oxidation of IAA and nicotinamide adenine dinucleotide phosphate, reduced (NADPH) were catalyzed by intact roots and were stimulated by Mn(2+) and p-coumarate. Oxidation of NADPH involved superoxide anion (O2-) and hydrogen peroxide formation. Molecular sizing chromatography of root washes demonstrated NADPH oxidase and peroxidase to be associated with higher wt. components than IAA oxidase. Root surface and root wash peroxidase displayed optimal activity between pH 7 and 8, whereas both sources of IAA oxidase were more active at acidic pH. Native polyacrylamide gel electrophoresis of sterile root washes displayed 2 fast-moving anodic bands, whereas homogenates of the plant roots had several slower moving bands in addition. (AS)

0015

27329 ANDRIOLO, S. ; ROUANET, J-M.; LAFONT, J.; BESANCON, P. 1984. Inactivation of phaseolamin, and alfa-amylase inhibitor from Phaseolus vulgaris by gastric acid and digestive proteases. Nutrition Reports International 29(1):149-156. En., Sum. En., 15 Ref., Il. [Laboratoire de Physiologie de la Nutrition, USTL, 34060 Montpellier, France]

Phaseolus vulgaris. Inhibitors. Antinutritional factors. Enzymes. France.

An attempt is made to explain the inefficiency of phaseolamin, an alpha-amylase inhibitor from Phaseolus vulgaris, on in vivo starch digestion. In vitro digestion of phaseolamin by some proteases from the digestive tract of bovines was tested. Pepsin was ineffective, but the inhibitory activity was denatured by acidity below pH 3.0. Furthermore, although unaffected by trypsin, this activity was entirely destroyed by chymotrypsin within 2 h at pH 8.1 when the wt. ratio (protease vs. phaseolamin extract) was 1:50. (AS)

0016

27205 ASARE-BOAMAH, N.K. ; FLETCHER, R.A. 1986. Protection of bean seedlings against heat and chilling injury by triadimefon. Physiologia Plantarum 67(3):353-358. En., Sum. En., 26 Ref., Il. [Dept. of Environmental Biology, Univ. of Guelph, Guelph, Ontario N1G 2W1, Canada]

Phaseolus vulgaris. Temperature. Chlorophyll. Plant injuries. Shoots. Chemical control. Plant physiological disorders. Canada.

Triadimefon, a triazole fungicide which protects bean plants from heat and chilling injury, was studied. When the plants of bean cv. Spring Green were exposed to heat shock by dipping the shoots in hot (50 degrees Celsius) distilled water for 2 min or exposing the plants to cold (1 degree Celsius) for 8 h, the primary leaves showed visual symptoms of injury 2 days after treatment and thereafter there was a progressive decline in chlorophyll and an increase in electrolyte leakage indicative of a loss of membrane integrity. There was a loss of metabolic (respiratory) activity in the root meristems when the roots were dipped in hot (48 degrees Celsius) water. All these symptoms of heat and chilling injury in the controls were either delayed or prevented by root application of triadimefon. (AS)

0017

27209 AZIZ, Z.A. ; DRENNAN, D.S.H. 1983. The contributions of pods of Phaseolus vulgaris (L) as photosynthetic sites. MARDI Research Bulletin 11(1):57-61. En., Sum. En., Mal., 8 Ref. [Malaysian Agricultural Research & Development Inst., Field Crops Branch, Serdang, Selangor, Malaysia]

Phaseolus vulgaris. Pods. Photosynthesis. Plant assimilation. United Kingdom.

The photosynthetic capabilities of bean pods of different sizes and their contribution during the reproductive phase were investigated at the Department of Agriculture Botany, U. of Reading, England. Results indicated that bean pods did contribute some of the fixed assimilates through photosynthesis for their own development. When whole plants (except the pods) were labelled, 60 percent of (14)C-assimilates was found in the pods; when only the pods were labelled, 72 percent of (14)C assimilates was found in the pods. (CIAT)

0018

27271 CLIFFORD, P.E. ; OFFLER, C.E.; PATRICK, J.W. 1986. Growth regulators have rapid effects on photosynthate unloading from seed coats of Phaseolus vulgaris L. Plant Physiology 80(3):635-637. En., Sum. En., 28 Ref., Il. [Botany Dept., The Queen's Univ. of Belfast, Belfast, Northern Ireland B17 1NN]

Phaseolus vulgaris. Plant growth substances. Seed coat. Plant physiological processes. Australia.

Of 9 plant growth regulators (IAA, NAA, GA3, gibberellin 4/7, BAP, 6-furfurylaminopurine, abscisic acid, and 1-aminocyclopropane carboxylic acid) tested, only BAP and abscisic acid affected (14)C-photosynthate unloading from excised seed coats of Phaseolus vulgaris. Unloading, in the presence of KCl, was stimulated by 25-40 percent. Stimulation occurred immediately for BAP and for abscisic acid within 10-12 min of application. (AS)

0019

27274 ELLENSON, J.L. 1986. Flash-induced delayed light emission patterns of red kidney bean leaves: evidence of a new component dependent upon tissue integrity. Plant Physiology 80(4):988-991. En., Sum. En., 12 Ref., Il. [Boyce Thompson Inst. for Plant Research, Cornell Univ., Ithaca, NY 14853, USA]

Phaseolus vulgaris. Light. Photoperiod. Leaves. Enzymes. Plant physiology. USA.

Studies of flash-induced delayed light emission profiles of dark-adapted intact bean tissues revealed a previously unreported component of plant luminescence. Only partially evident in intact chloroplasts and totally absent in broken chloroplasts, this peak may reflect the interaction of one or more light-activated enzyme systems with photosynthetic electron transport. (AS)

0020

26568 GUSTAFSON, S.W. 1984. Effects of CO2 enrichment during flowering and podfill on net photosynthesis, dry matter accumulation and yield of beans, Phaseolus vulgaris L. Ph.D. Thesis. Corvallis, Oregon State University. 105p. En., Sum. En., 110 Ref., Il

Phaseolus vulgaris. Snap beans. CO2. Flowering. Podding. Photosynthesis. Dry matter. Yields. Yield components. USA.

Available photosynthate was increased during flowering and/or pod fill in order to examine its role as a limiting factor in DM accumulation, pod set, and seed yield in beans. Also, photosynthesis and other physiological

parameters of a single leaf were monitored during the reproductive period to better assess the response to enrichment. Bush snap bean cv. Oregon 1604, grown in the field or outside in containers, was exposed to CO2 in open top chambers at either 300 microliters/liter (control) or 1250 microliters/liter (enrichment) during day-light hours from flowering to seed maturity, over a period of 45 (field) or 35 (container) days. Enrichment with CO2 increased net photosynthesis 3.6-fold in the field and 2.5-fold in the containers over the controls. Enhancement of net photosynthesis was maintained despite large accumulations of leaf starch and a 50 percent decrease in leaf conductance. Specific leaf wt. of enriched leaves was approx. 40 percent higher than that of controls at or before pod maturity in field plants, but the difference was not significant at seed maturity. (CIAT)

0021

27250 HUBER, S.C. ; KERR, P.S.; RUFTY, T.W. 1985. Diurnal changes in sucrose phosphate synthase activity in leaves. Physiologia Plantarum 64(1):81-87. En., Sum. En., 19 Ref., Il. [United States Dept. of Agriculture, Agricultural Research Service, Depts. of Botany & Crop Science, Box 7631, North Carolina State Univ., Raleigh, NC 27695-7631, USA]

Phaseolus vulgaris. N. Leaves. Photosynthesis. USA.

Identification and comparison of diurnal changes in sucrose phosphate synthase activity were performed in leaves of beans, peas, soybeans, maize, groundnuts, tobacco, cucumbers, and tomatoes grown with a 15-h photoperiod. A marked decrease in sucrose phosphate synthase activity at 03 00 h compared with 15 00 h was observed in cucumber, bean, peas, and maize. Peaks of sucrose phosphate synthase activity were observed in maize, pea, soybean, and cucumber leaves during a 24-h period. In all species activity was greater in newly expanded leaves. (AS (extract))

0022

27285 ITO, O. ; MITSUMORI, F.; TOTSUKA, T. 1985. Effects of NO2 and O3 alone or in combination on kidney bean plants (Phaseolus vulgaris L.): products of (13)CO2 assimilation detected by (13)C nuclear magnetic resonance. Journal of Experimental Botany 36(163):281-289. En., Sum. En., 21 Ref., Il. [National Inst. for Environmental Studies, Yatabe, Tsukuba, Ibaraki 305, Japan]

Phaseolus vulgaris. Leaves. NO2. Ozone. Photosynthesis. CO2. Plant assimilation. C. Sucrose. Amino acids. Japan.

The effect of exposure of primary leaves of Phaseolus vulgaris to NO2 and O3, alone or in combination, on the fate of (13)CO2 assimilated by photosynthesis was examined by (13)C-nuclear magnetic resonance. Over 70 peaks appeared in the spectra for substances in leaf extracts in 80 percent ethanol. The 16 relatively well resolved peaks corresponded to signals from 3 sugars, 2 organic acids, and 4 amino acids. Pool sizes and (13)C incorporation values were estimated from the signals. Exposure to NO2 and O3 increased sucrose and fructose concn. but not the (13)C incorporation during 10 min photosynthesis, suggesting the presence of photosynthetically inactive pools of sucrose and fructose. Amounts of glycine and serine, and (13)C incorporation into them, were increased by exposure to pollutants. (13)C incorporation into alanine was stimulated by exposure to NO2, with or without O3, but not by exposure to O3 alone. (AS)

0023

27413 KUNISADA, T. ; YAMAGISHI, H.; KINOSHITA, I.; TSUJI, H. 1986. Amplification of extrachromosomal circular DNA in intact bean leaves treated with benzyladenine. Plant and Cell Physiology 27(2):355-36'. En., Sum. En., 25 Ref., Il. [Dept. of Biophysics, Faculty of Science, Kyoto Univ., Kyoto 606, Japan]

Phaseolus vulgaris. Leaves. DNA. Chloroplasts. Plant physiological processes. Japan.

Bean leaves were treated with benzyladenine beginning 7 days after sowing, and were harvested at 21 days. There were less than 10 molecules/cell of small polydisperse circular (spc) DNA in mesophyll cells from untreated leaves, and more than 30 molecules in the benzyladenine-treated cells. The spcDNA ranged in size from 0.2 to 7.5 microns, with a mean length of 1.7 microns. (AS)

0024

22515 LEE, Y.H. ; MOK, M.C.; MOK, D.W.S.; GRIFFIN, D.A.; SHAW, G. 1985. Cytokinin metabolism in Phaseolus embryos. Genetic difference and the occurrence of novel zeatin metabolites. Plant Physiology 77(3):635-641. En., Sum. En., 32 Ref., Il. [Dept. of Horticulture, Oregon State Univ., Corvallis, OR 97331, USA]

Phaseolus vulgaris. Embryo. Cytokinins. Metabolism. Plant physiology. USA.

The metabolism of trans-(8-(14)C)zeatin was examined in embryos of Phaseolus vulgaris cv. Great Northern and P. lunatus cv. Kingston in an attempt to detect genetic variations in organized plant tissues. Five major metabolites were recovered from P. vulgaris embryo extracts: ribosylzeatin, ribosylzeatin 5' monophosphate, an O-glucoside of ribosylzeatin, and 2 novel metabolites, designated as I and II. On the basis of results of degradation tests and gas chromatography-mass spectrometry analyses, I and II were tentatively identified as O-ribosyl derivatives of zeatin and ribosylzeatin. In embryos of P. lunatus, however, metabolites I and II were not present. The major metabolites were ribosylzeatin, ribosylzeatin 5'-monophosphate, and the O-glucosyl derivatives of zeatin and ribosylzeatin. The zeatin metabolites recovered were the same for embryos of different sizes but their quantities varied with embryo size and incubation time. The genetic differences appeared to be embryo-specific and potentially useful in the studies of the possible relationship between abnormal interspecific hybrid embryo growth and hormonal derangement in Phaseolus. In addition, it is suggested that analyses of both organized (intact) and unorganized (callus) tissues of the same genotype may provide an opportunity to address the problem of differential expression of genes regulating cytokinin metabolism during plant development. (AS)

0025

27280 PECHAN, P.M. ; WEBSTER, B.D. 1986. Seed and pod set of Red Kidney beans. Journal of the American Society for Horticultural Science 111(1):87-89. En., Sum. En., 14 Ref., Il. [Genetic Eng. Sec., Building #21, Ottawa Research Station, Ottawa, Canada K1A 0C6]

Phaseolus vulgaris. Pods. Seed. Abscission. Podding. Anthesis. Plant fertility. Plant reproduction. Pollen. USA.

Plants of Phaseolus vulgaris Red Kidney were studied under controlled environmental conditions to determine the effect of prefertilization events on seed and pod set. These were analyzed on flowers of the terminal raceme at anthesis and 7 days postanthesis. Microscopic examination of pollen indicated that less than 7 percent of the grains were aborted and that a significant no. of grains germinated on the stigma to ensure fertilization of all ovules within an ovary. All ovules observed were fertilized; the no. of ovules/ovary was 4 or 5. Results indicate that the discrepancy between the no. of ovules and the final seed no./pod is due to seed abortion rather than to ovules abortion. Pod abortion appears to be a consequence of postfertilization processes. (AS)

0026

27216 PURANIK, R.M. ; SRIVASTAVA, H.S. 1985. Increase in nitrate reductase activity in bean leaves by light involves a regulator protein. Agricultural and Biological Chemistry 49(7):2099-2104. En., Sum. En., 25 Ref., Il. [Dept. of Biochemistry, Holkar Science College, Indore 452001, India]

Phaseolus vulgaris. Light. Enzymes. Proteins. India.

Nitrate reductase activity, assayed either in vivo or in vitro, was considerably higher in bean leaves from 7-day-old light-grown seedlings than those from dark-grown seedlings, both in the absence as well as presence of nitrate. Cytochrome c reductase activity was, however, similar in both regimes, while peroxidase was lower in light than in dark. The light-stimulated increase in nitrate reductase activity in leaf segments from dark-grown seedlings was inhibited by cycloheximide, dinitrophenol, chloramphenicol, and sodium tungstate and was unaffected by lincomycin and 3(3,4-dichloro-phenyl)-1,1 dimethyl urea (DCMU). Under similar conditions, the increase in total chlorophyll was inhibited completely by cycloheximide and dinitrophenol, partially by chloramphenicol and lincomycin, and was unaffected by tungstate and DCMU. A supply of 1-5 millimolar reduced glutathione increased enzyme activity in the dark and also to some extent in light. The substrate induction of enzyme activity started after a lag of 1 h in light or dark and continued for either 5 h in the dark or 8 h in light. Two proteinaceous inhibitors (Factors I and II) of nitrate reductase were isolated by ammonium sulfate precipitation and Sephadex gel filtration. The amount of Factor I was higher in the dark than in light. The amount and activity of Factor II was, however, almost equal in light and dark. The inhibition of enzyme activity by these inhibitors increased with their concn. It is proposed that light increases nitrate reductase activity by decreasing the amount of a nitrate reductase inhibitor. (AS)

0027

27291 ROBERT, F.M. ; WONG. P.P. 1986. Isozymes of glutamine synthetase in Phaseolus vulgaris L. and Phaseolus lunatus L. root nodules. Plant Physiology 81(1):142-148. En., Sum. En., 22 Ref., Il. [Division of Biology, Kansas State Univ., Manhattan, KS 66506, USA]

Phaseolus vulgaris. Enzymes. Cultivars. Nodulation. Plant physiological processes. USA.

The glutamine synthetase (GS) isozymes in the plant fraction of nodule extracts from 62 Phaseolus vulgaris cv. and 1 P. lunatus cv. were analyzed by polyacrylamide gel electrophoresis. All P. vulgaris nodule extracts displayed 2 GS activity bands: a nodule-specific band (GSn1) and a band (GSn2) similar to the single band (GSr) present in root extracts. In contrast to P. vulgaris, the GSn2 band and the GSr band of P. lunatus appeared to be different. The electrophoretic mobility of the GSn1 band in P. vulgaris was governed by both the plant cv. and the development stage of the nodule. In nodule extracts of P. vulgaris and P. lunatus, the zone of GSn1 activity coincided with 6-9 distinct protein bands as revealed after treatment of gels, which had previously been stained for GS activity, with Coomassie blue. All these protein bands were shown to consist of polypeptides of identical mol. wt. (approx. 47,000 daltons) by SDS-polyacrylamide gel electrophoresis. Results indicate that P. vulgaris continuously generates isozymes of GSn1 of increasing electrophoretic mobility during the course of nodule development. (AS)

0028

27431 SCHUMACHER, T.E. ; SMUCKER, A.J.M. 1985. Carbon transport and root respiration of split root systems of Phaseolus vulgaris subjected to short term localized anoxia. Plant Physiology 78(2):359-364. En., Sum. En., 30 Ref., Il. [Dept. of Plant Science, South Dakota State Univ., Brookings, SD 57007, USA]

Phaseolus vulgaris. Roots. Cultivars. Plant respiration. Growth. CO2. USA.

The influence of anoxia on C transport and root respiration was evaluated by applying (U-(14)C)sucrose to the foliage. Translocation patterns to the root systems of 2 dry edible bean genotypes were examined after a 3-day exposure to aerated and nonaerated environments. Localized anoxia of root systems was simulated by growing roots in split configurations and exposing half of the system to anoxic conditions. Anoxia of the root system for 72 h reduced the movement of (14)C label into the roots with concurrent accumulations in the hypocotyl region. The translocation of (14)C label to anoxic roots was less than 50 percent of the aerated controls of both genotypes. Most of the (14)C label translocated to anoxic root systems was excluded from respiratory metabolism during the 3-h pulse/chase period and was an order of magnitude less than the aerated controls. These observations suggest that the bulk of (14)C label which entered the root during the anoxic period was unavailable for metabolism by the enzymes of glycolysis and/or was diluted by a relatively large metabolite pool. A higher percentage of (14)C label was translocated to the aerated half of the localized anoxia treatment relative to the half of the aerated controls. The proportion of (14)C label translocated to the root system in the aerated control was 20 and 16 percent compared with 28 and 25 percent in the aerated localized anoxia treatment for the genotypes Seafarer and line 31908, resp. Line 31908 partitioned a greater percentage of (14)C-labeled compounds to the actively growing fraction of the root system in the localized anoxia treatment than did Seafarer. This suggests a greater reliance on previously stored carbohydrate for immediate root growth in Seafarer than in line 31908. (AS)

0029

27222 SHARKEY, T.D. ; SEEMANN, J.R.; BERRY, J.A. 1986. Regulation of ribulose-1,5-bisphosphate carboxylase activity in response to changing partial pressure of O2 and light in Phaseolus vulgaris. Plant Physiology 81(3):788-791. En., Sum. En., 30 Ref. [Biological Sciences Center, Desert Research Inst., P.O. Box 60220, Reno, NV 89506, USA]

Phaseolus vulgaris. Photosynthesis. CO2. Light. USA.

The regulation of ribulose-1,5-bisphosphate (RuBP) carboxylase (rubisco) activity in Phaseolus vulgaris was studied under moderate CO2 and high light, conditions in which photosynthesis in C3 plants can be insensitive to changes in O2 partial pressure. Steady state RuBP concn. were higher, the calculated rate of RuBP use was lower and the activation state of rubisco was lower in low O2 relative to values observed in normal O2. It is suggested that the reduced activity of rubisco observed here is related to feedback effects which occur when the rate of net CO2 assimilation approaches the max. capacity for starch and sucrose synthesis (triose phosphate utilization). The activation state of rubisco was independent of O2 partial pressure when light of CO2 was limiting for photosynthesis. Reduced activity of rubisco was also observed at limiting light. However, in this species light-dependent changes in the concn. of an inhibitor of rubisco controlled the apparent Vmax of rubisco in low light while changes in the CO2-Mg(2+) dependent activation of rubisco controlled the apparent Vmax in high light. (AS)

0030

27312 SHARKEY, T.D. ; BERRY, J.A.; RASCHKE, K. 1985. Starch and sucrose synthesis in Phaseolus vulgaris as affected by light, CO2, and abscisic acid. Plant Physiology 77(3):617-620. En., Sum. En., 20 Ref., Il. [Biological Sciences Center, Desert Research Inst., P.O. Box 60220, Reno, NV 89506, USA]

Phaseolus vulgaris. Light. CO2. Photosynthesis. Sucrose. Starch content. Plant assimilation. USA.

The ratio of starch to sucrose synthesis was found to be constant in Phaseolus vulgaris leaves supplied with CO2 under a range of light intensities. Disruption of the control of photosynthetic metabolism by treatment with ABA or high CO2 levels combined with low O2 did not affect the sucrose:starch formation ratio. (CIAT)

0031

27440 SIFFEL, P. ; LEBEDEV, N.N.; SESTAK, Z. 1985. Changes in chloroplast absorption and fluorescence spectra during ontogeny of primary bean leaves. Photosynthetica 19(2):127-137. En., Sum. En., 39 Ref., Il. [Inst. of Experimental Botany, Czechoslovak Academy of Sciences, Flemingovo n.2, CS-160 00 Praha 6, Czechoslovakia]

Phaseolus vulgaris. Chloroplasts. Leaves. Chlorophyll. Photosynthesis. Illumination. Czechoslovakia.

Absorption, fluorescence emission, and excitation spectra of isolated chloroplasts as well as P700 and chlorophyll contents have been measured during ontogeny of primary leaves of intact and decapitated bean plants. Relative concn. of long-wavelength carotenoids (absorbing around 518 nm) and chlorophyll a (absorbing at 708 nm), and long-wavelength fluorescence emission around 735 nm simultaneously increased during leaf ontogeny. The development of the P700 signal did not follow the same kinetics. The long-wavelength carotenoids and chlorophyll a are probably essential for the development of long-wavelength fluorescence emission in chloroplasts and the concn. of these long-wavelength pigments forms are not directly connected with the activity of photosystem 1. (AS)

0032

27255 SIJMONS, P.C. ; LANFERMEIJER, F.C.; DE BOER, A.H.; PRINS, H.B.A.; BIENFAIT, H.F. 1984. Depolarization of cell membrane potential during trans-plasma membrane electron transfer to extracellular electron acceptors in iron-deficient roots of Phaseolus vulgaris L. Plant Physiology 76(4):943-946. En., Sum. En., 26 Ref., Il. [Dept. of Plant Physiology, Univ. of Amsterdam, Kruislaan 318, 1098 SM Amsterdam, Netherlands]

Phaseolus vulgaris. Cell structure. Roots. Mineral deficiencies. Fe. Nutrient transport. Netherlands.

Extracellular ferricyanide and Fe(III)EDTA caused a rapid depolarization of the membrane potential of Phaseolus vulgaris root cells. This was most pronounced in Fe-deficient plants, which showed increased rates of reduction of ferricyanide and FeEDTA. During ferricyanide reduction, protons and K ions were excreted. It was concluded that there was a trans-plasma membrane electron transfer system by which electrons were transferred from nicotinamide adenine dinucleotide phosphate, reduced, for the reduction of extracellular ferric salts. (AS (extract))

0033

27244 WOOLHOUSE, H.W. 1984. The biochemistry and regulation of senescence in chloroplasts. Canadian Journal of Botany 62(12):2934-2942. En., Sum. En., Fr., 81 Ref., Il. [Photosynthesis Group, John Innes Inst., Colney Lane, Norwich, NR4 7UH, England]

Phaseolus vulgaris. Chloroplasts. Aging. Biochemistry. DNA. RNA. Chlorophyll. United Kingdom.

Biochemical events in chloroplast breakdown are reviewed with emphasis on regulation of RNA, lipid, chlorophyll, and protein degradation. A new hypothesis is presented concerning the relationship between proteolysis and the initial steps in chlorophyll breakdown. Species considered include Phaseolus vulgaris, barley, Trifolium pratense, oats, wheat, Festuca pratensis, cucumber, and Petunia, Tradescantia, and Philodendron species. (AS) See also 0253

0034

27258 AGUI, I. ; GOMEZ, M.; PALMA, T.; SKRABONAJA, M.A. 1983. Influencia de la aplicación de EDTA-Fe y arcilla-Fe en judia (Phaseolus vulgaris, L.). 1. Efecto sobre el crecimiento. (Influence of Fe-EDTA and Fe-clay application in beans. 1. Effect on growth). Anales de Edafología y Agrobiología 42(3-4):613-627. Es., Sum. En., Es., 24 Ref., Il.

Phaseolus vulgaris. Nutrient solution. Growth. Fe. Dry matter. Leaves. Spain.

The effects of differents levels of Fe-EDTA and Fe-clay application on plant growth were studied in beans grown hydroponically. Growth parameters determined were fresh and dry wt., leaf surface, leaf no., stem length, and their interrelationships. Significant differences were obtained for the parameters studied. At 25 ppm Fe the effects on the studied parameters were similar, but Fe chelate was more efficient at levels up to 5 ppm than Fe-clay. Optimum levels were 5 ppm for Fe-EDTA and 25 ppm for Fe-clay. (AS)

0035

27284 BARCELO, J. ; POSCHENRIEDER, C.; GUNSE, B. 1986. Water relations of chromium VI treated bush bean plants (Phaseolus vulgaris L. cv. Contender) under both normal and water stress conditions. Journal of Experimental Botany 37(175):178-187. En., Sum. En., 34 Ref., Il. [Depto. de Fisiología Vegetal, Facultad de Ciencias, Univ. Autónoma de Barcelona, Bellaterra, España]

Phaseolus vulgaris. Cr. Water stress. Growth. Resistance. Spain.

The effect of Cr VI on leaf water potential, solute potential, turgor potential, and relative water content of primary and 1st trifoliate leaves of Phaseolus vulgaris was studied under normal growth conditions and during an artificially induced water stress period in order to establish the possible influence of this heavy metal on the water stress resistance of plants. Plants were grown on perlite with nutrient solution containing 0, 1.0, 2.5, 5.0, or 10.0 micrograms Cr/cubic centimeter as $Na_2Cr_2O_7.2H_2O$. The effect of Cr on water relations was highly concn. dependent, and primary and 1st trifoliate leaves were affected differently. The growth reducing concn. of Cr (2.5, 5.0, and 10.0 micrograms/cubic centimeter) generally decreased solute potential and leaf water potential and increased turgor potential in primary leaves. The 1.0 microgram Cr/cubic centimeter treatment did not affect growth, but altered water relations substantially: in primary leaves leaf water potential and turgor potential were increased and solute potential decreased, while in trifoliate leaves the effect was the opposite. All Cr-treated plants resisted water stress for longer than control plants. The higher water stress resistance may be due to the lower solute potential and to the increased cell wall elasticity observed in Cr VI-treated plants. (AS)

0036

27092 BIGOT, J. ; BINET, P. 1986. Etude des capacités d'échange et des sélectivités cationiques de parois isolées des racines de Cochlearia anglica et de Phaseolus vulgaris cultivés sur des milieux diversement salés. (The cationic exchange capacity and the cell wall selectivity of roots of Cochlearia anglica and Phaseolus vulgaris grown in media of ifferent salinities). Canadian Journal of Botany 64(5):955-958. Fr., Sum. Fr., En., 23 Ref. [Laboratoire de Physiologie Végétale, Unité d'enseignement et de Recherche de Sciences, Université de Caen, Caen, France]

Phaseolus vulgaris. Cell walls. Salinity. Nutrient solution. Nutrient uptake. Ca. Mg. K. Na. Plant nutrition. France.

Cochlearia anglica (halophyte) and Phaseolus vulgaris (glycophyte) were grown in media of different salinities. The root cell walls were isolated and then equilibrated with various salt solutions. There were differences between cell walls from C. anglica and P. vulgaris in both the CEC (computed by the sum of parietal cations) and the cell wall selectivity (evaluated by the centesimal proportion of each cation). In cell walls from plants grown without NaCl, the no. of exchange sites was greater for the halophyte than for the glycophyte. Growing the plants on 42 and 85 millimolar NaCl medium reduced or reversed the disparities between the 2 species: with C. anglica, the cell wall CEC decreased when the growth medium salinity increased whereas this capacity tended to rise for P. vulgaris. The culture medium salinity, however, did not affect the cell wall selectivity of these species for major cations. For Ca(2+), the selectivity of cell walls from P. vulgaris was higher than that of cell walls from C. anglica; for the other cations, the situation was reversed. (AS)

0037

27275 DUBOIS, J.D. ; BURRIS, R.H. 1986. Comparative study of N uptake and distribution in three lines of common bean (Phaseolus vulgaris L.) at early pod filling stage. Plant and Soil 93(1):79-86. En., Sum. En., 12 Ref., Il. [Dept. of Biochemistry, Univ. of Wisconsin-Madison, 420 Henry Mall, Madison, WI 53706, USA]

Phaseolus vulgaris. N. Nitrogen fixation. Nutrient uptake. Cultivars. Developmental stages. USA.

The uptake and distribution of (15)NH4(+), (15)NO3(-), and (15)N2 were studied in greenhouse-grown beans with a commercial cv. and 2 recombinant inbred backcross lines; (15)N was supplied in the nutrient solution at the R3 (50 percent bloom) stage. Plants were harvested 1, 5, and 10 days after treatment, and were separated into nodules, roots, stems, mature leaflets, immature leaflets, and flowers/fruits. All 3 lines showed rapid increases in the N content of flowers/fruits after the R3 stage; however, the percentage N in these tissues decreased after the R3 stage. One of the recombinant lines showed a greater uptake of NH4(+) than the other 2 lines. Rates of (15)N2 fixation and NO3(-) uptake were similar for all 3 lines. N2 fixation estimated from total N content showed the 2 recombinant lines with 24 and 34 percent greater activity than the commercial cv. Distribution of (15)N at the whole plant level was similar for all 3 lines for a similar N source. (15)NO3(-) was transported 1st to leaflets and the label then moved into flowers/fruits. Transport of fixed N2 was from the nodules to roots, stems, and flowers/fruits; usually less than 10 percent entered the leaflets. This indicates that N2 fixation furnishes N directly to flowers/fruits with over 50 percent of the fixed N being deposited into flowers/fruits within 5 days after treatment. (AS)

0038

27203 GARG, O.K. ; HEMANTARANJAN, A.; RAMESH, C. 1986. Effect of iron and zinc fertilization on senescence in French bean (Phaseolus vulgaris L.). Journal of Plant Nutrition 9(3-7):257-266. En., Sum. En., 26 Ref. [Dept. of Plant Physiology, Inst. of Agricultural Sciences, Banaras Hindu Univ., Varanasi-221005, India]

Phaseolus vulgaris. Snap beans. Fertilizers. Fe. Zn. Chlorophyll. Growth. Yields. India.

In greenhouse expt., applications of Fe and/or Zn in the form of ferrous sulphate and zinc sulphate induced increased chlorophyll a and b concn., IAA, nitrate reductase activity, and DM yield of French bean plants. Fe and Zn combined were more effective in delaying leaf senescence compared with controls. Chlorophyll destruction was more rapid at the postflowering stage in control plants, leading to early senescence and reduced photosynthetic duration. A rapid decline in nitrate reductase activity and IAA concn. in

control plants after the 50-day growth stage further induced senescence. Fe alone and combined with Zn appeared to contribute to the inhibition of senescence in French bean plants. (AS)

0039

27100 HURLEY, A.K. ; JOLLEY, V.D.; BROWN, J.C.; WALSER, R.H. 1986. Response of dry beans to iron deficiency stress. Journal of Plant Nutrition 9(3-7):805-814. En., Sum. En., 12 Ref., Il. [Dept. of Agronomy & Horticulture, Brigham Young Univ., Provo, UT 84602, USA]

Phaseolus vulgaris. Cultivars. Fe. Mineral deficiencies. Yields. USA.

Two dry bean cv., one susceptible (PI-165078) and one resistant (Great Northern Valley) to Fe-deficiency chlorosis in the field, were grown in a modified Hoagland solution in a growth chamber under varying degrees of Fe stress (0, 0.05, 0.10, and 1.00 mg Fe/liter). Response to Fe-deficiency stress was determined by measuring daily release of H(+) ions and reductant from the roots, leaf chlorophyll, and Fe and Mn concn. in leaves and roots. As the plants responded to Fe stress, both var. released H(+) ions and reductant from their roots, with Great Northern Valley responding sooner than PI-165078. There were generally no significant differences between cv. in chlorophyll concn. The Fe concn. in top leaves was not significantly different between cv. at solution Fe levels below 1 mg/liter. There was some indication that Great Northern Valley might be more Fe-efficient at the 0.05 mg Fe/liter treatment than PI-165078, but these 2 dry bean cv. are similar enough in their response to Fe-deficiency stress for both to be designated Fe-efficient. (AS)

0040

27396 KEEFER, R.F. ; SINGH, R.N.; HORVATH, D.J. 1986. Chemical composition of vegetables grown on an agricultural soil amended with sewage sludges. Journal of Environmental Quality 15(2):146-152. En., Sum. En., 25 Ref. [Division of Plant & Soil Sciences, Box 6108, West Virginia Univ., Morgantown, WV 26506, USA]

Phaseolus vulgaris. Snap beans. Soil amendments. Zn. Cd. Nutrient uptake. USA.

Heavy metals were analyzed in edible and nonconsumable parts of radish, carrots, cabbage, green beans, sweet corn, and tomatoes grown on a sandy loam soil to which 4 sewage sludges were applied in the field (Point Pleasant, West Virginia, USA) at 90 and 180 t/ha. Results (tabulated in detail) indicated that Cd, Cr, and Pb concn. in the edible parts of the vegetables from sludge-treated plots were no more than 1.0 mg/kg above those from the untreated control plots. Ni concn. in vegetables from plots receiving 2 of the sludges were significantly higher than in the controls for both edible and nonconsumable parts of most of the vegetables grown. More Ni was absorbed by vegetables grown on a plot treated with a sludge that was relatively low in total Ni (270 mg/kg) than with a sludge that contained more than 47 times as much total Ni. Cu and Zn levels in vegetables grown on some sludge-treated soils were elevated; however, these were not high enough to cause alarm. (AS (extract))

0041

27412 LANG, A. ; THORPE, M.R. 1986. Water potential, translocation and assimilate partitioning. Journal of Experimental Botany 37(177):495-503. En., Sum. En., 38 Ref., Il. [Physics & Engineering Laboratory, Dept. of Scientific & Industrial Research, Private Bag, Lower Hutt, New Zealand]

Phaseolus vulgaris. Translocation. Osmotic potential. Nutrient uptake. New Zealand.

The effect of water status on translocation and assimilate partitioning is examined both from theory and in an expt. with young Phaseolus plants.

Theory predicts that translocation is unlikely to be directly affected by water status; however, water potential differences within plants should influence translocation flow, with regions at lower potentials attracting disproportionately large shares of assimilate. This prediction is supported in the expt. with Phaseolus in which the pattern of partitioning in the root changed rapidly in response to bathing portions of it in solutions of different osmolarity. The relevance of these findings to the growth of plants under natural conditions is considered and evidence is presented that water potential gradients may be an important factor in the control of partitioning. (AS)

0042

27309 PAZ, L.G. DA ; RUSCHEL, A.P.; MALAVOLTA, E. 1982. Efeito do N combinado, do pH e dos níveis de P, Ca, Al e Mn na solucao no crescimento e fixacao do N2 pelo feijoeiro (Phaseolus vulgaris L.). (Effect of combined N, pH, and P, Ca, Al, and Mn concentrations in a culture solution on growth and N2 fixation in beans). Anais da Escola Superior de Agricultura Luiz de Queiroz 39(1):189-201. Pt., Sum. Pt., En., 9 Ref., Il. [Faculdade de Medicina Veterinária, Univ. Federal de Ceará, Fortaleza-CE, Brasil]

Phaseolus vulgaris. N. Nitrogen fixation. Ca. Al. Mn. Growth. Nodulation. pH. Brazil.

In solution culture expt. with bean cv. Carioca, Rico 23, and Venezuela, the effects of sodium nitrate at 0-42.0 ppm, pH values of 4.0, 5.0, 6.0, and 7.0, Ca concn. of 0.4-125.0 ppm, and P concn. of 0.3-75.0 ppm were investigated. Growth was promoted by increase in N concn. whereas nodule dry wt. and nitrogenase activity were highest at 4.2 ppm nitrate. Nodulation and nitrogenase activity were highest at pH 6.0. DM production increased with increase in pH. Nitrogenase activity was highest at 10 ppm Ca; nodulation and DM production were highest at 50 ppm. Response of nodule dry wt. and plant DM production to P was approx. linear. At concn. above 37.5 ppm P, nitrogenase activity decreased; 5 ppm Al and 10 ppm Mn decreased nodulation, root growth, and N fixation. (CIAT)

0043

27099 PIERSON, E.E. ; CLARK, R.B.; COYNE, D.P.; MARANVILLE, J.W. 1986. Iron deficiency stress effects on total iron in various leaves and nutrient solution pH in sorghum and beans. Journal of Plant Nutrition 9(3-7):893-907 . En., Sum. En., 27 Ref., Il. [Depts. of Agronomy & Horticulture, Univ. of Nebraska, Lincoln, NE 68583, USA]

Phaseolus vulgaris. Fe. Mineral deficiencies. Nutrient solution. pH. USA.

Total Fe concn. in upper (newly developing), middle, and lower leaves of sorghum and dry bean plants, grown with and without Fe, were determined for each of the 25 or 27 days plants were grown in treatment nutrient solutions. Lower and middle leaves of sorghum had higher Fe concn. than upper leaves, but upper, middle, and lower leaves of bean had relatively uniform Fe concn. Daily fluctuations of Fe were noted in each group of leaves. Changes in nutrient solution pH were not related to the alleviation of Fe deficiency stress in sorghum, but pH changes appeared to be related to Fe deficiency stress in beans. Fe did not appear to be remobilized from lower to upper leaves in sorghum, but some alleviation of Fe deficiency was noted in beans even though nutrient solutions received no Fe. Rapid increases of Fe accumulation in all leaves were noted in both sorghum and bean when plants received Fe after being in an Fe deficiency stress condition for several days. Beans appeared to have internal mechanisms for alleviating Fe deficiency stress which were not exhibited by sorghum. (AS)

0044

27430 RAMANI, S. ; KANNAN, S. 1985. Studies on translocation of zinc in bean plants: evidence for retranslocation during new growth. Journal of Plant Physiology 121(4):313-318. En., Sum. En., 16 Ref., Il. [Plant Nutrition Section, Nuclear Agriculture Division, Bhabha Atomic Research Centre, Bombay 400085, India]

Phaseolus vulgaris. Zn. Translocation. Nutrient transport. Nutrient uptake. India.

The absorption and transport of Zn in young bean plants were studied during a short absorption period of 24 h. Zn was supplied as 50 micromolar $ZnCl_2$, ZnEDTA, or ZnEDDHA (Zn ethylene diamine di(O)dihydroxyacetate). Root absorption was found to be more from $ZnCl_2$ than from the chelated forms. Translocation to the stem and new buds was more than to the primary leaves. In another expt., retranslocation to newer organs was examined by excising the roots after a 24 h absorption of Zn from $ZnCl_2$ or ZnEDDHA, and removing the terminal buds in some plants. The retranslocation of Zn was measured in the newly grown roots and trifoliates after growing the plants in the nutrient medium for 7 days. The results confirm the finding that the stem acts as a source for subsequent retranslocation to the developing trifoliates and the new shoot, thus forming the sink. (AS)

0045

27223 RIC DE VOS, C. ; LUBBERDING, H.J.; BIENFAIT, H.F. 1986. Rhizosphere acidification as a response to iron deficiency in bean plants. Plant Physiology 81(3):842-846. En., Sum. En., 32 Ref., Il. [Dept. of Plant Physiology, Univ. of Amsterdam, Kruislaan 318, 1098 SM Amsterdam, The Netherlands]

Phaseolus vulgaris. Nutrient solution. Mineral deficiencies. Fe. Enzymes. Rhizosphere. pH. Netherlands.

Citrate and malate were found to accumulate in bean var. Prélude, not because of a lack of the Fe-containing enzyme aconitase, but in close coupling to the extrusion of protons during rhizosphere acidification, one of the Fe-efficiency reactions of dicotyledonous plants. When proton excretion was induced in roots of control bean plants by addition of fusicoccin, only malate, not citrate, was accumulated. It is proposed that Fe deficiency induces production of organic acids in the roots, which, in beans, leads to both proton excretion and an increased capacity to reduce ferric chelates via the induced electron transfer system in the root epidermis cells. (AS)

0046

27226 SRIVASTAVA, H.S. ; ORMROD, D.P. 1986. Effects of nitrogen dioxide and nitrate nutrition on nodulation, nitrogenase activity, growth, and nitrogen content of bean plants. Plant Physiology 81(3):737-741. En., Sum. En., 27 Ref. [Dept. of Bio-Sciences, Maharshi Dayanand Univ., Rohtak-124001, India]

Phaseolus vulgaris. N. Nodulation. Acetylene reduction. Growth. Shoots. Mineral content. Nitrogen fixation. Plant nutrition. Canada.

The influence of nutrient nitrate level (0-20 milimolar) on the effects of NO_2 (0-0.5 ppm) on nodulation and in vivo acetylene reduction activity of the roots and on growth and nitrate and Kjeldahl N concn. in shoots was studied in bean cv. Kinghorn Wax plants. Exposing 8-day-old seedlings for 6 h each day, for 15 days, to 0.02-0.50 ppm NO_2 decreased total nodule wt. at 0 and 1 millimolar nitrate, and nitrogenase (acetylene reduction) activity at all concn. of nitrate. The pollutant had little effect on root fresh or dry wt. Shoot growth was inhibited by NO_2. The NO_2 exposure increased nitrate concn. in roots only at 20 millimolar nutrient nitrate. Exposure to NO_2 markedly increased Kjeldahl N concn. in roots but generally decreased that in shoots. The expt. demonstrated that nutrient N level and

NO2 concn. act jointly in affecting nodulation and N fixing capability, plant growth and composition, and root/shoot relationships of bean plants. (AS)

0047

27272 VAN ASSCHE, F. ; CLIJSTERS, H. 1986. Inhibition of photosynthesis in Phaseolus vulgaris by treatment with toxic concentrations of zinc: effects on electron transport and photophosphorylation. Physiologia Plantarum 66(4):717-721. En., Sum. En., 31 Ref., Il. [Limburgs Univ. Centrum, Univ. Campus, B-3610 Diepenbeek, Belgium]

Phaseolus vulgaris. Nutrient solution. Zn. Translocation. Plant physiological disorders. Plant physiology. Belgium.

The effect of the absorption of toxic amounts of Zn(2+) by beans in vivo on photosynthetic electron transport and photophosphorylation was studied. Dwarf bean cv. Limburgse Vroege was grown on a nutrient medium containing a toxic nonlethal ZnSO4 concn. Electron transport was significantly inhibited by Zn(2+) treatment. Photosystem 2 activity proved to be more sensitive than photosystem 1 activity. Inhibition was dependent on electron flow rate. Noncyclic photophosphorylation capacity was also limited as a result of inhibition of electron transport. Phosphorylation efficiency (ATP/2e ratio) involving both energy conserving sites was hardly affected. (CIAT)

0048

27201 ZAITER, H.Z. ; COYNE, D.P.; CLARK, R.B.; NULAND, D.S. 1986. Field, nutrient solution and temperature effect upon iron leaf chlorosis of dry beans (Phaseolus vulgaris L.). Journal of Plant Nutrition 9(3-7):397-415. En., Sum. En., 24 Ref., Il. [Depts. of Horticulture & Agronomy, Univ. of Nebraska, Lincoln, NE 68583, USA]

Phaseolus vulgaris. Cultivars. Nutrient solution. Temperature. Fe. Mineral deficiencies. Growth. Chlorosis. Plant nutrition. USA.

One hundred dry bean cv./lines were evaluated for Fe deficiency on a calcareous soil at the U. of Nebraska, USA. Twenty-four cv./lines, varying in resistance and susceptibility to Fe chlorosis, were grown in nutrient solutions in growth chambers and analyzed for total Fe in leaves. Fifteen materials were subsequently screened for Fe chlorosis under field conditions on a calcareous soil. Five of the 15 cv./lines were grown in nutrient solutions under low (21.1/15.6 degrees Celsius) and high (32.2/26.7 degrees Celsius) light/dark temp. regimes, and a photoperiod of 12 h in growth chambers. The cv./lines differed in Fe chlorosis severity, and exhibited high to intermediate resistance and susceptibility. Some of the most resistant cv./lines grown in the field and in nutrient solution tests were Black DCB, Pinto UI 114, LRK 2602, Pinto UI 126, Cranberry (vine), and Pinto ND 912. No correlation was found between the degree of Fe chlorosis and total Fe in leaves. A genotype x environment interaction was noted. The rate of leaf chlorosis development was more rapid and severity of symptoms greater under lower than higher temp. in growth chambers. A genotype x temp. interaction was also noted. The following cv./lines behaved differently under different temp. regimes: Navy NW 11, LRK NW 126, LRK 2602, Stueben Yellow Eye, and G.N. JM 24. (AS (extract)) See also 0069 0073 0094 0095 0233 0325 0327 0334

C02 Plant Development

0049

27027 ASADY, G.H. ; SMUCKER, A.J.M.; ADAMS, M.W. 1985. Seedling test for the quantitative measurement of root tolerances to compacted soil. Crop Science 25(5):802-806. En., Sum. En., 14 Ref., Il.

Phaseolus vulgaris. Roots. Seedlings. Soil compaction. Cultivars. USA.

Some of the primary morphological and physiological root responses of several bean cv. to soil compaction were examined using a rapid and nondestructive soil core seedling test which consists of an experimentally compacted soil having air-filled porosities of 31, 18, and 6 percent. Root penetration ratios were measured 14 days after planting without destroying seedling viability. Root penetration ratios and root lengths declined linearly with decreasing air-filled porosity. Xylem accumulations of toxic anaerobic metabolites were directly correlated with soil bulk density and inversely related to O diffusion rates in the soil. High correlations (r = 0.91) were observed between root penetration ratios of this rapid test and the growth and yield of field-grown Phaseolus vulgaris. (AS)

0050

27090 AZCON-BIETO, J. 1986. Effect of oxygen on the contribution of respiration to the CO2 compensation point in wheat and bean leaves. Plant Physiology 81(2):379-382. En., Sum. En., 29 Ref., Il. [Fisiologia General, Facultat de Biologia, Universitat de Barcelona, Diagonal 645, Barcelona-08028, Spain]

Phaseolus vulgaris. Plant respiration. O. CO2. Australia.

The CO2 compensation point at 21 percent O2 (T21) and at 2 percent O2 (T2), and the rate of dark CO2 efflux at 21 percent O2 (Rn), were studied during the growth period of leaves of bean cv. Hawkesbury Wonder. The values of T21 and Rn were high in young leaves, and decreased rapidly in parallel during maturation. However, T2 presented relatively low values in growing bean leaves, and a model predicted that the observed values of T2 should have been considerably higher if their respiratory component was considered to be as large as that of T21. The results suggest that the rate of respiration in the light contributing to the CO2 compensation point in bean leaves is smaller at low O2 levels than at ambient levels. (AS)

0051

27210 AZIZ, Z.A. ; DHENNAN, D.S.H. 1983. The effects of removing cotyledons and primary leaves on the leaf area and growth of Phaseolus vulgaris (L.). MARDI Research Bulletin 11(2):171-178. En., Sum. En., Mal., 20 Ref. [Malaysian Agricultural Research & Development Inst., Field Crops Branch, Serdang, Selangor, Malaysia]

Phaseolus vulgaris. Cotyledons. Leaves. Leaf area. Abscission. Growth. Seedlings. United Kingdom.

The loss of cotyledons or primary leaves of Phaseolus vulgaris after emergence was investigated. Growth and seedling establishment were affected but the plants usually recovered by the reproductive stage or even earlier. In this expt. the cotyledons seemed relatively more important than primary leaves at establishment. (AS)

0052

26248 BARONA R., G. 1983. Efecto del almacenamiento en un banco de germoplasma sobre la germinación y el contenido de humedad del frijol (Phaseolus vulgaris L.). (Effect of storage in a germplasm bank on the germination and moisture content of beans). Tesis Ing.Agr. Palmira, Universidad Nacional de Colombia. 205p. Es., Sum. Es., 96 Ref., Il.

Phaseolus vulgaris. Plant introductions. Seeds. Storage. Germination. Water content. Seed color. Seed characters. Colombia.

In CIAT's Seed Lab., the effect of storage in a germplasm bank on the germination of bean seeds was determined as well as seed MC and its relationship with germination. A total of 500 bean entries, stored for 2 yr at 0 degrees Celsius, with a seed MC equal to or less than 7 percent and packed in sealed aluminum bags, were used. Seeds were divided into 8 colors (white, cream, yellow, brown, pink, red, purple, and black) and 3 sizes

(small, medium, and big). Material for germination was distributed at a rate of 60 entries/wk. and was evaluated 8 days later by comparing it with normal seedlings. Storage affected the germination of the tested entries; at the end of the 2-yr storage period, these showed a highly significant change. Large, light-colored (white and cream) seeds were the most affected regarding the percentage of normal seedlings; the least affected were the small, pink seeds. Regarding the size of the seeds it was concluded that the percentage of normal seedlings of the big seeds were more affected during storage; the least affected were the small size seeds. In the interaction seed color x size, the combinations of medium-sized, pink- and red-colored seeds, and the small, black- and yellow-colored seeds were the least affected during storage. A high negative correlation between normal seedlings in relation to abnormal seedlings and dead seeds, and a high negative correlation for seed quality were determined. The MC of red-colored seeds was the highest and that of yellow- and purple-colored seeds, the lowest. Small seeds showed the highest moisture percentage. In the interaction color x size, the combination with small-sized seeds showed higher moisture compared with combinations of big-sized seeds of lower moisture. Seed MC and the variables of the germination trial did not correlate in any of the evaluation methods. (AS (extract))

0053

27260 CHATFIELD, J.M. ; ARMSTRONG, D.J. 1986. Regulation of cytokinin oxidase activity in callus tissues of Phaseolus vulgaris L. cv. Great Northern. Plant Physiology 80(2):493-499. En, Sum. En., 24 Ref., Il. [Dept. of Botany & Plant Pathology, Oregon State Univ., Corvallis, OR 97331, USA]

Phaseolus vulgaris. Cytokinins. Plant tissues. Enzymes. USA.

The regulation of cytokinin oxidase activity in callus tissues of Phaseolus vulgaris cv. Great Northern was examined using an assay based on the oxidation of N(6)-(delta(2)-isopentenyl)adenine-8-(14)C(i(6) Ade-8-(14)C) to adenine. Solutions of exogenous cytokinins applied directly to the surface of the callus tissues induced relatively rapid increases in cytokinin oxidase activity. The cytokinin-induced increase in cytokinin oxidase activity was inhibited in tissues pretreated with cordycepin or cycloheximide, suggesting that RNA and protein synthesis may be required for the response. All cytokinin-active compounds tested, including both substrates and nonsubstrates of cytokinin oxidase, were effective in inducing elevated levels of the enzyme in Great Northern callus tissue. The cytokinin-active urea derivative, thidiazuron, was as effective as any adenine derivative in inducing this response. It is possible that thidiazuron may serve as a substrate for cytokinin oxidase, but other mechanisms of inhibition have not yet been excluded. (AS (extract))

0054

26931 COULSON, C.L. 1985. Radiant energy conversion in three cultivars of Phaseolus vulgaris. Agricultural and Forest Meteorology 35(1):21-29. En., Sum. En., 25 Ref., Il. [Dept. of Crop Science, Faculty of Agriculture, Univ. of Nairobi, Kenya]

Phaseolus vulgaris. Cultivars. Climatic requirements. Light. Dry matter. Kenya.

DM accumulation, leaf area development and radiant energy interception were monitored over the growth period of 3 Phaseolus vulgaris cv. The radiant energy conversion to total DM averaged 1.6 percent in all var. (taking the photosynthetically active radiation as 0.63 of total and the reflection coefficient as 0.21). Based on economic yield, the conversion efficiency is less than 1.6 percent, though the small-seeded Rose Coco had a slightly higher conversion efficiency than Mwezi Moja and Canadian Wonder. Efficiency increased in all 3 cv. and then decreased as the crops matured and senesced. Variations of calculated efficiency reported may be due to

several factors, which include the values accepted for the photosynthetically active radiation: total radiation ratio, reflectance, and calorific values. (AS)

0055

27295 DAVIS, T.D. ; SANKHLA, N.; SMITH, B.N. 1986. Influence of 2-(3,4 dichlorophenoxy)-triethylamine on photosynthesis of Phaseolus vulgaris L. Photosynthesis Research 8(3).275-281. En., Sum. En., 12 Ref., Il. [College of Biology & Agriculture, Brigham Young Univ., Provo, UT 84602, USA]

Phaseolus vulgaris. Plant growth substances. Leaves. Photosynthesis. Stomata. Chlorophyll. USA.

The effect of foliar sprays of the growth regulator 2-(3,4 dichlorophenoxy)-triethylamine (DCPTA) on net photosynthesis by intact bean plants depended upon concn. and the stage of development of the leaves. A single foliar spray of 2.0 millimolar DCPTA reduced net photosynthesis when applied to young expanding leaves but had little effect on fully expanded leaves. Lower DCPTA concn. (0.2-0.8 millimolar) had no effect on net photosynthesis, unless applied more than once, which resulted in reduced net photosynthesis. The DCPTA-induced inhibition of net photosynthesis was associated with chlorosis and aberrations in chloroplast ultrastructure. DCPTA did not affect stomatal resistance. When applied to detached leaf disks in the dark, DCPTA retarded the normal loss of chlorophyll suggesting that DCPTA may have antisenescent properties. (AS)

0056

27273 DAVIS, T.D. ; SANKHLA, N.; WALSER, R.H.; UPADHYAYA, A. 1985. Promotion of adventitious root formation on cuttings by paclobutrazol. HortScience 20(5):883-884. En., Sum. En., 14 Ref., Il. [Dept. of Botany, Univ. of Jodhpur, India]

Phaseolus vulgaris. Inhibitors. Rooting. Shoots. Roots. India.

Cuttings of Plectranthus australis and Phaseolus vulgaris were placed in solutions of the chemical paclobutrazol for 24-40 h. Paclobutrazol at relatively low concn. (3-6 mg/liter) increased the no. of roots formed on cuttings of P. australis and P. vulgaris by about 100 and 85 percent, resp. Paclobutrazol did not affect root length greatly but reduced shoot length by about 20 percent compared with the controls. (AS)

0057

27296 DE MOURA, R.L. ; FOSTER, K.W. 1986. Effects of cultivar and flower removal treatments on the temporal distribution of reproductive structures in bean. Crop Science 26(2):362-367. En., Sum. En., 7 Ref., Il. [Nor-Cal Wild Rice, P.O. Box 940, Woodland, CA 95695, USA]

Phaseolus vulgaris. Plant architecture. Abscission. Cultivars. Flowering. Podding. Yields. Yield components. USA.

Three expt. were conducted to determine the temporal distribution of flowering and the effects of flower removal on flower production and seed yield in dry bean. All expt. were planted in Davis (California, USA) on beds having 76-cm centers. In the cv. comparison expt., flowers of Sacramento, Red Kidney, Sutter Pink, and T-39 were tagged over a 20-day period beginning at 1st flower. By day 12 or 13, all cv. had reached peak flower production and had set pods, which would eventually constitute approx. 80 percent of their total seed yield. The rate of flower production differed among cv., but the earliest produced flowers had the highest pod set percentage. In the defloration expt., flowers of Red Kidney and California Red were removed or counted during various 10-day intervals or combinations thereof over a 30-day period. Removal of flowers during the 1st 20 days resulted in a significant increase in flower production during the last 10 days. Flower removal during days 11-20 had the greatest impacts

on seed yield. In the partial defloration expt. where a fixed proportion of flowers (e.g. every 4th flower) was removed over the entire season, flower production or yield was not significantly affected. A min. of 20 days of flowering and pod set is essential for high yields. Stresses causing flower loss or pod abortion during days 11-20 will have a significant impact on yield. (AS (extract))

0058

27415 FLETCHER, R.A. ; HOFSTRA, G.; GAO, J. 1986. Comparative fungitoxic and plant growth regulating properties of triazole derivatives. Plant and Cell Physiology 27(2):367-371. En., Sum. En., 12 Ref., Il. [Dept. of Environmental Biology, Univ. of Guelph, Guelph, Ontario, Canada N1G 2W1]

Phaseolus vulgaris. Plant growth substances. Growth. Canada.

The triazole derivatives S-3307, S-3308, triadimefon, triadimenol, and paclobutrazol exhibit fungicidal and growth regulating action to varying degrees. In in vitro tests S-3308 was the most fungitoxic to 4 plant pathogens, followed by S-3307, whereas S-3307 and paclobutrazol were the most active plant growth retardants in bean and Poa pratensis. (AS)

0059

27307 HUBERMAN, M. ; JAFFE, M.J. 1986. Thigmotropism in organs of the bean plant (Phaseolus vulgaris L.). Annals of Botany 57(2):133-137. En., Sum. En., 13 Ref., Il. [Horticulture Dept., Faculty of Agriculture, The Hebrew Univ. of Jerusalem, Rehovot, Israel]

Phaseolus vulgaris. Petioles. Leaves. Mechanical perturbation. Plant development. USA.

When each vegetative aerial organ of the young bean plant is unilaterally mechanically perturbed by gentle rubbing, it exhibits positive thigmotropism. The internodes undergo only moderate thigmotropism, but leaves and petioles bend much more, especially when they are rubbed on their abaxial surfaces. When the abaxial surface of 1 petiole is rubbed, it bends down, but the opposite petiole bends upward. These observations are interpreted in terms of the vining habit of bean plants. (AS)

0060

27374 JOYNER, R. ; DUNNING, J.; REINERT, R.; RANGAPPA, M. 1985. The influence of O3 - SO2 on the growth response of Phaseolus vulgaris. Bean Improvement Cooperative. Annual Report 28:89-90. En. [Dept. of Botany, North Carolina State Univ., Raleigh, NC 27605, USA]

Phaseolus vulgaris. Cultivars. Ozone. SO2. Growth. Yields. Biomass production. USA.

A field expt. using open-top chambers was conducted in Raleigh (North Carolina, USA) in 1984 to determine the effects of O3 and SO2 singly and in mixture on the growth and yield of 5 selected Phaseolus vulgaris accessions (BBL 290, Sanilac, PI 312029, DBL 47, and Nep 2). A randomized split plot design was used. The plants were treated with O3 for 7 h/day and with SO2 for 4 h/day during 7 days/wk. from transplanting until harvest. Beans responded differently to mixtures of SO2 + O3; these differences may be due to differing sensitivity of each bean accession to O3 or SO2 alone. Bean seed yield and biomass decreased as O3 concn. increased. (CIAT)

0061

27424 KALINICH, J.F. ; MANDAVA, N.B.; TODHUNTER, J.A. 1985. Relationship of nucleic acid metabolism to brassinolide-induced responses in beans. Journal of Plant Physiology 120(3):207-214. En., Sum. En., 17 Ref. [Plant Hormone Laboratory, Agricultural Research Service, United States, Dept. of Agricultural, Beltsville, MD 20705, USA]

Phaseolus vulgaris. Growth. Plant growth substances. Protein content. RNA. DNA. USA.

The relationship of nucleic acid metabolism to the brassinolide-induced responses of cell elongation and cell division in beans was examined. Excised sections from 2 intact plant systems, the pinto bean 2nd internodes and mung bean epicotyls, were chosen for this study. In pinto beans, excised swollen and split internodes were compared with the excised internodes of the untreated controls. In mung beans, hypocotyls and epicotyls from brassinolide-treated and untreated seedlings were compared. This study showed that brassinolide treatment enhanced the activities of RNA and DNA polymerases as well as the levels of RNA, DNA, and protein, suggesting that brassinolide responses are dependent on nucleic acid and protein synthesis. (AS)

0062

27091 LADROR, U. ; DYCK, R.L.; SILBERNAGEL, M.J. 1986. Effects of oxygen and temperature during imbibition on seeds of two bean lines at two moisture levels. Journal of the American Society for Horticultural Science 111(4):572-577. En., Sum. En., 30 Ref., Il. [Dept. of Plant Biology, Univ. of Illinois, Urbana, IL 61801, USA]

Phaseolus vulgaris. Snap beans. Cultivars. Seeds. Germination. Temperature. O. USA.

Low temp. and O stresses were imposed during the 1st 48 h of germination on 2 snap bean lines, stress-tolerant (PI-165426-BS) and stress-sensitive (Goldcrop). At 22 degrees Celsius, O2 concn. of 0, 1, and 2 percent increased leakage from the seeds, delayed emergence, and reduced growth, compared with 5 and 21 percent O2. These effects were aggravated by reducing the initial seed moisture from 12 to 8 percent in Goldcrop, but not in PI-165426-BS. At 10 degrees Celsius, the effect of O deficiency was minimized. Low temp. inhibited growth of Goldcrop, but not of PI-165426-BS, and increased leakage from seeds of both lines. The survival of seeds exposed to the low temp. decreased when initial seed moisture was reduced from 12 to 8 percent. Flooding the seeds for 24 h increased leakage and reduced emergence and growth much more than 24 h of complete anoxia. Since the effects of anoxia are different than flooding injury, a mechanism of flooding injury not related to O deficiency is discussed. (AS)

0063

27240 MARTINS, I.S. ; SONDAHL, M.R. 1984. Axillary bud development from nodal cultures of bean seedlings (Phaseolus vulgaris L.). Turrialba 34(2):157-161. En., Sum. Pt., En., 5 Ref., Il. [Dept. Genetics, Inst. of Agronomy, P.O. Box 28, Campinas-SP, Brasil]

Phaseolus vulgaris. Tissue culture. Germplasm. Seedlings. Cultivars. Brazil.

A methodology for the development of axillary buds from nodal cultures and plant recovery in beans is presented. The best conditions for the induction of development and growth of axillary buds of bean seedlings consist of germination in the presence of BAP (20 micromolar) and culture of derived nodal regions in the basic B5 medium supplemented with BAP (5 micromolar) and IBA (0.25 micromolar). Rooting of the shoots derived from axillary buds was induced by IBA (10 micromolar) for 10 days, followed by culturing the plantlets in the basic B5 medium without growth regulators. The presence of light was essential to the development of axillary buds from nodal explants of bean seedlings. The frequency of axillary bud induction and the shoot growth were different according to the node position and genotype. Cv. Puebla-153 presented higher induction frequencies, whereas better shoot growth was observed for the cv. Carioca. The max. no. of buds developed/leaf axil was 6 (cv. Moruna, node I) suggesting a total of 12 dormant buds at each cotyledonary node of bean seedlings. (AS)

0064

27317 MISRA, S.H. ; BEWLEY, J.D. 1985. Reprogramming of protein synthesis from a developmental to a germinative mode induced by desiccation of the axes of Phaseolus vulgaris. Plant Physiology 78(4):876-882. En., Sum. En., 35 Ref., Il. [Plant Physiology Research Group, Dept. of Biology, Univ. of Calgary, Calgary, Alberta T2N 1N4, Canada]

Phaseolus vulgaris. Proteins. Seeds. Drying. Germination. RNA. Canada.

Immature seeds of Phaseolus vulgaris cv. Taylor's Horticultural, removed from the pod at 32 days of development, do not germinate unless 1st subjected to desiccation. Premature drying not only redirects metabolism from a developmental to a germination program but it does so permanently, thus effecting an irreversible switch. This is shown by in vitro protein synthesis, and analysis of poly(A)(+) mRNA with a cDNA probe specific for phaseolin message. For example, the pattern of proteins synthesized in vitro by the mRNA fraction from fresh and prematurely dried axes show strong similarities; on the other hand, the mRNA population from rehydrated axes code for a different set of proteins. Also, the message for phaseolin is preserved following the normal maturation process and premature desiccation of seeds. Following rehydration of immature seeds at the desiccation-tolerant stage, this message is no longer detectable in the axes. (AS)

0065

27293 POWELL, A.A. ; OLIVEIRA, M. DE A.; MATTHEWS, S. 1986. The role of imbibition damage in determining the vigour of white and coloured seed lots of dwarf French beans (Phaseolus vulgaris). Journal of Experimental Botany 37(178):716-722. En., Sum. En., 13 Ref., Il. [Dept. of Agriculture, Univ. of Aberdeen, Aberdeen AB9 1UD, Scotland]

Phaseolus vulgaris. Snap beans. Seed vigor. Water absorption. Cultivars. Seed color. Germination. United Kingdom.

Seeds of dwarf French beans showed evidence of damage after imbibition in water in the form of dead tissue and high solute leakage. Damage was more extensive in seeds of a cv. with white testae (Tenderette) both at 20 degrees Celsius and with the initial 6 h imbibition at 4 degrees Celsius where damage was more severe, whereas a cv. with brown testae (Provider) was damaged only after the 4 degrees Celsius treatment. Tenderette imbibed more rapidly than Provider in both imbibition treatments. Significant correlations within each cv. of both solute leakage (positive) and the extent of living tissue (negative) with the rate of water uptake, and the reduced damage when seeds imbibed slowly in polyethylene glycol indicated that this was imbibition damage due to rapid water uptake. Differences in the rates of water uptake were also observed in sand at 15 and 20 percent MC where rapid imbibition was associated with reduced germination and the production of more abnormal seedlings. A temp. of 4 degrees Celsius during the 1st 6 h germination in sand at 15 percent MC also reduced germination, particularly in Tenderette. It is suggested that the more rapid water uptake by white-seeded cv. of dwarf French beans and their greater susceptibility to imbibition damage are responsible for their low vigor. (AS)

0066

27294 POWELL, A.A. ; OLIVEIRA, M. DE A.; MATTHEWS, S. 1986. Seed vigour in cultivars of dwarf French bean (Phaseolus vulgaris) in relation to the colour of the testa. Journal of Agricultural Science 106(2):419-425. En., Sum. En., 15 Ref., Il. [Dept. of Agriculture, Univ. of Aberdeen, Aberdeen AB9 1UD, Scotland]

Phaseolus vulgaris. Seeds. Seed vigor. Snap beans. Seed color. Seed coat. Emergence. Scotland.

Differences in the field emergence of 30 commercial seed lots of dwarf French beans were associated with the color of the testa; the 11 lots with a white testa had a lower mean field emergence (67) compared with lots with black (11 lots) or brown (8 lots) testae (91 percent each). The white-seeded lots also had higher leachate conductivities (mean 42 microsiemens/cm/g) and imbibed more rapidly (an av. 43 percent wt. increase after 6 h imbibition) than black- or brown-seeded lots (av. 25 microsiemens/cm/g; 30 percent wt. increase). In 2 successive imbibition cycles seeds of Provider (brown testae) took up water far more rapidly in the 2nd imbibition (78 percent wt. increase after 3 h) than in the 1st (25 percent wt. increase). The colored testae normally adhere very tightly to the cotyledons but were loosened following the 1st imbibition leading to a more rapid uptake of water. The rapid imbibition of Tenderette (white testae), which has a loose fitting testa even in the dry seed, was increased only slightly by a 2nd imbibition. When seeds were imbibed from one end only from which the testa was removed, Tenderette imbibed rapidly (90 percent wt. increase after 12 h) whereas in Provider the tightly adhering testa limited the rate of water uptake (42 percent wt. increase after 12 h) despite the ready access to water of the seed. It is suggested that the degree of adherence of the testa to the cotyledons is the major factor influencing the rate of imbibition of dwarf French beans cv. differing in testa color. Its role in determining seed vigor is discussed. (AS)

0067

26556 RODRIGUEZ C., R.R. 1986. Caracterización morfo-fisiológica e identificación de caracteres para mayor rendimiento en genotipos precoces de fríjol común (Phaseolus vulgaris L.). (Morphophysiological characterization and identification of characters for higher yields in early maturing common bean genotypes). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 190p. Es., Sum. Es., 107 Ref., Il.

Phaseolus vulgaris. Genotypes. Selection. Maturation. Yields. Yield components. Growth. Colombia.

In 1985, 2 expt. were conducted at CIAT-Palmira, Colombia, to identify criteria for bean selection associated with yield in early maturing genotypes, and to study some of the mechanisms related to earliness through morphophysiological characterization of 16 genotypes from Central America, Mexico, and Colombia. Twelve genotypes were classified as early maturing and 4 as late maturing. Yield and physiological maturity were highly and positively correlated with seed size parameters. Early maturing materials tended to be more efficient than late maturing ones, mainly regarding the utilization of their leaf area. No efficient materials over time that were consistent in both study periods (June and Sept.) were found. Three early maturing, high yielding genotypes (JU 84-7, G 3017, and Rabia de Gato) were found and, in general terms, they showed a strong erect stem with little branching. Sufficient evidence was not found that supported the plant model: late flowering-early maturity, but genotypes that correspond to that model were observed, although with low yields, due to their short pod filling period. In general, this last aspect seems to be critical for final yield; thus, its reduction is not convenient. (AS (extract)-CIAT)

0068

27288 SIDDIQUE, M.A. ; GOODWIN, P.B. 1985. Conductivity measurements on single seeds to predict the germinability of French beans. Seed Science and Technology 13(3):643-652. En., Sum. En., Fr., De., 7 Ref., Il. [Dept. of Horticulture, Bangladesh Agricultural Univ., Mymensingh, Bangladesh]

Phaseolus vulgaris. Snap beans. Seed characters. Analysis. Germination. Australia.

Soaking of individual seeds in 80 ml of distilled water for 16 h at 25 degrees Celsius was found optimal for judging seed quality in snap bean by

the electrical conductivity test. A conductivity level of 165 micromhos/cm/g dry seed was considered as the critical level for bean cv. Apollo. Seeds showing an electrical conductivity value less than the critical level were classed in the low conductivity group. The percentage seed in the low conductivity group and the percentage normal seedlings obtained in the seedling evaluation test were highly correlated. This indicates that the test can be used as a predictor. (AS)

0069

27318 SIJMONS, P.C. ; KOLATTUKUDY, P.E.; BIENFAIT, H.F. 1985. Iron deficiency decreases suberization in bean roots through a decrease in suberin-specific peroxidase activity. Plant Physiology 78(1):115-120. En., Sum. En., 27 Ref., Il. [Dept. of Plant Physiology, Univ. of Amsterdam, Kruislaan 318, 1098 SM Amsterdam, Netherlands]

Phaseolus vulgaris. Roots. Fe. Mineral deficiencies. Netherlands.

The suberin content of young root parts of Fe-deficient and Fe-sufficient Phaseolus vulgaris cv. Prelude was determined. The aliphatic components that could be released from suberin-enriched fractions by LiAlD4 depolymerization were identified by gas chromatography-mass spectrometry. Fe-deficient bean roots contained only 11 percent of the aliphatic components of suberin found in control roots although the relative composition of the constituents was not significantly affected by Fe deficiency. Analysis of the aromatic components of the suberin polymer that could be released by alkaline nitrobenzene oxidation of bean root samples showed a 95 percent decrease in p-hydroxybenzaldehyde, vanillin, and syringaldehyde under Fe-deficient conditions. The inhibition of suberin synthesis in bean roots was not due to a decrease in Fe-dependent w-hydroxylase activity since normal w-hydroxylation could be demonstrated, both in vitro with microsomal preparations and in situ by labeling of w-hydroxy and dicarboxylic acids with ((14)C) acetate. The level of the isozyme of peroxidase that is specifically associated with suberization was suppressed by Fe deficiency to 25 percent of that found in control roots. None of the other extracted isozymes of peroxidase was affected by the Fe nutritional status. The activity of the suberin-associated peroxidase was restored within 3-4 days after application of Fe to the growth medium. In bean roots, Fe deficiency causes inhibition of suberization by causing a decrease in the level of isoperoxidase activity which is required for polymerization of the aromatic domains of suberin, while the ability to synthesize the aliphatic components of the suberin polymer is not impaired. (AS)

0070

27437 TAYLOR, A.G. ; SAMIMY, C.; KENNY, T.J. 1985. Vigor of snap bean seeds: relationship of laboratory tests to field emergence. Bean Improvement Cooperative. Annual Report 28:28-29. En., 1 Ref. [Dept of Horticultural Sciences, New York State Agricultural Experiment Station, Geneva, NY 14456, USA]

Phaseolus vulgaris. Seed vigor. Laboratory experiments. Germination. Seed. Snap beans. USA.

Several lab. tests used to assess snap bean seed vigor (standard germination, accelerated aging, conductivity, and cold tests) were evaluated at the New York State Agricultural Expt. Station in Geneve (USA) to develop a technique that could be provided on a service basis by the New York Seed Testing Lab. The 4 tests were performed on 25 and 13 samples obtained from commercial seed lots in New York in 1982 and 1983, resp. All samples which germinated below 70 percent, the min. standard germination for snap beans, were deleted from the analysis. Based on several years of work with seed vigor tests, the cold test has been consistently shown to rank seed lot performance in snap beans. This test is performed by sowing

seeds at 2 cm depth in a 1:1:1 (peat, sand, and field soil) soil media, and is now offered as a routine service provided by the New York State Seed Testing Lab. (CIAT)

0071

27436 TURNER, J.E. ; MOK, M.C.; MOK, D.W.S. 1985. Zeatin metabolism in fruits of Phaseolus; comparison between embryos, seedcoat, and pod tissues. Plant Physiology 79(1):321-322. En., Sum. En., 5 Ref. [Dept. of Horticulture, Oregon State Univ., Corvallis, OR 97331, USA]

Phaseolus vulgaris. Phaseolus lunatus. Embryo. Pods. Seed coat. Plant growth substances. USA.

Zeatin metabolites were isolated from seed coats and pod tissues of Phaseolus vulgaris and P. lunatus. The differences observed previously between P. vulgaris and P. lunatus embryos (the formation of O-ribosyl derivatives in the former and O-glucosyl derivatives in the latter) could also be detected in seed coats, although the levels of these metabolites were much lower and there was a concomitant increase of breakdrown products (adenine, adenosine, and adenosine 5'-monophosphate. Inner pod wall tissues of both genotypes metabolized zeatin at a slow rate and the major metabolite was the mononucleotide of zeatin. The array of metabolites recovered was not influenced by the extraction method (cold ethanol or modified Bieleski solution). (AS)

0072

27306 UPADHYAYA, A. ; DAVIS, T.D.; SANKHLA, N. 1986. Some biochemical changes associated with paclobutrazol-induced adventitious root formation on bean hypocotyl cuttings. Annals of Botany 57(3):309-315. En., Sum. En., 33 Ref., Il. [Dept. of Botany, Univ. of Jodhpur, India]

Phaseolus vulgaris. Rooting. Plant growth substances. Enzymes. Hypocotyls. India.

Bean hypocotyl cuttings were placed in solutions containing either 0 (controls) or 43 micromolar paclobutrazol for 24 h after which they were placed in peat-perlite for 8 days. Paclobutrazol more than doubled the no. of roots formed on the cuttings but did not affect individual root length. Compared with controls, treated cuttings exhibited increased activities of catalase, peroxidase, polyphenol oxidase, malate dehydrogenase, protease, and RNase in the base of cuttings. These data indicate that the enhancement of adventitious root formation by paclobutrazol is accompanied by changes in the activities of a no. of enzymes that have previously been postulated to be involved in rooting. However, these changes in activity are generally greatest later in the rooting period, suggesting that they may be involved in the development rather than the initiation of roots. (AS (extract))

0073

27276 VEGA, M.A. ; SANTAMARIA, E.C.; MORALES, A.; BOLAND, R.L. 1985. Vitamin D3 affects growth and Ca(2+) uptake by Phaseolus vulgaris roots cultured in vitro. Physiologia Plantarum 65(4):423-426. En., Sum. En., 19 Ref., Il. [Dept. de Biologia, Univ. Nacional del Sur, 8000 Bahia Blanca, Argentina]

Phaseolus vulgaris. Growth. Vitamin content. Roots. Ca. Nutrient uptake. Argentina.

Vitamin D3 at low concn. (nanomolar) inhibited the growth of Phaseolus vulgaris cv. Contrancha roots in vitro as measured by elongation (14 h) and ((3)H)-leucine incorporation into protein (2 h), and increased their labelling with (45)Ca(2+) (2 h). Cycloheximide and puromycin (50 micromolar) blocked vitamin D3 stimulation of root (45)Ca(2+) labelling, indicating that it is mediated by de novo protein synthesis. The Ca ionophore X-537A (10(-5)molar) induced similar changes both in root

elongation and (45)Ca(2+) uptake (14 h). This may indicate that the inhibitory effects of the sterol on root growth are mediated by changes in Ca(2+) fluxes. This interpretation, however, should be further strengthened by additional studies as the ionophore may have acted on root growth, affecting physiological processes other than Ca(2+) transport. (AS)

0074

27268 WADMAN-VAN SCHRAVENDIJK, H. ; VAN ANDEL, O.M. 1986. The role of ethylene during flooding of Phaseolus vulgaris. Physiologia Plantarum 66(2):257-264. En., Sum. En., 34 Ref., Il. [Botanical Lab., State Univ. of Utrecht, Lange Nieuwstraat 106, 3512 PN Utrecht, The Netherlands)]

Phaseolus vulgaris. Plant growth substances. Flooding. Netherlands.

Wilting symptoms in Phaseolus vulgaris cv. bruine Noord-Hollandse were observed after a few hours of flooding. They were well correlated with an accumulation of ethylene. The ethylene level in the leaves started to increase after 2 h of flooding and reached a 3-4 fold rise after 4-6 h. From then on throughout the next 2 days it gradually returned to control values. On the day when plants were flooded, a positive correlation was found between the ethylene concn. and the degree of wilting. During this day the time course of ABA level, diffusion resistance, and water potential was measured. The effect of ethylene on stomatal aperture was investigated by spraying ethephon on the leaves. In control plants, ethephon treatment had no influence on the diffusion resistance. Spraying plants with ABA resulted in a significant, dose-dependent increase in diffusion resistance. When ethephon was added to the ABA-containing solutions only 62 percent of this increase was observed. Ethephon (pre-) treatment of plants that were to be flooded had a similar effect; the increase in diffusion resistance was only 70 percent of that observed in untreated flooded plants. It is concluded that ethylene may interfere with the regulation of stomatal aperture by ABA. (AS) See also 0034 0035 0037 0038 0042 0043 0046 0078 0081 0082 0095 0098 0102 0104 0105 0111 0117 0118 0121 0122 0123 0130 0138 0221 0228 0306 0308 0327 0335 0349

C03 Chemical Composition: Methodology and Analyses

0075

27256 BEL, A.J.E. VAN ; PATRICK, J.W. 1985. Proton extrusion in seed coats of Phaseolus vulgaris L. Plant Cell and Environment 8(1):1-6. En., Sum. En., 32 Ref., Il. [Botanisch Laboratorium, Rijksuniversiteit Utrecht, Lange Nieuwstraat 106, 3512 PN Utrecht, The Netherlands]

Phaseolus vulgaris. Seed coat. Ovules. Sucrose. Netherlands.

Vacated seed coat halves of P. vulgaris were exposed to bathing solutions with indicators for proton pump action and the pH changes in the media were measured. Fusicoccin increased the rate of proton extrusion from the seed coats. Orthovanadate and ABA retarded the proton extrusion evoked by fusicoccin. Old seed coats reacted more rapidly to fusicoccin treatments than young ones. Proton pumping in seed coats and cotyledons showed differential responses to fusicoccin, K(+), and sucrose. The significance of proton pumps for photosynthate transfer in vivo is discussed. (AS (extract))

0076

21770 BRESSANI, R. ; ELIAS, L.G.; WOLZAK, A.; HAGERMAN, A.E.; BUTLER, L.G. 1983. Tannin in common beans: methods of analysis and effects on protein quality. Journal of Food Science 48(3):1000-1001,1003. En., Sum. En., 22 Ref. [Division of Agricultural & Food Sciences, INCAP, Carretera Roosevelt Zone 11, Guatemala, Guatemala]

Phaseolus vulgaris. Tannin content. Animal nutrition. Diets. Digestibility. Proteins. Guatemala.

Condensed tannins and related phenols in 13 samples of red common beans collected from rural markets in Guatemala were determined by 4 chemical assays. The results were highly correlated although the degree of variation among the samples differed greatly according to the assay. In rat feeding trials, tannin content was negatively correlated with NPR, a measure of protein quality, and positively correlated with protein digestibility. Neither correlation was statistically significant due primarily to the low tannin content of the diet. Met. supplementation not only improves the protein quality but may also play a role in metabolic detoxification of tannin. (AS)

0077

27379 CHANG, R. ; SCHWIMMER, S.; BURR, H.K. 1977. Phytate: removal from whole dry beans by enzymatic hydrolysis and diffusion. Journal of Food Science 42(4):1098-1101. En., Sum. En., 26 Ref., Il.

Phaseolus vulgaris. Phytic acid. P. Analysis. Temperature. Hydrolysis. USA.

California Small White beans were found to contain about 1 percent phytate, of which 70 percent is in water-soluble form. Incubation of presoaked beans in water at 60 degrees Celsius for 10 h lowered their phytate content by 90 percent. Incubation in pH 5.5 buffer at 50 degrees Celsius for 24 h lowered it by 62 percent. When leaching was eliminated by incubating in water-saturated air at 60 degrees Celsius overnight, 33 percent of the phytate was destroyed by hydrolysis. Similar treatments were effective with mung beans, lima beans, and wheat. The study suggests that destruction of heat-sensitive cell membranes leads to the potentiation of phytate. (AS)

0078

27227 EL-SAEID, H.M. ; EL-BELTAGY, A.S.; ABOU-HUSSEIN, M.R.; KHALIL, S.; EL-BELTAGY, M.S. 1983. Changes in the endogenous levels of auxins, gibberellins and inhibitors of bean plants during their growth and development as affected by different water requirement. Egyptian Journal of Horticulture 10(1):83-92. En., Sum. En., Ar., 26 Ref., Il. [Horticulture Dept., Faculty of Agriculture, Ain Shams Univ., Shubra El- Kima, Egypt)]

Phaseolus vulgaris. Soil moisture. Auxins. ibberellins. Inhibitors. Developmental stages. Composition. Egypt.

Plants of bean var. Giza 3 grown at 90 percent field capacity had higher levels of acidic auxins and acidic and basic gibberellins, and low levels of inhibitors, compared with those grown at 54 percent field capacity, from the initial sampling (16 days after sowing and just before treatments were applied) to the 2nd one (62 days after sowing and about 16 days before max. flowering). Neutral auxins, however, were higher in plants grown at 54 percent field capacity during this same period. At the 3rd sampling (82 days after sowing and about 16 days before peak pod production), plants grown at 54 percent field capacity contained higher levels of acidic auxins and acidic and basic gibberellins, and inhibitors appeared in the basic fraction bioassayed by lettuce seed test compared with those grown at 90 percent field capacity. Moreover, at that stage plants contained low levels of neutral auxins and inhibitors appeared in the acidic fraction bioassayed by both wheat coleoptile straight growth test and lettuce seed test. (AS)

0079

27435 ELLENRIEDER, G. ; GERONAZZO, H.; BOJARSKI, A.B. DE 1980. Thermal inactivation of trypsin inhibitors in aqueous extracts of soybeans, peanuts, and kidney beans: presence of substances that accelerate inactivation. Cereal Chemistry 57(1):25-27. En., Sum. En., 14 Ref., Il.

Phaseolus vulgaris. Antinutritional factors. Analysis. Bean flour. Argentina.

Thermal inactivation of trypsin inhibitors in aqueous suspensions and centrifuged water extracts of dehulled and defatted soybean and peanut flours and of flours prepared from whole kidney beans depended on concentration. Thermal stability (after heating at 96 degrees Celsius for 15 min) of TIA was greatly increased when these aqueous suspensions and extracts were diluted. High mol. wt. components, separated from soybean extracts by gel filtration on Sephadex G-75, accelerated thermal destruction of TIA in purified inhibitor preparations. (AS)

0080

27432 GOMES, J.C. ; KOCH, U.; BRUNNER, J.R. 1979. Isolation of a trypsin inhibitor from navy beans by affinity chromatography. Cereal Chemistry 56(6):525-529. En., Sum. En., 45 Ref., Il.

Phaseolus vulgaris. Proteins. Analysis. Amino acids. USA.

A protein fraction that strongly inhibited the enzymic activity of trypsin and chymotrypsin was separated from navy bean cv. Sanilac by affinity chromatography with trypsin immobilized on agarose (Sepharose 4B). Under isoelectric focusing, the inhibitor revealed 2 zones at pH values of 4.40 and 4.45 for the major and minor zones, resp. A mol. wt. of 16,600 for the major component was determined by SDS-polyacrylamide gel electrophoresis. A mol wt. of 11,900 was estimated from an inhibitor-trypsin interaction. Finally, a min. wt. of 12,214 was calculated from amino acid data, based on the limiting amino acid, met. Absence of tryptophan, low met., and high half-cystine contents characterized the inhibitor. Its composition is similar to an inhibitor isolated previously from navy beans by ion exchange on diethylaminoethyl cellulose and gel filtration. (AS)

0081

27071 KERMASHA, S. ; VAN DE VOORT, F.R.; METCHE, M. 1986. Changes in lipid components during the development of the French bean seed (Phaseolus vulgaris). Journal of the Science of Food and Agriculture 37(7):652-658. En., Sum. En., 34 Ref., Il. [Dept. of Food Science & Agricultural Chemistry, Macdonald Campus, McGill Univ., 21111 Lakeshore Road, Ste Anne de Bellevue, Quebec, Canada H9X 1C0]

Phaseolus vulgaris. Snap beans. Fatty acids. Seeds. Seed. Proteins. Plant development. Canada.

Changes in lipid classes and fatty acid composition and distribution have been monitored during the germination, development, and maturation of French bean seed. A lipase activity profile over time was also determined. Ungerminated seeds contained high levels of triglycerides and free fatty acids, but low levels of polar lipids, monoglycerides, and diglycerides. Five days after germination there was a decrease in the quantity of triglycerides and free fatty acids and a concomitant increase in the levels of monoglycerides, diglycerides, and polar lipids. As development and maturation progressed, triglycerides increased substantially at the expense of mono- and diglycerides. Ungerminated seeds contained high levels of C20-C22 fatty acids which decreased after germination with a concomitant increase in C16-C18 unsaturated fatty acids. A study of the fatty acid distribution among the different classes of lipids demonstrated that 55 percent of the unsaturated fatty acids in the ungerminated seeds were present in the triglycerides, whereas the remainder were distributed among the mono- and diglycerides as well the other lipid classes (free fatty acids, polar lipid, and sterols). Five days after germination, the majority of these unsaturated fatty acids were found in the glyceride form. Overall, the lipid classes and fatty acid composition and distribution changes during development and maturation of the French bean seed indicated that it shares many of the characteristics of soybean development. (AS)

0082

27253 KINOSHITA, I. ; TSUJI, H. 1984. Benzyladenine-induced increase in DNA content per chloroplast in intact bean leaves. Plant Physiology 76(3):575-578. En., Sum. En., 16 Ref., Il. [Laboratory for Plant Ecological Studies, Faculty of Science, Kyoto Univ., Kyoto 606, Japan]

Phaseolus vulgaris. Leaves. Chloroplasts. DNA. Chlorophyll. Composition. Japan.

Benzyladenine treatment was found to induce chloroplast DNA (ctDNA) synthesis after it had stopped in primary leaves of light-grown intact bean plants. The leaves were treated with benzyladenine from 7 days after sowing. Chloroplasts were isolated and the ctDNA content/chloroplast was determined. Chloroplast division occurred until 13 days after sowing in untreated leaves. Benzyladenine stimulated the division keeping the level of ctDNA content/chloroplast the same as that in the untreated controls. After the division period, the ctDNA content/chloroplast increased in benzyladenine-treated leaves, but not in controls. Consequently, ctDNA/leaf (or per cell) increased immediately after the beginning of benzyladenine treatment, but remained constant in the control leaves. (AS)

0083

27422 LEAVITT, R.D. ; FELSTED, R.L.; BACHUR, N.R. 1977. Biological and biochemical properties of Phaseolus vulgaris isolectins. Journal of Biological Chemistry 252(9):2961-2966. En., Sum. En., 26 Ref., Il.

Phaseolus vulgaris. Phytohemagglutinins. Carbohydrate content. Proteins. Analysis. Biochemistry. USA.

Affinity-purified phytohemagglutinin from red kidney bean resolves into 5 isolectins by SP-Sephadex ion exchange chromatography. Recoveries ranging from 30 to 130 mg of protein for each isolectin are easily achieved. The isolectins have similar amino acid compositions which differ only in threonine, lysine, and arginine. A distinguishing feature of the amino acid composition is the total lack of S-containing amino acids. Each isolectin contains about 4 percent mannose and 2.2 percent N-acetyl-D-glucosamine. All isolectins on electrophoresis form single protein bands under denaturing and nondenaturing conditions in polyacrylamide gels, and all have apparent subunit mol. wt. of 33,000 by SDS-polyacrylamide gel electrophoresis. (AS (extract))

0084

27385 LOLAS, G.M. ; MARKAKIS, P. 1977. The phytase of navy beans (Phaseolus vulgaris). Journal of Food Science 42(4):1094-1097,1106. En., Sum. En., 24 Ref., Il.

Phaseolus vulgaris. Enzymes. Bean flour. Hydrolysis. Human nutrition. USA.

The phytase of Sanilac navy beans was extracted with 2 percent CaCl2 and purified by ammonium sulphate fractionation and diethylaminoethyl-cellulose chromatography. The enzyme showed an optimum pH of 5.3 and Km of 0.018 millimolar with phytic acid as substrate. The optimum temp. was 50 degrees Celsius. The activation energy of the enzymic hydrolysis of phytic acid was 11,500 calories/mole and the inactivation energy of the enzyme, 55,800 calories/mole. The purified phytase showed broad specificity. This enzyme may be described as a nonspecific phosphomonoesterase with phytase and potent pyrophosphatase activities. It was inhibited by high concn. of phytic acid. Phytase activity was increased by about 35 percent in the presence of 1 millimolar CO(2+). Soaking beans in distilled water did not affect their phytic acid content and phytase activity. Germination of the beans resulted in an increase in phytase activity and breakdown of phytic acid. (AS)

0085

27395 LOLAS, G.M. ; MARKAKIS, P. 1975. Phytic acid and other phosphorus compounds of beans (Phaseolus vulgaris L.). Journal of Agricultural and Food Chemistry 23(1):13-15. En., Sum. En., 21 Ref., Il.

Phaseolus vulgaris. Cultivars. Mineral content. P. Phytic acid. Protein content. USA.

Fifty cultivated dry bean var. and lines were analyzed for phytic acid, total P, inorganic P, and organic P (other than phytate). The resp. concn. on a dry wt. basis were 0.54-1.58, 0.259-0.556, 0.021-0.044, and 0.050-0.135 percent. A correlation coefficient of 0.9847 was found between total P content and phytic acid content. A protein-phytate complex was also isolated. It was observed that 99.6 percent of the total phytic acid was in a water-soluble form. (AS)

0086

27083 PERNOLLET, J.C. 1985. Biosynthesis and accumulation of storage proteins in seeds. Physiologie Végétale 23(1):45-59. En., Sum. En., Fr., 113 Ref. [Laboratoire d'Etude des Protéines, Département de Physiologie et Biochimie Végétales, Centre Inst. National de Recherches Agronomiques, Route de Saint-Cyr, 78000 Versailles, France]

Phaseolus vulgaris. Proteins. Seed. Genes. Plant breeding. France.

The biosynthesis of seed storage proteins of cultivated species belonging to 2 botanical groups accumulating 2 kinds of proteins, prolamins in maize, wheat, and barley and globulins in Phaseolus vulgaris, peas, and soybeans, is reviewed. The time course accumulation of reserve protein groups in the developing storage tissue (endosperm for cereals and cotyledons for legumes) and the formation of protein bodies are described, and seed storage proteins and animal secretory proteins are compared. The co- and post-translational modifications are discussed in relation to their mode of synthesis. The organization and expression of the relevant genes and some factors controlling protein synthesis are outlined and the prospects of using plant gene transfer through genetic engineering in order to improve the quantity and quality of the seed proteins are considered. (AS)

0087

27321 ROMERO-ANDREAS, J. 1984. Genetic variability in the seed phaseolin of nondomesticated bean (Phaseolus vulgaris L. var aborigeneus) and the inheritance and physiological effects of arcelin, a novel seed protein. Ph.D. Thesis. Madison, University of Wisconsin-Madison, 168p. En., Sum. En., 94 Ref., Il.

Phaseolus vulgaris. Phaseollin. Seed. Composition. Proteins. Genetics. USA.

SDS-polyacrylamide gel electrophoresis and differential solubility studies of seed proteins from Mexican nondomesticated beans (Phaseolus vulgaris var. aborigeneus) revealed the presence of phaseolin, the major seed storage protein in domesticated common bean. However, the phaseolins were structurally different from the S, T, and C types found in domesticated beans and were designated M-type phaseolins. Genetic analyses of F2 populations from crosses between nondomesticated beans and Sanilac, a domesticated bean cv., showed that the M phaseolin variants were allelic to the 3 phaseolin types of domesticated beans. A novel 35 kilodalton seed protein was discovered in a seed from P.I. 325690 during electrophoretic screening. Studies revealed that the 35 kilodalton protein was neither an altered phaseolin, nor an enhancement of the lectin fraction. The protein was named arcelin, after Arcelia, the Mexican village closest to where P.I. 325690 was collected. The seed from P.I. 325690 was planted and resulting selfed seed from this plant gave rise to the pure line UW 325. Despite a low percentage of seed phaseolin (14.6), UW 325 displayed no abnormalities

in plant or seed phenotype, plant growth, fertility, or seed germination. The percentage seed protein (25.5) was within the normal range for common beans. (AS (extract))

0088

27238 SATHE, S.K. ; DESHPANDE, S.S.; SALUNKHE, D.K. 1984. Dry beans of Phaseolus. A review. 1. Chemical composition: proteins. CRC Critical Reviews in Food Science and Nutrition 20(1):1-46. En., 463 Ref., Il. [Dept. of Nutrition & Food Science, Muscle Biology Group, Univ. of Arizona, Tucson, AZ 85721, USA]

Phaseolus vulgaris. Proteins. Water content. Protein content. Fat content. Ash content. Carbohydrate content. Fiber content. Analysis. USA.

An extensive literature review on the chemical and nutritional composition of legumes, among them (Phaseolus vulgaris), is presented. The following aspects of proteins are analyzed in detail: classified distribution, recent advances in study techniques, isolation and fractionation, functional properties, chemical and enzymatic modifications for improved functionality, and quality. (CIAT)

0089

27066 VITALE, A. ; BOLLINI, R. 1985. Phytohemagglutinin genes and polypeptides in Phaseolus vulgaris cv. Pinto III seeds. Bean Improvement Cooperative. Annual Report 28:83. En., 4 Ref. [Istituto Biosintesi Vegetali, Consiglio Nazionale delle Ricerche, Via Bassini 15, 20133, Milano, Italy]

Phaseolus vulgaris. Phytohemagglutinins. Genes. Seeds. Italy.

Seeds of bean cv. Pinto III contain low amounts of a protein which can be recognized by phytohemagglutinin-specific immunoglobulins. It was found that this protein is synthesized and processed with mechanisms identical to those of the phytohemagglutinin-L subunit, and that it possesses lymphocyte stimulating activity at levels comparable with phytohemagglutinin. The phytohemagglutinin-like protein accumulated in the seeds of this cv. could be either a minor phytohemagglutinin-L polypeptide whose sythesis is not affected by the mutation, or a lectin normally present at low levels in all bean cv. (CIAT)

0090

27221 WEISS, A. ; LUKENS, D.L.; STEADMAN, J.R. 1985. Measurement and interpretation of leaf wetness in a bean crop. Bean Improvement Cooperative. Annual Report 28:25-26. En., 2 Ref.

Phaseolus vulgaris. Cultivars. Canopy. Leaves. Water content. Whetzelinia sclerotiorum. USA.

Two bean cv., Great Northern Tara (postrate, dense, and vigorous) and A55 (tall, upright canopy), were used to determine the duration of leaf wetness as a function of canopy architecture. Leaf wetness measurements were made in both canopies at 10 cm above the base of the plant and just above the A55 canopy. The A55 plot consistently had a greater duration of leaf wetness than the Tara plot; however, in the field Tara has a higher probability of infection by Sclerotinia sclerotiorum than A55. Duration of leaf wetness can be a limiting factor in the infection and development of this disease. (CIAT) See also 0004 0005 0013 0040 0046 0052 0061 0065 0071 0099 0100 0104 0106 0111 0112 0122 0138 0143 0225 0233 0261 0264 0311 0313 0319 0322 0323 0350 0356

D00 AGRONOMY

0091

27042 WARREN, A. 1985. Bean production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 42p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Production. Cultivation systems. Cultivation. Fertilizers. Tanzania. Malawi. Zambia. Zimbabwe.

An expedition was organized in 1984 to obtain information on bean production in Tanzania, Malawi, Zambia, and Zimbabwe. This information represents valuable research literature not available through conventional sources. Personal interviews were conducted with scientists to explore different aspects of bean cultivation such as entomology, soils, statistical data, breeding, nutrition, cropping systems, pests and diseases attacking beans, production data, marketing, and bean nutrition. Individual papers are recorded in this publication under the following consecutive no.: 0124, 0125, 0155, 0156, 0157, 0159, 0167, 0219, 0246, 0265, 0307, 0340, 0341, 0342, 0343, 0344, 0345, 0346, 0347, and 0348. (CIAT)

D01 Soil, Water, Climate and Fertilization

0092

27065 ABBOUD, A.C. DE S. ; DUQUE, F.F. 1986. Efeitos de materiais organicos e vermiculita sobre a sequencia feijao-milho-feijao. (Effects of the application of organic matter and vermiculite on beans-maize-beans sequential cropping). Pesquisa Agropecuaria Brasileira 21(3):227-236. Pt., Sum. Pt., En., 28 Ref., Il. [Empresa Brasileira de Pesquisa Agropecuaria, Unidade de Apoio ao Programa Nacional de Pesquisa em Biologia do Solo, Km 47, 23.851 Seropédica-RJ, Brasil]

Phaseolus vulgaris. Zea mays. Rotational crops. Green manures. N. Nitrogen fixation. Rhizobium. Brazil.

In expt. with beans and sequential cropping of beans-maize-beans, the effect of incorporating into the soil Stizolobium aterrimum and Crotalaria juncea green matter, sugarcane bagasse, rice polishings, sewage compost, and vermiculite was studied. The effects of these materials and of Rhizobium phaseoli strains on biological N fixation in beans was also evaluated under greenhouse conditions. S. aterrimum incorporation produced the most efficient nodulation and the greatest N and DM accumulation. Under field conditions, the application of materials with higher N contents did not inhibit nodulation and nitrogenase activity as did the fertilization with 50 kg N/ha. Incorporation of the OM affected bean yield more than its application as mulch. Incorporation of C. juncea with bean inoculation increased grain production at the 1st planting. The residual effect on maize at the 2nd planting was largest in the treatment with S. aterrimum and N fertilization. At the 3rd planting no residual effect on bean yield was observed. (AS)

0093

27087 AÑEZ R., B. ; TAVIRA D., E. 1985. Aplicación foliar de fertilizantes en caraota (Phaseolus vulgaris L.). (Foliar applications of fertilizers in beans). Turrialba 35(2):197-200. Es., Sum. Es., En., 13 Ref. [Inst. de Investigaciones Agropecuarias, Facultad de Ciencias Forestales, Apartado 220, Univ. de Los Andes, Mérida, Venezuela]

Phaseolus vulgaris. Fertilizers. N. P. K. Yields. Venezuela.

The effect of foliar fertilization as compared with soil fertilization of beans was evaluated in 2 field trials carried out in 1978 and 1980 in San Juan de Lagunillas (Mérida, Venezuela). Bean var. Criolla de San Juan was

used in a completely randomized block design with 4 replicates. No yield differences were found between treatments; foliar fertilization increased grain yield up to 600 kg/ha over the check. (AS)

0094

27341 BOARETTO, A.E. ; DAGHLIAN, C.; MURAOKA, T.; CRUZ, A. DE P. 1983. Absorcao foliar e translocacao de calcio ((45)Ca) pelo feijoeiro. (Foliar absorption and translocation of calcium ((45)Ca) by common bean). Cientifica 11(2):227-231. Pt., Sum. Pt., En., 4 Ref., Il. [Depto. de Ciencias do Solo, Faculdade de Ciencias Agronómicas, Univ. Estadual de Sao Paulo, 18.600 Botucatu-SP, Brasil]

Phaseolus vulgaris. Fertilizers. Leaves. Ca. Nutrient uptake. Translocation. Brazil.

An expt. was conducted to verify whether Ca is absorbed by bean leaves when applied as CaCl2 (0.6 percent) and also whether translocation of this absorbed Ca occurs. For this, a CaCl2 solution, with approx. 4 microcurie (45)Ca/ml, was applied to the oldest trifoliate leaf of 30-day-old bean plants. The plants were harvested after: 15 and 30 min; 1, 2, 4, 8, and 16 h; and 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, and 15 days. Each plant was separated into 2 parts, the trifoliate leaf which received the radioactive solution and the rest, and prepared for radioactive counting. The results showed that Ca is rapidly absorbed, 50 percent being absorbed within 2 h; however, during the 15-day-period the translocation of absorbed Ca was negligible. (AS)

0095

27263 CABALLERO, S.U. ; LIBARDI, P.L.; REICHARDT, K.; MATSUI, E.; VICTORIA, R.L. 1985. Utilizacao do fertilizante nitrogenado aplicado a uma cultura de feijao. (The use of nitrogen fertilizer in bean crops). Pesquisa Agropecuaria Brasileira 20(9):1031-1040. Pt., Sum. Pt., En., 23 Ref., Il. [Empresa Brasileira de Pesquisa Agropecuária, Unidade de Apoio ao Programa Nacional de Pesquisa em Biologia do Solo, Km 47, 23.460 Seropédica-RJ, Brasil]

Phaseolus vulgaris. Fertilzers. Ammonium sulphate. N. Plant development. Brazil.

N efficiency in bean cv. Carioca was studied in an Oxic Paleudalf soil in Piracicaba (Sao Paulo, Brazil) in 5 periods (6, 26, 46, 66, and 86 days after germination). Zero and 42 kg N/ha were applied, using ammonium sulphate with 56.11 percent of (15)N atoms in excess. This fertilization took place in 2 stages: 1/3, 6 days after germination and the rest, 26 days after germination. Plant population was of 250,000/ha. Each sample comprised branches + leaves, roots, pods, and whole plants, and was analyzed for total N content (semi-microkjeldahl method) and N isotopic composition (Dumas method), using an Atlas Variant CH-4 mass spectrometer. The source of N used was found to significantly increase production. The percentage of N in the plant, obtained from the fertilizer, varied (P = 0.05) regarding sampling time, but not among plant parts within each sample. The max. efficiency of N fertilizer utilization (75.9 percent) was observed during the stage of greater pod development. The grains extracted 16.4 kg N/ha from the fertilizer, using efficiently 38.9 percent. (AS)

0096

27393 CASTRO, P.R.C. ; KUNIYUKI, H.; BARROS, B.C.; PIRES, E.J.P. 1983. Efeitos da adubacao foliar em cultivares de feijoeiro (Phaseolus vulgaris L.). (Effects of foliar fertilization in bean cultivars). Anais da Escola Superior de Agricultura Luiz de Queiroz 40(1):109-118. Pt., Sum. Pt., En., 8 Ref.

Phaseolus vulgaris. Cultivars. Fertilizers. Leaves. Yields. Yield components. Brazil.

The effects of 3 foliar fertilizers (Rhodia, Colombina, and Wuxal) on growth and productivity of bean. cv. Carioca, Rosinha, and Goiano were studied under greenhouse conditions. Plants growing in pots received 3 applications of the products at 10, 25, and 40 days after germination. Similar behavior was observed for the 3 cv. Plant height was reduced with Wuxal, but no significant differences were found regarding no. of pods, no. of seeds, and seed production between the treatments of Rhodia (0.2 ml/liter), Colombina (3.0 ml/liter), and Wuxal (2.5 ml/liter). (AS)

0097

26999 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Genetic Improvement. Character Improvement. Drought tolerance. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.85-92. En. Also in Spanish.

Phaseolus vulgaris. Drought. Resistance. Cultivars. Selection. Colombia.

Studies on drought tolerance at CIAT emphasized validating present screening strategies, and testing modifications that will further improve their efficiency. The evaluation of the screening techniques included the selection of appropriate exptl. design and the study of the interactions among var. and agronomic management. Also, efforts were invested in understanding tolerance mechanisms such as root growth and orientation of leaves. (CIAT)

0098

26998 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Genetic Improvement. Character Improvement. Photoperiod-temperature adaptation. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.79-84. En. Also in Spanish.

Phaseolus vulgaris. Germplasm. Photoperiod. Plant habit. Seed characters. Yields. Flowering. Adaptation. Colombia.

A series of comparisons of photoperiod response in relation to seed size, growth habit, origin, and yield performance were conducted using photoperiod response data obtained in previous trials with 450 bean lines. Data for all the materials evaluated are presented in table form. Regional differences in needs for photoperiod response were detected using data from yield and adaptation in different environments. (CIAT)

0099

27015 CHRISTENSON, D.R. ; BRICKER, C.; HEISEN, J. 1981. Effect of fertilizer sources and manganese rate on yield and tissue manganese levels of soybeans and navy beans. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1981 Research Report. pp.19-21. En.

Phaseolus vulgaris. Fertilizers. Mn. Yields. Mineral content. Plant tissues. USA.

A fertilization expt. with navy beans was carried out at the Saginaw Valley research farm (Michigan, USA), in which the effect of applying monoammonium phosphate or diammonium phosphate together with $MnSO_4$ was compared. Navy bean yields were significantly greater (2409 kg/ha) when Mn was applied than when it was not (2250 kg/ha). There was significantly more Mn in the plant tissue at 4 wk. when monoammonium phosphate was applied. The results of 1981 were not consistent with those of other years during which the Mn level was higher with diammonium phosphate. When Mn was not included in the fertilizer, there were no differences in yield or in tissue Mn levels between the different fertilizer sources. (CIAT)

0100

27017 CHRISTENSON, D.R. ; BRICKER, C.; REISEN, J. 1981. Effect of rate of Wex on yield and tissue nutrient levels of corn, navy beans, soybeans and sugar beets. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1981 Research Report. pp.39-42. En.

Phaseolus vulgaris. Fertilizers. Yields. Mineral content. N. P. K. Ca. Mg. Zn. Fe. Mn. USA.

The effect of the application of Wex on yield and tissue nutrient levels was measured for several crops, including beans. Wex was applied with a hand sprayer immediately after planting at rates of 0, 1.12, 2.24, and 3.36 kg/ha. Increasing rates of Wex did not significantly affect navy bean yield; however, Wex applications affected K, Ca, Mg, and Mn concn. in 5-wk.-old navy bean plants, the pattern of change being more significant for K and Mn. (CIAT)

0101

27016 CHRISTENSON, D.R. ; BRICKER, C.; REISEN, J. 1981. Evaluation of soil fertility requirements of erect dry bean varieties. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1981 Research Report. pp.31-36. En.

Phaseolus vulgaris. Cultivars. Fertilizers. N. P. Zn. Mn. Yields. Mineral content. Plant tissues. USA.

The fertilizer needs of the erect bean var. Swan Valley and Neptune (white-seeded), Domino and Black Magic (black-seeded), along with var. Sanilac, were evaluated. The effect of the method of fertilizer application on N, P, Zn, and Mn nutrition of the erect beans was also studied. All var. responded similarly to applied N at the Saginaw Valley research farm (Michigan, USA). There was a yield response up to 101 kg N/ha; Swan Valley outyielded the other 3 var. (3319.0 kg/ha vs. 3080.0, 2990.0, and 3080.0 for Black Magic, Neptune, and Domino, resp.). There were no significant differences in N concn. in plant tissues due to N rate, var., or the interaction between the 2. In the study with P, there was a significant yield response in the Neptune var. but not in the Black Magic var. The response was greatest at 13.5 kg and least at 68.4 kg P/ha. Banded fertilizer treatments yielded more than when fertilizer was broadcast. The method of fertilizer application had no effect on P concn. in 5-wk.-old plants but differences among var. were observed. Sanilac had more N than the other var., but its Zn concn. was lower. Additional studies are required to draw conclusions. (CIAT)

0102

27078 EL-SAEID, H.M. ; ABOU-HUSSEIN, M.R.; EL-BELTAGY, A.S.; KHALIL, S.; EL-BELTAGY, M.S.; MAKSOUD, M.A. 1983. Effect of water imbalance on growth and development of bean plants (Phaseolus vulgaris L.). Egyptian Journal of Horticulture 10(1):63-82. En., Sum. En., Ar., 30 Ref., Il. [Horticulture Dept., Faculty of Agriculture, Ain Shams Univ., Shubra El-Kima, Egypt]

Phaseolus vulgaris. Soil moisture. Growth. Flowering. Podding. Foliage. Abscission. Yields. Yield components. Egypt.

Pot expt. were conducted during the summer season of 1978 and 1979 at the National Research Center (Dokki Giza, Egypt) to investigate the effect of different percentages of field capacity (9, 27, 54, and 90) on the growth, flowering, and fruiting of plants of bean cv. Giza 3. At 9 or 27 percent field capacity, plants died before flowering. In general, as field capacity was increased, plant height, no. of leaves produced, and net no. of leaves (no. of leaves produced minus no. of leaves abscissed) were increased. Leaf abscission increased, in general, as field capacity percentage was

decreased. At 54 percent field capacity, flower production was enhanced relative to that of 90 percent; however, flower abscission was stimulated. Thus, the net no. of flowers was not significantly different at both percentages of field capacity during the last stage of the growth period. At 90 percent field capacity, pod production increased and pod abscission decreased; yield and yield components also increased. (AS)

0103

27332 ISHIMURA, I. ; FEITOSA, C.T.; LISBAO, R.S.; PASSOS, F.A.; FORNASIER, J.B.; NODA, M. 1985. Diferentes combinacoes de NPK na producao do feijao-vagem em solo organico álico do Vale do Ribeira (SP). (Different NPK combinations in snap bean production in organic soil of high acidity of Vale do Ribeira (Sao Paulo)). Bragantia 44(1):429-436. Pt., Sum. Pt., En., 7 Ref. [Estacao Experimental de Pariquera-Acu, Inst. Agronomico, Caixa Postal 28, 13.100 Campinas-SP, Brasil]

Phaseolus vulgaris. Snap beans. Fertilizers. N. P. K. Yields. Brazil.

A trial was carried out at the Pariquera-Acu exptl. station (Sao Paulo, Brazil) on organic soil of high acidity (pH = 4.9) to determine the influence of 4 levels of fertilizers (0, 118-192-186, 236-384-372, and 354-576-558 kg N-P-K/ha on the yield of snap bean cv. Teresópolis. The results showed that pod yield increased with increasing fertilizer levels (linear effect). The highest pod yield was obtained with 354-576-558 kg N-P-K/ha, resp. The results also showed that av. pod wt. remained constant. (AS)

0104

27237 LOFTY, A.A. ; EL-HADY, O.A. 1984. Effect of bentonite on some characteristics, yield and water use efficiency of kidney bean in sandy soil under trickle irrigation. Egyptian Journal of Soil Science 24(3):225-235. En., Sum. En., Ar., 15 Ref., Il. [Soils & Water Use Laboratory, National Research Center, Cairo, Egypt]

Phaseolus vulgaris. Irrigation. Soil fertility. Soil analysis. Growth. Egypt.

A field expt. was conducted at the Irrigation Exptl. Station in Inshas, Egypt, on kidney bean plants, grown in sandy soil mixed with Egyptian bentonite at the rates of 2.5, 5.0, 7.5, and 10.0 percent, to determine the effect of this soil on germination, growth, water use efficiency, macro- and micronutrient uptake, and yield under a trickle irrigation system. The addition of bentonite decreased the dry wt. of seedlings due to delayed germination, but it increased the dry wt. of plants at both vegetative and flowering stages, as well as the water use efficiency, and N, P, K, Fe, Zn, and Mn contents and uptake by plants at different growth stages. Consequently, yield also increased. Bentonite (as natural deposite in Egypt) can be used for conditioning sandy soil, especially under a suitable and economical irrigation system. (AS)

0105

27328 MANRIQUE, L.A. 1986. Field bean leaf area development and seed yield as affected by phosphorus application on a Typic Tropudult in Panama. Communications in Soil Science and Plant Analysis 17(2):135-147. En., Sum. En., 13 Ref., Il. [Dept. of Agricultural Engineering, Univ. of Hawaii, Honolulu, HI 96822, USA]

Phaseolus vulgaris. Fertilizers. P. Growth. Yields. Leaf area. Panama.

A long-term P expt. is currently being conducted on a Typic Tropudult in Panama to study plant growth and yield response of a sequence of crops, with differential external P requirements, to initial applications of fertilizer P at rates of 0, 25, 50, 100 and 200 kg/ha. The response of beans, the 1st crop in this sequence, to P fertilization is reported. Both plant growth and seed yield were greatly increased with P fertilization.

Leaf area attained max. expansion at 50 kg P/ha, whereas seed yield response was evident up to 100 kg P/ha. Neither leaf area production nor yields significantly responded to additional P rates above 100 kg/ha. Assessment of the external P requirement for beans indicated this crop could attain approx. 80 percent of max. yields at a level of 12 mg of extractable P (0.5 molar $NaHCO_3$ + EDTA)/kg. (AS)

0106

27029 MICHIGAN STATE UNIVERSITY. AGRICULTURAL EXPERIMENT STATION. 1982. Saginaw Valley bean-beet research farm and related bean-beet research East Lansing. 1982 Research Report. 150p. En., Il.

Phaseolus vulgaris. Soil compaction. Soil fertility. Cultivars. Adaptation. Plant breeding. Agronomic characters. Resistance. Colletotrichum lindemuthianum. Xanthomonas phaseoli. Xanthomonas phaseoli var. fuscans. Bean common mosaic virus. Isariopsis griseola. Pseudomonas phaseolicola. Seed color. Palatability. Land preparation. Growth. Mineral content. Yields. USA.

The results of research on beets, beans, maize, and soybeans carried out at the Saginaw Valley Research Farm (Michigan, USA) during 1982 are compiled. Work on beans cover soil compaction, fertility, and management, evaluation of var. and lines, breeding for improved agronomic characteristics and for resistance to Colletotrichum lindemuthianum, Xanthomonas phaseoli, and X. phaseoli var. fuscans, development of great northern beans, the winter nursery, and pathology (BCMV, Isariopsis griseola, and Pseudomonas phaseolicola). Also, consumer color acceptability of beans and growth, ion accumulation, and yield responses of beans to secondary tillage treatments in clay soils are discussed. The individual papers are found in this publication under the following consecutive no.: 0131, 0138, 0142, 0165, 0179, 0180, 0254, 0290, 0295, 0296, 0297, and 0317. (CIAT)

0107

27013 MICHIGAN STATE UNIVERSITY. AGRICULTURAL EXPERIMENT STATION. 1981. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1981 Research Report. 115p. En., Il.

Phaseolus vulgaris. Fertilizers. Mn. Mineral content. Plant tissues. Yields. Adaptation. Plant breeding. Resistance. Germplasm. Colletotrichum lindemuthianum. Xanthomonas phaseoli. Land preparation. Soil compaction. Growth. USA.

The results of research conducted mostly at the Saginaw Valley bean and beet research farm (Michigan, USA) during 1981 are compiled. Work on bean fertilization covers soil fertility and management, effects of fertilizer sources and Mn rates on yield and Mn levels in navy bean tissues, soil fertility requirements of erect bean var., and effects of Wex rates on yield and tissue nutrient levels of navy beans. Results are presented of bean yield trials, advances of the pinto, pink, red mexican, and great northern bean breeding program, the anthracnose and halo blight breeding program, the winter nursery program, and the results of a special study on the inhibition of bean production by soil physical stresses. The results of the 1981 International Bean Rust Nursery and the sources of tolerance to Xanthomonas phaseoli are discussed. Individual papers are found in this publication under the following consecutive no.: 0099, 0100, 0101, 0121, 0143, 0160, 0181, 0197, 0255, 0257, 0267, 0291, and 0298. (CIAT)

0108

27097 MILLER, D.E. ; BURKE, D.W. 1984. Response of dry beans to deep tillage in relation to soil texture and irrigation interval. Bean Improvement Cooperative. Annual Report 27:174-175. En.

Phaseolus vulgaris. Irrigation. Land preparation. Timing. Yields. USA.

The response of beans to deep tillage, as affected by water holding capacity of the soil and the interval between irrigations, was evaluated in 2 soils (Warden loam and Quincy sand) without severe Fusarium infestation. Irrigations were made daily on the sand and weekly on the loam. Prior to planting, the soil was loosened by ripping. Bean yields were lower with ripping than nonripping and were poor in both cases (1570.5 vs. 2019.3 kg/ha). In order to prevent serious Sclerotinia injury in a loam soil, the interval between irrigations must be long enough to allow drying in the heavier foliage that results from ripping. (CIAT)

0109

27224 MILLER, D.E. ; BURKE, D.W. 1981. Response of dry beans to deficit daily sprinkler irrigation as related to soil texture. Bean Improvement Cooperative. Annual Report 24:47. En.

Phaseolus vulgaris. Irrigation. Soil requirements. USA.

For 3 yr. deficit daily sprinkler irrigation studies were conducted with dry beans (Pink 6R-122) using the line source technique on loam and sand soils. The line source is a single line with sprinkler heads 4.5 m apart. Irrigation water is applied at a max. rate of about 2.3 cm/h at the line. On the sand, yields increased with irrigation rate up to estimated evapotranspiration. On the loam soil irrigation rates were reduced to about 1/3 estimated evapotranspiration before yields were reduced. Severe injury from Sclerotinia occurred on the loam soil. The disease was not a problem on the sandy soil. (CIAT)

0110

27239 M'RIBU, E. 1985. The effects of differential watering at various development stages on the production of French beans (Phaseolus vulgaris L.). Acta Horticulturae no.153:145-149. En., Sum. En., 10 Ref. [Dept. of Crop Science, Egerton College, Njoro, Kenya]

Phaseolus vulgaris. Snap beans. Irrigation. Timing. Yields. Yield components. Kenya.

Plants of French bean cv. Monel were grown in polyethylene bags in the greenhouse. From the 2-leaf stage the plants were watered at intervals of 2-6 days in various combinations during the vegetative, flowering, and pod development stages. Short watering intervals during the vegetative stage increased the total and marketable yield but had no effect on pod length. Watering at short intervals during pod development increased total and marketable yields and pod length. The watering interval during the main flowering stage had no effect on yield or quality. (AS)

0111

27388 NAKAYAMA, L.H.I. ; MALAVOLTA, E. 1983. Aproveitamento pelo feijoeiro de um fosfato natural parcialmente solubilizado. 1. Estudos em casa de vegetacao com um Latossolo Vermelho Amarelo. (Response of the bean plant to a partially acidulated rock phosphate. 1. Greenhouse studies using a red yellow Latosol). Anais da Escola Superior de Agricultura Luiz de Queiroz 40(2):745-762. Pt., Sum. Pt., En., 4 Ref., 11. [Depto. de Quimica, Escuela Superior de Agricultura Luiz de Queiroz, Univ. Sao Paulo, 13.400 Piracicaba-SP, Brasil]

Phaseolus vulgaris. Fertilizers. P. Agricultural lime. Nutrient uptake. Yields. Dry matter. Mineral content. Ca. Mg. Soil moisture. Brazil.

The response of beans to a partially acidulated (50 percent sulfuric acid) rock phosphate (FAPS) was studied under greenhouse conditions. Simple superphosphate, the original rock phosphate, and Gafsa rock phosphate were used for comparison. The soil was acidic and low in available P. Three successive crops were made to evaluate the residual effects both in presence and in absence of initial liming. Giving the DM yield obtained

with powder simple superphosphate the relative value of 100, the efficiency of the other P sources was in the absence of liming, as follows: granulated simple superphosphate, 80; original rock phosphate, 85; FAPS, 75-90 (depending on granule size); Gafsa rock phosphate, 150. In the presence of liming these values were as follows: granulated simple superphosphate, 98; original rock phosphate, 66; FAPS, 70-85; Gafsa rock phosphate, 110. Liming increased the uptake of P from all sources. FAPS served as source of Ca and S as well. After the 3rd crop the available (Olsen) P content obeyed the following decreasing order: simple superphosphate, Gafsa rock phosphate, FAPS, and original rock phosphate. Regardless of the source, the P content was lower when lime was applied. (AS)

0112

27389 NAKAYAMA, L.H.I. ; MALAVOLTA, E. 1983. Aproveitamento pelo feijoeiro de um fosfato natural parcialmente solubilizado. 2. Estudos em casa de vegetacao com um Latossolo Vermelho Escuro. (Response of beans to a partially acidulated rock phosphate. 2. Greenhouse studies using a dark red Latosol). Anais da Escola Superior de Agricultura Luiz de Queiroz 40(2):763-779. Pt., Sum. Pt., 3 Ref., Il. [Depto. de Química, Escola Superior de Agricultura Luiz de Queiroz, Univ. Sao Paulo, 13.400 Piracicaba-SP, Brasil]

Phaseolus vulgaris. Fertilizers. P. Agricultural lime. Yields. Brazil.

The efficiency of a partially acidulated Araxá phosphate, PAAP, was studied using bean as a test crop in an acidic dark red Latosol low in P. For comparison, ground rock phosphate from Araxá and from Gafsa (Minas Gerais, Brazil), and simple superphosphate, either powder or granulated, were employed. Three successive croppings were conducted in order to estimate the residual effect of the P sources. As subtreatments initial liming and no liming were used. Statistical analyses were made taking into account the DM production observed in the 3 harvests, and making the yield obtained at the expenses of simple superphosphate as powder equal to 100: (1) in the absence of liming simple superphosphate, granulated = 100, ground rock phosphate from Araxá = 60-85 (depending upon granule size), ground rock phosphate from Gafsa = 132; (2) in the presence of liming, simple superphosphate, granulated = 105, ground rock phosphate from Araxá = 52. PAAP = 75-90 and, ground rock phosphate from Gafsa = 95. Irrespective of P source, liming increased the absorption of P only in the 3rd crop. PAAP acted also as source of Ca and S. Liming decreased residual available (Olsen) P determined after the 3rd cropping, except in the case of the treatment with larger granules. The available residual P obeyed the following decreasing order: simple superphosphate, PAAP, ground rock phosphate from Gafsa, and ground rock phosphate from Araxá. The performance of PAAP was similar to that of the simple superphosphate. (AS)

0113

27335 NICHOLAIDES III, J.J. ; CHANCY, H.R.; NELSON, L.A.; SHELTON, J.E. 1985. Snap bean grade and yield response to N rate and time of application and P and K rate. Communications in Soil Science and Plant Analysis 16(7):741-757. En., Sum. En., 12 Ref., Il. [North Carolina Agricultural Research Service, Raleigh, NC 27695-7619, USA]

Phaseolus vulgaris. Snap beans. Fertilizers. N. P. K. Timing. Yields. Mineral content. Plant tissues. USA.

A field expt. was conducted on a gravelly loam in North Carolina, USA, to determine the effect of timing and rate of N and rate of P and K fertilization on snap bean yield and grade, plant tissue nutrient concn., and residual soil test levels. Initial soil test levels by the Mehlich-I extractant were 4 micrograms P/cc (very low) and 0.09 meq K/100 cc (low). Total snap bean fresh wt. yield response to N fertilization was quadratic with max. yield at 168 kg N/ha. The 112 kg N/ha rate produced greater

yield when 66 percent rather than 50 or 100 percent of the N was applied preplant. P had a significant quadratic effect on total bean yield with max. being predicted by the response equation to occur at 145 kg P/ha, which gave a residual soil test level of 20 micrograms P/100 cc. No significant increase in total yield occurred above 68 kg K/ha, which gave a residual soil test level of 0.124 meq K/100 cc. (AS)

0114

27406 OLIVEIRA, I.P. DE 1985. Bean fertilization. 1. Alternative sources of fertilizers. Bean Improvement Cooperative. Annual Report 28:133. En., [Centro Nacional de Pesquisa de Arroz e Feijao, Caixa Postal 179, 74.000 Goiania-GO, Brasil]

Phaseolus vulgaris. Fertilizers. Dung. Agricultural lime. Green manures. Yields. Brazil.

Three field expt. were conducted to evaluate the response of bean cv. CNF 178 to simple superphosphate (80 kg P/ha), apatite phosphate (80 kg P/ha), bovine biofertilizer (20 t/ha), gypsum (50 kg/ha), and dry residue of Leucaena leucocephala (5 t/ha) tested in isolation and in combination at the Centro Nacional de Pesquisa de Arroz e Feijao (Goiania, Brazil). In general, good results were obtained by applying different sources of fertilizers in comparison with the unfertilized check treatment. (CIAT)

0115

27407 OLIVEIRA, I.P. DE 1985. Bean fertilization. 2. Alternative sources of fertilizers. Bean Improvement Cooperative. Annual Report 28:134. En. [Centro Nacional de Pesquisa de Arroz e Feijao, Caixa Postal 179, 74.000 Goiania-GO, Brasil]

Phaseolus vulgaris. Fertilizers. Green manures. Dung. P. Yields. Brazil.

Two field expt. were conducted at the Centro Nacional de Pesquisa de Arroz e Feijao (Goiania, Brazil) to evaluate alternative sources of fertilizers for bean crops. Basic treatments were crop residues (pigeon pea and sugarcane), bovine biofertilzer, apatite phosphate, and triple superphosphate. Fertilizers were applied and incorporated at planting. In general, the best results were obtained with 50 and 100 t biofertilizer/ha, NPK (according to soil requirements), and combinations of different sources. (CIAT)

0116

27365 OLIVEIRA, I.P. DE ; MOREIRA, J.A.A.; SOARES, M. 1985. Response of bean (Phaseolus vulgaris L.) to bovine biofertilization on cerrado soil. Bean Improvement Cooperative. Annual Report 28:101-102. En. [Centro Nacional de Pesquisa de Arroz e Feijao, Caixa Postal 179, 74.000 Goiania-GO, Brasil]

Phaseolus vulgaris. Fertilizers. Dung. Yields. Brazil.

Two field expt. were conducted at Centro Nacional de Pesquisa de Arroz e Feijao (Goiás, Brazil) to evaluate the response of bean cv. Carioca to 5 levels of bovine biofertilizer (0, 6, 12, 18, and 24 t/ha), applied and incorporated at plowing. A 2nd expt. was set up with levels of 0, 6, 12, 18, and 24 t/ha in half of each plot to determine cumulative and residual effects of the biofertilizer. A factorial randomized block design with 4 replications was used. Grain yield was linearly increased with the application of bovine biofertilizer in the 1st yr. The results obtained in the 2nd yr suggest that a low level of bovine biofertilizer (6 t/ha) is enough to obtain high grain yields (2640 kg/ha). (CIAT)

0117

27218 PAL, R.K. ; PHOGAT, K.P.S. 1984. Effect of foliar application of urea on the green pod yield of French bean (Phaseolus vulgaris L.) var. Contender. Progressive Horticulture 16(1-2):95-96. En., 5 Ref. [Government Valley Fruit Research Station, Jeolikote, Nainital, Uttar Pradesh, India]

Phaseolus vulgaris. Snap beans. Fertilizers. Leaves. N. Yields. Yield components. Plant development. India.

In 2-yr trials with French bean in Jeolikote (Uttar Pradesh, India), urea at 5.0-2.5 percent was applied in late April before flowering. The green pod yield (24.5/plant) was greatest with urea at 2 percent. Data are tabulated on plant height, no. of branches and leaves, plant spread, pod length and no./plant. (CIAT)

0118

27418 PORTELA, M.C.L. DA S. ; DEFELIPO, B.V.; BRAGA, J.M.; RIBEIRO, A.C. 1985. Necessidade de calagem da cultura do feijao, em solos da microrregiao Mata de Vicosa, Minas Gerais. Experimento em casa de vegetacao. (The need for liming in bean crops in soils of the Mata microregion of Vicosa, Minas Gerais. A greenhouse trial). Revista Ceres 32(182):271-282. Pt., Sum. Pt., En., 14 Ref. [Inst. de Pesquisas Agronomicas de Pernambuco, Caixa Postal 125, 55.100 Caruaru-PE, Brasil]

Phaseolus vulgaris. Agricultural lime. pH. Growth. Dry matter. Brazil.

Samples of 9 soils from the Zona da Mata region of Vicosa (Minas Gerais, Brazil) received different rates of lime and were planted to bean var. Negrito under greenhouse conditions. Samples of each soil of 1000 cubic centimeters were incubated for 35 days with 5 rates of lime (CaO = 33 percent; MgO = 11 percent) with the soil MC maintained at the field capacity. The effect of lime was evaluated on the basis of DM production. The rates of lime required to maximize DM production were determined by use of the following methods: incubation procedures, Woodruff, SMP, calcium acetate, exchangeable Al and Ca + Mg, and base saturation; the OM method was employed to raise the soil pH to 6.0 and 6.5. The effect of lime on bean growth varied among the soils. The liming recommendations obtained by the various methods were interrelated, except for the OM procedure used to raise the soil pH to 6.5. The method of exchangeable Al and Ca + Mg understimated the lime required whereas the other methods overestimated the requirements. (AS)

0119

27443 SAMPER, C. ; ADAMS, M.W. 1985. Geometric mean of stress and control yield as a selection criterion for drought tolerance. Bean Improvement Cooperative. Annual Report 28:53-54. En., 1 Ref. [Dept. of Crop & Soil Science, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Statistical analysis. Selection. Cultivars. Water stress. Resistance. USA.

The advantages of utilizing the geometric mean as a criterion for selecting ov. with tolerance to water stress are discussed. A comparison is made with other selection criteria, namely the yield differential, the arithmetic mean, and the drought susceptibility index. (CIAT)

0120

27442 SAMPER, C. ; ADAMS, M.W. 1985. Yield potential and drought susceptibility. Bean Improvement Cooperative. Annual Report 28:51-52. En., 2 Ref. [Dept. of Crop & Soil Science, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Cultivars. Irrigation. Drought. Adaptation. Selection. Resistance. Yields. Mexico.

Two expt. were conducted in 2 dry land areas (Iguala and Durango) of Mexico to obtain information on specific drought resistant mechanisms. Bean plants were irrigated until flowering and an effective water stress was imposed at mid-seed filling period. Drought susceptibility indexes were calculated for the individual cv. and for the cv. groups. Drastic changes in drought susceptibility indexes of individual cv. such as 800122 and BAT 798 show the importance of local adaptation when selecting for drought tolerance. In cv. BAT 47 and Durango 222 there was no apparent change in the drought susceptibility indexes, indicating that these cv. had a broader adaptation. (CIAT)

0121

27024 SMUCKER, A.J.M. ; ADAMS, M.W.; CHRISTENSON, D.R.; HOGABOAM, G.J.; SRIVASTAVA, A.K. 1981. Inhibition of dry bean, soybean and sugar beet production by soil physical stresses. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1981 Research Report. pp.86-95. En., Il.

Phaseolus vulgaris. Land preparation. Soil compaction. Genotypes. Resistance. Growth. Yields. USA.

Results are presented of the research designed to identify more tolerant genotypes to soil compaction as well as develop methods and resources for investigating the influence of soil compaction on plant growth, nutrient accumulation, and yields of beans, soybeans, and sugar beets. Tillage treatments included: (1) min. or no secondary tillage, (2) excessive secondary tillage compaction, and (3) excessive secondary tillage which included a complete pass with a sheeps foot roller, 4 passes with spring tooth and wheel traffic compaction. Beans planted on soils tilled to 3 different levels of compaction emerged at a significantly greater rate in treatments planted by the modified planter in soils receiving no secondary tillage. At midseason, plant growth was 12-340 percent greater in the treatments receiving no secondary tillage. Differences in plant growth continued until plants with secondary tillage reached physiological maturity. Av. yields for 4 cv. (Black Turtle, Swan Valley, Nep-2, and Domino) for the 1981 growing season were 3016, 2838, and 2886 kg/ha for treatments with zero, conventional, and excessive tillage, resp. (CIAT)

0122

27236 SSALI, H. ; KEYA, S.O. 1980. Nitrogen level and cultivar effects on nodulation, dinitrogen fixation and yield of grain legumes: 2. Common bean cultivars. East African Agricultural and Forestry Journal 45(4):277-283. En., Sum. En., 7 Ref., Il.

Phaseolus vulgaris. Cultivars. Fertilizers. N. Nodulation. Growth. Nitrogen fixation. Dry matter. Yields. Mineral content. Kenya.

The effects of a low and a high N fertilizer dose (20 and 100 kg/ha, resp.) on nodulation, growth, and dinitrogen fixation of 3 common bean cv. (Rose Coco, Canadian Wonder, and Mwezi Moja) as measured by the (15)N technique were investigated in a field study in Kabete, Kenya. A low N fertilizer dose did not significantly affect nodulation, DM, and seed yield of the 3 cv. whereas a high dose significantly reduced nodulation but had no significant effect on DM and seed yield of the 3 cv. At a low N dose, beans fixed between 27.7-35.2 kg N/ha but fixation was reduced by 15-47 percent at the higher N dose. At both N levels, the bulk of bean plant tissue N was derived from nonfertilizer soil N. There were no significant interactions between bean cv. and N level for all parameters. (AS)

0123

27225 VAN BRUGGEN, A.H.C. ; WHALEN, C.H.; ARNESON, P.A. 1986. Emergence, growth, and development of dry bean seedlings in response to temperature, soil moisture, and Rhizoctonia solani. Phytopathology 76(6):568-572. En., Sum. En., 25 Ref., Il. [Boyce Thompson Inst., Cornell Univ., Ithaca, NY 14853, USA]

Phaseolus vulgaris. Temperature. Soil moisture. Rhizoctonia solani. Growth. Plant development. Emergence. USA.

The rates of emergence and initial seedling growth of red kidney beans were determined in response to various conditions of temp. and soil moisture in the presence and absence of Rhizoctonia solani. In incubators, the optimal temp. and soil moisture for seedling emergence were around 27 degrees Celsius and 20 percent (-0.2 bar). R. solani delayed emergence, reduced the growth rate, and increased the shoot:root ratio, particularly at temp. above 18 degrees Celsius and at low soil moisture levels. The proportion of plants infected was dependent only on temp. (optimum at 24-30 degrees Celsius). Lesion size was determined primarily by soil moisture (largest at 10 percent or -9.5 bar). (AS)

0124

27052 WARREN, A. 1985. Zambia: bean nutrition/soils. In Bean production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 1p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Fertilizers. N. P. K. S. Malawi.

Fertilizer (N, P, K, S) application rates recommended by the Ministry of Agriculture are given for beans cultivated in low, medium, and high fertility soils in Zambia. Soil characteristics in farmers' fields in the northern region are described. (CIAT)

0125

27058 WARREN, A. 1985. Zimbabwe: bean nutrition. In Bean production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 1p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Fertilizers. N. P. K. Rhizobium. Zimbabwe.

NPK fertilizer recommendations are given for different regions in Zimbabwe according to alt. Also, the activities regarding Rhizobium inoculation are briefly described. (CIAT) See also 0035 0038 0040 0042 0049 0054 0062 0065 0074 0078 0143 0144 0148 0151 0159 0160 0205 0275 0279 0306 0327 0329 0331 0336

D02 Cultivation Practices: Planting, Weed Control and Harvesting

0126

27363 BAILIE, J.E. ; COYNE, D.P.; PAPAROZZI, E.T.; HANNA, M.A. 1985. Effect of date of planting on seed coat cracking, adhesion and internal morphology of seed coat to cotyledon of dry beans (Phaseolus vulgaris). Bean Improvement Cooperative. Annual Report 28:58-59. En. [Univ. of Nebraska, Lincoln, NB 68583, USA]

Phaseolus vulgaris. Cultivars. Planting. Timing. Seed coat. USA.

The effect of planting date (June 6 and 23, 1983) on seed coat cracking, adhesion, and internal morphology of seed coat to cotyledon of beans was evaluated under field conditions in Scottsbluff (Nebraska, USA). Significant differences and a cv./line x planting date interaction were detected among entries for all traits within each planting date. Cv. GN

Star showed a high degree of cracked seed injury (58 percent) at the 1st planting date. Most cv./lines showed a slight increase in percentage of area of adhesion of the seed coat to the cotyledon. (CIAT)

0127

26997 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Genetic Improvement. Character improvement. Yield potential. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.69-78. En. Also in Spanish.

Phaseolus vulgaris. Cultivars. Yields. Density. Photoperiod. Colombia.

Studies on yield potential continued at CIAT with the reevaluation of agronomic practices for max. yield. A considerable effort was invested in the production of erect, type IIa lines. Unfortunately, these lines have not shown the yield potential expected, possibly due to their erect habit, which makes them incapable of achieving full canopy cover at the 60-cm row spacings used at CIAT. Several expt. were conducted to compare a large range of materials at 20, 30, 45, and 60 cm-row spacings. In subsequent expt., the 41 most promising lines from previous screenings for earliness indicated a high correlation between yield, crop dry wt., and days to maturity. (CIAT)

0128

27355 FLESCH, R.D. ; MONDARDO, E. 1984. Feijao. (Beans). In Empresa Catarinense de Pesquisa Agropecuária. Recomendacao de cultivares para o Estado de Santa Catarina 1984-1985. Florianópolis-SC, Brasil. Boletim Técnico no.23. pp.28-31. Pt., Il.

Phaseolus vulgaris. Maps. Planting. Timing. Cultivars. Yields. Agronomic characters. Brazil.

A map showing the regions suitable for bean cultivation in Santa Catarina, Brazil, is presented. Data of planting time, yields, and agronomic characteristics of cv. recommended for the region are also included. (CIAT)

0129

24886 GONZALEZ, A.R. ; GAVIN, J.C.; MARX, D.B. 1984. Effect of planting date, sieve size and cultivar on color of snap beans. Arkansas Farm Research 33(2):8. En., Il.

Phaseolus vulgaris. Snap beans. Cultivars. Planting. Timing. Seed color. Pods. Chlorophyll. USA.

The effect of planting date, cv., and sieve size on the color of snap bean cv. Gallatin Valley 50, Early Bird, Blue Mountain, Epoch, and the breeding line USDA-711 was evaluated at the Main Expt. Station in Fayetteville (Arkansas, USA). The cut bean pods were blanched for 3 min in boiling water, cooled in running tap water, and then frozen and stored at -20 degrees Celsius. The data were statistically analyzed in split-split plot design. The results indicated that cv. and sieve size have a strong effect on the color of snap beans, and that the planting date is not critical. Breeding line USDA-711 showed the darkest green color and the highest chlorophyll content as compared with the other cv. Gallatin Valley 50 and Early Bird showed the lightest green color and the most variability in color between sieve sizes. (CIAT)

0130

27080 GRAFTON, K.F. ; SCHNEITER, A.A. 1985. Effect of planting dates on yield and other agronomic traits of dry bean. North Dakota Farm Research 42(6):11-13. En., 6 Ref. [Dept. of Agronomy, North Dakota State Univ., Fargo, ND 58102, USA]

Phaseolus vulgaris. Planting. Timing. Cultivars. Yields. Yield components. Maturation. USA.

The effect of sowing dates on yield, emergence, and seed wt. of Phaseolus vulgaris cv. Seafarer and UI-114, sown on 1, 15, or 31 May or 14 June in 1977-80, were investigated. Late sowing caused delayed maturity and av. yield was reduced from 2011.9 kg/ha (1 May sowing) to 1740.5 kg/ha (14 June sowing). The no. of seeds/pod was similar for the 2 cv., but 250-seed wt. were 43.2-45.6 g and 83.6-75.0 g for UI-114 and Seafarer, resp. Differences in yields between cv. were not significant. (CIAT)

0131

27040 JOHNSON, B. ; ERICKSON, A.E.; ROBERTSON, L.S.; SMUCKER, A.J.M.; OAKS, J. 1982. Alleviation of soil compaction on fine textured soils in Michigan. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1982 Research Report. pp.95-131. En., Il.

Phaseolus vulgaris. Soils. Land preparation. Yields. Mechanization. USA.

Secondary tillage treatments were set up on a clay soil at the Saginaw Valley bean-beet research farm (Michigan, USA) and at a farm with clay loam soil to observe their effects on yields of navy bean cv. Sanilac and maize. Basically 4 treatments were implemented: (1) fall moldboard plow and disc, (2) fall moldboard plow without secondary tillage, (3) spring plow and disc, and (4) no tillage. On the loam soil, navy bean yields were inversely proportional to the degree of secondary tillage. The use of the moldboard plow in the fall and no secondary tillage resulted in the highest bean yields (3000 kg/ha). With secondary spring tillage, soil crust formation following planting caused stand and yield reductions. Significant effects of primary tillage on navy bean production were observed on the clay soil. It was concluded that favorable soil physical conditions for crop production on fine-textured soils of the Saginaw Valley can be created with fall plowing and min. secondary tillage. (CIAT)

0132

27287 LEDEZMA A., E. ; ARAYA V., R. 1983. Evaluación de distancias de siembra en cuatro cultivares de fríjol común (Phaseolus vulgaris). (Evaluation of planting distances in four bean cultivars). Boletín Técnico Estación Experimental Fabio Baudrit 16(4):21-26. Es., Sum. Es., En., 18 Ref.. Il.

Phaseolus vulgaris. Cultivars. Planting. Spacing. Yields. Yield components. Costa Rica.

Three distances between rows (30, 45, and 60 cm) and 3 distances between plants (7, 8, and 9 cm), resulting in populations from 185,000 to 476,000 plants/ha, of 4 bean cv. (Porrillo Sintético, ICA Pijao, Talamanca, and Mexico 80-R) were evaluated in Grecia, Costa Rica. A negative lineal effect (P equal to or less than 0.01) of the distances between rows on yield was found. Distances between plants did not affect this variable. The no. of seeds/pod and the wt. of 100 seeds were not modified by the effect of the distances between rows and plants. Only the no. of pods varied with the distances between rows (positive lineal effect, P equal to or less than 0.01). The yield was statistically the same for the cv. Porrillo Sintético, ICA Pijao, and Talamanca with av. yields of 2589, 2532, and 2424 kg/ha, resp., and higher than that of Mexico 80-R (2170 kg/ha). (AS)

0133

27242 LOCASCIO, S.J. ; STALL, W.M. 1983. Weed control in snap beans. Proceedings of the Florida State Horticultural Society 96:90-92. En., Sum. En., 3 Ref. [Vegetable Crops Dept., Inst. of Food and Agricultural Sciences, Univ. of Florida, Gainesville, FL 32611, USA]

Phaseolus vulgaris. Snap beans. Herbicides. USA.

Snap beans were grown to evaluate 12 herbicides in 1982-83. Principal weeds were Euphorbia hirta in 1982 and Brassica kaber in 1983. Adequate broad-leaved weed control without reduction in vigor was provided by 0.85 kg ethalfluralin + 3.30 kg EPTC/ha, and 2.20 kg metolachlor/ha. Trifluralin at 0.85 kg/ha provided adequate control in 1983, but not in 1982. Preemergence treatments that provided control of Brachiaria platyphylla in 1982 and Digitaria sanguinalis and Eleusine indica in 1983 included ethalfluralin + EPTC, 0.85 kg pendimethalin/ha, and 2.20 kg metolachlor/ha. Postemergence grass control was excellent with 0.22 kg sethoxydim/ha, 0.28 kg fluazifop-butyl, and 0.28 kg CGA 82725 (chlorazifop). Moderate to good sedge control was obtained with EPTC and metolachlor treatments. (AS)

0134

27333 MICHEL JUNIOR, J... : FORNSTROM, K.J.; BORRELLI, J. 1985. Energy requirements of two tillage systems for irrigated sugarbeets, dry beans and corn. Transactions of the American Society of Agricultural Engineers 28(6):1731-1735. En., Sum. En., 12 Ref.

Phaseolus vulgaris. Land preparation. USA.

At the Torrington Research and Extension Center (Wyoming, USA.), a chisel-based tillage system was compared with a moldboard plow-based tillage system for irrigated sugar beets, dry beans, and maize. Speed, travel reduction, and time, power, energy, and fuel requirements were measured for each field operation for both tillage systems. Plant populations and yields were also sampled for the 2 yr of study. The chisel-based system produced equal yields with approx. 40 percent less energy, fuel, and time for preplant tillage operations. (AS)

0135

27387 MONTENEGRO G., V. ; CRIOLLO E., H. 1984. Efecto de la competencia entre el fríjol de clima frio variedad Diacol Andino y las malezas. (The effect of competition between cold climate bean cv. Diacol Andino and weeds). Revista de Ciencias Agrícolas 8(1-14):26-34. Es., Sum. Es., En., 7 Ref., Il. [Depto. de Producción Vegetal, Univ. de Nariño, Pasto, Colombia]

Phaseolus vulgari . Weeds. Yields. Weeding. Colombia.

The critical period of weed competition and their effect on the production of cold climate bean var. Diacol Andino were determined in a random block design with 7 treatments. These included bean plots completely weeded to completely weedy throughout the entire growth cycle. It was found that a crop left weedy throughout the season can cause losses up to 70 percent. The critical competition period was between 40-60 days after germination. (AS)

0136

27084 PEREZ, E. 1982. Principales malas hierbas en el cultivo del fríjol (Phaseolus vulgaris) en la provincia de Holguin. (Major weeds in bean crops in the province of Holguin). Ciencia y Técnica en la Agricultura. Protección de Plantas 5(3):117-129. Es., Sum. Es., En., 23 Ref., Il. [Inst. de Investigaciones de Sanidad Vegetal, Ministerio de la Agricultura, Ciudad de La Habana, Cuba]

Phaseolus vulgaris. Weeds. Herbicides. Cuba.

From 1978 to 1980, representative areas of the province of Holguin, Cuba, were sampled to determine the major weeds affecting crops of bean cv. Ica Pijao, Ica Tuy, Bolita 42, and Velazco Largo. The study was concentrated mainly in Velazco, which traditionally produces beans and where the local flora has been reported to include 25 families, 51 genera, and 61 species. The prevailing weed species were Chamaesyce hirta, Eleusina indica,

Echinochloa colona, Andropogon pertusus and A. caricosus, Boerhaavia erecta, Cyperus rotundus, Euphorbia heterophylla, Amaranthus dubius, and Leptochloa panicea. These determined 3 basic types of weeds: (1) annual grasses and dicotyledons, (2) annual species and perennial monocotyledons, and (3) perennial grasses and annual dicotyledons. The species found in fields treated with the herbicide trifluralin (1.0 kg a.i./ha) are listed, and these data are compared with the flora of untreated fields. Some recommendations are given based on these results. (AS)

0137

27449 ROBINSON, R.G. 1985. Tillage for sunflower control and for annual canarygrass and fieldbean production. Agronomy Journal 77(4):612-616. En., Sum. En., 13 Ref. [Univ. of Minnesota, St. Paul, MN 55108, USA]

Phaseolus vulgaris. Planting. Timing. Land preparation. Weeding. Weeds. Yields. USA.

The population density of Helianthus annuus and the performance of Phalaris canariensis and Phaseolus vulgaris following tillage treatments of moldboard plowing, chisel plowing, rototilling, or zero tillage repeated on the same plots for 5 yr were measured. Tillage plots, on Typic Hapludoll soil in Rosemount (Minnesota, USA), were divided into subplots of P. canariensis planted between 26 March-30 April and P. vulgaris planted between 21-25 May. Less than 1 percent of the H. annuus achenes survived more than 1 yr in the soil, but tillage and planting date determined whether H. annuus remained an important weed for 0, 1, 2, or 3 yr. H. annuus was a major weed the 1st year after H. annuus; however, the problem could be avoided by planting after mid-June in soil not tilled in the fall. Moldboard plowing, which buried 82 percent of the achenes over 10 cm deep, gave the best but not adequate control the 1st year. Zero tillage or chisel plowing in the spring eliminated H. annuus as an important weed after 1 yr, regardless of planting date. Chisel plowing in the fall or moldboard plowing in the spring tended to prolong the H. annuus problem beyond 2 yr. Weed control in both crops was poorest following zero tillage. Moldboard or chisel plowing in the spring resulted in highest av. yields of P. vulgaris. Highest yields of P. canariensis followed moldboard plowing. (AS)

0138

27041 SMUCKER, A.J.M. ; CHRISTENSON, D.R.; ASLAKSON, J.; ADAMS, M.W.; HOGABOAM, G.R.; SRIVASTAVA, A.K. 1982. Plant growth, ion accumulation and yield responses of drybeans, soybeans and sugarbeet cultivars to secondary tillage treatments of a Charity clay soil. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1982 Research Report. pp.132-150. En.

Phaseolus vulgaris. Land preparation. Growth. Mineral content. Shoots. K. N. P. Ca. Mg. Zn. Mn. Yields. USA.

The effects of different secondary tillage treatments on plant growth, ion accumulation, and yields of bean cv. BTS, Swan Valley, NEP-2, and Domino were studied in a Charity clay soil at the Saginaw Valley bean-beet research farm (Michigan, USA). Treatments were no tillage, conventional tillage, and excessive tillage. Excessive secondary tillage and traffic significantly increased the bulk density of the soil to a depth of approx. 15 cm. Seedling emergence was significantly lower 11 days after planting on the excessively tilled soils and somewhat better in conventional tillage treatments. Emergence of white-seeded cv. was significantly greater on all tillage treatments than the black-seeded cv. Plant growth during the 1st 6 wk. was greatly reduced by the excessively tilled and compacted soils. Yield reductions due to excessive tillage ranged between 13-46 percent. Swan Valley was the most tolerant to soil compaction, yielding 2813, 2630, and 2489 kg/ha for the no tillage, conventional, and excessive tillage

treatments, resp. Excessive tillage reduced K concn. of plant shoots and the N, P, Ca, Mg, Zn, and Mn concn. increased in the smaller plants growing in compacted soils. The data are presented in table form. (CIAT)

0139

27398 WILSON, R.G. ; KERR, E.D.; NELSON, L.A. 1985. Potential for using weed seed content in the soil to predict future weed problems. Weed Science 33(2):171-175. En., Sum. En., 17 Ref. [Univ. of Nebraska, Scottsbluff, NE 69361, USA]

Phaseolus vulgaris. Weeds. USA.

In expt. carried out in Scottsbluff (Nebraska, USA), the seed composition in the upper 15 cm of the soil horizon was determined and correlated with weed seedlings growing with bean cv. Valley. The total seed reservoir averaged 250 seeds/kg soil, and 19 species were represented. Seed occurring with the most frequency were Amaranthus retroflexus, Chenopodium album, and Portulaca oleracea. Seed from these plants accounted for over 85 percent of the seed found. The no. of Echinochloa crus-galli, Solanum rostratum, P. oleracea, and Helianthus annuus seed in the soil was correlated with the no. of plants growing in the field with beans. A correlation occurred between A. retroflexus, Setaria lutescens, and E. crus-galli growing in maize fields in the fall of the year and plants growing in the field with beans the following year. (AS) See also 0107 0108 0121 0147 0148 0149 0152 0157 0200 0205 0246 0330 0344

D03 Cultivation Systems: Intercropping, Rotational Crops

0140

27402 BROWN, J.E. ; SPLITTSTOESSER, W.E.; GERBER, J.M. 1985. Production and economic returns of three vegetable double-cropping systems. Journal of the American Society for Horticultural Science 110(3):414-417. En., Sum. En., 16 Ref. [101 Funches Hall, Dept. of Hort., Auburn Univ., Auburn, AL 36848, USA]

Phaseolus vulgaris. Snap beans. Intercropping. Zea mays. Brassica oleracea. Yields. Incomc. USA.

Snap beans Bush Blue Lake, sweet corn Sundance, cauliflower Snow Crown, summer squash Zucchini Elite, and broccoli Green Comet were used to compare double cropping systems with monocropped systems. The double cropping systems used were spring snap bean and fall cauliflower, summer squash and fall broccoli, and spring sweet corn and fall snap beans. The monocrop system was used as a control for the double cropping systems. The greatest net returns were (1) squash monocropped or squash/broccoli double-cropped, (2) squash double-cropped, (3) cauliflower or cauliflower/snap bean double-cropped, and (4) broccoli or cauliflower or snap beans monocropped. Fall snap beans provided the least economic return. The double cropping system allows an option of crop production with a potencial increase in yield and economic returns using half the amount of land/yr required for either crop grown in monoculture. In addition, these systems reduce the risk of economic failure during a year of low market demand for either crop grown alone. (AS)

0141

27314 CHAGAS, J.M. ; ARAUJO, G.A.A.; VIEIRA, C. 1984. O consorcio de culturas e razoes de sua utilizacao. (Associated cropping and reasons for its use). Informe Agropecuario 10(118):10-12. Pt., 14 Ref., Il. [Empresa Brasileira de Pesquisa Agropecuaria, Empresa Agropecuaria de Minas Gerais, Caixa Postal 216, 36.570 Vicosa-MG, Brasil]

Phaseolus vulgaris. Intercropping. Zea mays. Sorghum vulgare. Manihot esculenta. Saccharum officinarum. Yields. Brazil.

The practice of intercropping, mainly with reference to Brazil, is briefly reviewed. Beans are the most popular crop grown in association with maize, sorghum, cassava, and sugarcane. It is estimated that at least 70 percent of beans in Brazil are grown by this method. (CIAT)

0142

27030 CHRISTENSON, D.R. ; BRICKER, C. 1982. Soil fertility and management for the production of sugar beets, navy beans, corn, and soybeans. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1982 Research Report. pp.5-9. En.

Phaseolus vulgaris. Rotational crops. Organic matter. Yields. USA.

Results are presented of the investigations carried out to (1) study the effect of length of rotation, cropping system, and cropping sequence on production, yield, and quality of navy beans and sugar beets, and (2) evaluate the effect of return of OM on yields as related to selected soil properties. Bean yields followed the same pattern as shown in other years; more intensive rotations (beans and beets) yield less (1807 kg/ha) than less intensive rotations such as maize-beans-beets (1990 kg/ha) or oats-beans-beets (1944 kg/ha). It was observed that a 4-yr rotation yields more (1978 kg/ha) than shorter rotations of 3 and 2 yr. (1853 and 1898 kg/ha, resp.) and that the return of OM favors higher yields. Fusarium incidence did not vary with crop sequence as much as was expected and remained low. (CIAT)

0143

27014 CHRISTENSON, D.R. ; BRICKER, C.; REISEN, J. 1981. Soil fertility and management for the production of sugar beets, navy beans, corn, and soybeans. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1981 Research Report. pp.5-14. En.

Phaseolus vulgaris. Rotational crops. Fusarium. Mineral content. Fertilizers. Fe. Cu. Zn. N. P. K. Ca. Mg. Mn. USA.

The results obtained in 1981 and the av. of the period 1975-81 are presented for expt. carried out to compare various combinations of crop rotations, which included maize, sugar beets, navy beans, oats, and alfalfa. In general, beans yielded less (1818.6 kg/ha) in the most intensive rotations (beans-sugar beets) than in the less intensive rotations (maize-beans-sugar beets or oats-beans-sugar beets with av. yields of 2011.8 and 1955.0 kg/ha, resp., for the period 1975-81). The interaction between cropping system and length of rotation, however was not significant. Fusarium root rot incidence was lowest in the sugar beets-beans rotation and highest in maize-beans. Data are presented regarding the effect of length of rotation and cropping sequence on N, P, K, Ca, Mg, Mn, Fe, Cu, and Zn concn. in 5-wk.-old navy bean plants for 1981 and for 1978-81. (CIAT)

0144

26080 CIFUENTES V., F.R. 1984. Evaluación del efecto de nitrógeno y fósforo sobre los sistemas maíz-fríjol-sorgo y fríjol-sorgo, en el sur-oriente del país. (Evaluation of the effect of nitrogen and phosphorus on the maize-beans-sorghum and beans-sorghum cropping systems, in the southeast region of the country). Tesis Ing.Agr. Guatemala, Universidad de San Carlos. 68p. Es., Sum. Es., 23 Ref., Il.

Phaseolus vulgaris. Intercropping. Zea mays. Sorghum vulgare. Fertilizers. N. P. Income. Costs. Guatemala.

To determine optimum N and P doses, 3 expt. were set up in Quesada for the bean-sorghum cropping system and 3 expt. in Jutiapa for the maize-bean-

sorghum system, both sites located in the department of Jutiapa, Guatemala. Doses of 50-150 kg N and 0-90 kg P/ha were evaluated for the maize-bean-sorghum system, and of 30-120 kg N and 0-90 kg P/ha for the bean-sorghum system. For the maize-bean-sorghum system the optimum economic av. dose for unlimited capital was 115 and 45 kg N and P/ha, resp., and for limited capital it was 83 and 30 kg N and P/ha, resp. For the bean-sorghum system, the optimum economic av. dose for unlimited capital was 90 and 90 kg N and P/ha, resp., and for limited capital it was 30 and 0 kg N and P/ha, resp. (AS (extract)-CIAT)

0145

26567 DZIETROR, A. 1984. Studies in polyculture: yield, disease and insect pest response in oat-wheat-barley mixtures and sweet corn-dry bean intercrops. Ph.D. Thesis. Ithaca, N.Y., Cornell University. 165p. En., Sum. En., 49 Ref.

Phaseolus vulgaris. Yields. Cultivars. Zea mays. Intercropping. Epilachna varivestis. Planting. Spacing. USA.

Field expt. were conducted to compare the yield, disease, and insect pest response of oats, wheat, and barley grown in mixtures, and of sweet maiz-dry bean intercrop patterns in New York (USA) in 1982 and 1983. The maize-bean tests were performed only in Aurora. In the maize-bean intercrops, significant yield increases were obtained from beans only, compared with monocropped beans. Yield gains were larger in 1982 than in the drier 1983. The activity of Ostrinia nubilalis larvae on sweet maize and of the Epilachna varivestis on beans was not significantly affected by polyculture, though beans in some polyculture planting patterns showed slightly reduced beetle feeding damage. It was concluded that no significant change occurred in the polyculture environment to significantly influence pest activity. Beans in polyculture showed increased foliage growth, and evidence was presented that suggests that the greater productivity of beans in polyculture was due to wind protection by the intercropped maize. (Dissertation Abstracts International (extract))

0146

27367 MULLINS, C.A. 1985. Effect of crop rotation on snap bean production. Bean Improvement Cooperative. Annual Report 28:107-109. En., 3 Ref. [Dept. of Plant & Soil Science, Univ. of Tennessee Plateau Experiment Station, Rt. 9, Box 363, Crossville, TN 38555, USA]

Phaseolus vulgaris. Snap beans. Rotational crops. Yields. USA.

A 5-yr trial was initiated in 1982 at the U. of Tennessee Plateau Expt. Station (USA) to obtain information on crop rotation for snap beans in this area. A plot rotated out of snap beans in 1979 and 1980 and planted to snap beans in 1981 was selected for the study. Rotation crops were snap beans, field maize, wheat, and grass. Rotation sequence had little effect on the fall bean yield in 1983. Rotation effects were most evident in the spring of 1984 when yields were highest in plots in sod the previous 2 yr. Plots that had 2 crops of snap beans in 1982 and field maize in 1983 had a moderate bean yield. It is evident that 2 yr out of snap beans is best, but double cropping did not appear as detrimental as was expected. (CIAT)

0147

27243 PEREIRA FILHO, I.A. ; RAMALHO, M.A.P. 1985. Efeito do dobramento do milho na producao do feijao consorciado. (Bean production as affected by folding maize stalks in a maize-bean intercropping system). Pesquisa Agropecuária Brasileira 20(11):1279-1288. Pt., Sum. Pt., En., 17 Ref., Il. [Empresa Brasileira de Pesquisa Agropecuaria, Empresa de Pesquisa Agropecuaria do Estado de Minas Gerais, Estacao Experimental de Patos de Minas, Caixa Postal 135, 38.700 Patos de Minas-MG, Brasil]

Phaseolus vulgaris. Intercropping. Zea mays. Cultivars. Brazil.

The effect of folding maize below the ear on bean production was evaluated in an intercropping system in Patos de Minas (Minas Gerais, Brazil) from 1981-82 to 1983-84. Tall- and short-statured maize and growth habit type II and III beans were evaluated in a randomized split-plot design with 5 replications. The maize cv. were planted in the plots and the effect of folding the stalks below the ear in the subplots. Stalks were folded shortly after physiological maturity and the bean cv. were planted immediately. Maize production was not affected by the folding of the stalk and the av. bean production was reduced 40 percent in the intercropping system as compared with that of the monoculture system. The folding of the tall-statured maize cv. did not increase bean yield, whereas the folding of short-statured maize cv. increased bean yield by an av. of 12 percent. No significant interaction of maize cv. x bean cv. or the practice of folding the stalks x bean cv. was detected. (AS)

0148

27316 RAMALHO, M.A.P. ; COELHO, A.M. 1984. Consorcio de milho verde com feijao na entressafra. (Associated cropping of green maize and beans between main crops). Informe Agropecuario 10(118):26-29. Pt., Sum. Pt., 12 Ref., Il. [Escola Superior de Agricultura de Lavras, Caixa Postal 37, 37.200 Lavras-MG, Brasil]

Phaseolus vulgaris. Intercropping. Zea mays. Planting. Timing. Cultivars. Yields. Fertilizers. N. Brazil.

In Minas Gerais, Brazil, trials were conducted to study the possibility of growing maize for production of green cobs in association with beans. Information is given on sowing date, maize and bean cv., and effect of N sources. It is possible to obtain high yields of green maize grown under irrigation during Feb.-Sept. Intercropping with beans reduced the yield of green cobs by 17 percent, indicating it is not economically advantageous. Maize cv. BR105 and BR126 are recommended for sowing in winter for production of green cobs. (CIAT)

0149

27315 RAMALHO, M.A.P. ; CRUZ, J.C. 1984. Mecanizacao de cultura consorciada de milho com feijao. (Mechanization of associated cropping of maize and beans). Informe Agropecuario 10(118):19-24. Pt., Sum. Pt., 23 Ref., Il. [Escola Superior de Agricultura de Lavras, Caixa Postal 37, 37.200 Lavras-MG, Brasil]

Phaseolus vulgaris. Intercropping. Zea mays. Mechanization. Cultivation. Brazil.

Information on techniques and machines that are available to small farmers and the use of animal traction are discussed in relation to mechanization of maize/bean intercropping. (CIAT)

0150

27360 RAMALHO, M.A.P. 1983. Consorciacao milho-feijao. (Maize/bean intercropping). Lavoura 85:36-38. Pt., Il.

Phaseolus vulgaris. Intercropping. Zea mays. Brazil.

The advantages and disadvantages of the beans-maize intercropping system are briefly discussed. The following intercropping systems are briefly described: beans planted before maize, simultaneous planting of both crops, beans planted in the maize row, bean planted between the maize rows, planting of beans and maize on alternate strips, and planting of beans after the physiological maturity of maize. (CIAT)

0151

27301 SABORIO M., M. ; ARAYA V., R. 1983. Efecto del sombreamiento de tres cultivares de maíz (Zea mays) y su fertilización residual sobre dieciseis cultivares de fríjol (Phaseolus vulgaris) en asociación de relevo. (Effect of shading of three maize cultivars and their residual fertilizer on sixteen bush bean cultivars in a relay cropping system). Boletin Técnico Estación Experimental Fabio Baudrit 16(4):14-20. Es., Sum. Es., 17 Ref.

Phaseolus vulgaris. Shading. Relay crop. Zea mays. Cultivars. Yields. Yield components. Costa Rica.

The effect of the shade of 3 maize cv. of different growth habits on 16 bush bean cv. was studied in Grecia, Costa Rica. Plots where the maize plants were removed 1 day before the bean sowing were used as check. Also, the effect of the residual fertilizer from maize on beans sown in a relay planting system was studied. Unfertilized, monocropped beans with the same planting distance between rows as that of maize were used as check. The differences of the penetration of light through the maize plant had no influence on bean yield. There was no statistical difference in bean yield between the plot which had maize plants up to the day before bean sowing and the plot with a relay planting system. Differences in yield between bean cv. were due to genotypic differences. The fertilization of maize had no influence on bean yield. (AS)

0152

27313 SOUZA FILHO, B.F. DE 1984. Consórcio feijao x cana-de-acúcar. (Beans/sugarcane intercropping). Informe Agropecuário 10(118):34-36,38-39. Pt., Sum. Pt., 9 Ref., Il. [Empresa de Pesquisa Agropecuaria do Estado do Rio de Janeiro, Caixa Postal 23124, 24.000 Niterói-RJ, Brasil]

Phaseolus vulgaris. Intercropping. Saccharum officinarum. Planting. Timing. Spacing. Yields. Cultivars. Herbicides. Brazil.

Technical, social, and economic aspects of growing beans in association with sugarcane, a traditional cropping system in Brazil especially among small sugarcane growers, are examined. These include sowing date for beans, methods of establishment, bean cv., herbicides, pests and diseases. (CIAT)

0153

27310 SOUZA FILHO, B.F. DE ; ANDRADE, M.J.B. DE 1984. Influencia de diferentes populacoes de plantas no consórcio milho x feijao. (Influence of different plant populations in maize/bean intercropping). Pesquisa Agropecuária Brasileira 19(4):469-471. Pt., Sum. Pt., En., 9 Ref., Il.

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

During 1977-80, 5 expt. were carried out in Rio de Janeiro, Brazil, to study the influence of plant populations in maize/bean intercropping. Maize yield was not influenced by intercropping, and 2 harvests of beans in the same maize crop were possible. Results showed that the most compatible plant combination were 40,000 maize plants and 120,000 bean plants/ha for simultaneous sowing, whereas a plant population of 240,000 bean plants/ha was more efficient for relay cropping after the physiological maturity of maize. (AS)

0154

20024 VALLE B., R. DEL 1978. La asociación maíz-frijol de guia sembrada en surcos dobles (0.4 m entre pares de surcos) con calles anchas de dos metros, una alternativa para intercalar trigo en areas de temporal. (Double-row maize/climbing bean association (0.4 m between the pairs of rows), an alternative for intercropping wheat in rainfed areas). Tesis Mag.So. Chapingo, Mexico, Colegio de Postgraduados. 290p. Es., Sum. Es., 68 Ref., Il.

Phaseolus vulgaris. Intercropping. Zea mays. Planting. Yields. Income. Triticum. Mexico.

A double-row planting pattern (0.4 m between pairs and 2.0 m between rows) for a maize-bean association, with wheat planted in the wide rows, was compared with the traditional maize-bean planting system, in 5 municipalities of Chimaltenango, Guatemala, where smallholdings predominate. A total of 8 plots, with 8 treatments each, were studied. Variance analysis and electronic computer analysis (SAS-72 package) were used for measuring maize, wheat, and bean yields, and net income. Results are presented for the mean of 21 treatments. The factors planting system, maize-bean spacings, and no. of bean plants/maize plant had a significant effect on bean yields; the introduced planting system and the maize-bean spacing of 0.8 m reduced bean productivity (226 to 197 and 243 to 179 kg/ha, resp.). The highest net income was obtained with the following treatment: traditional planting system, 60 kg N and 30 kg P/ha, 1.0 m between maize and bean plants, and 1 bean plant/maize plant. (CIAT)

0155

27051 WARREN, A. 1985. Malawi: bean cropping systems. In Bean production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 4p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Intercropping. Zea mays. Relay crops. Malawi.

The major bean cropping systems using in the Southern Highlands, Northern Region, and Central Plateau of Malawi are briefly described. Some problems encountered when intercropping beans with maize are mentioned. (CIAT)

0156

27044 WARREN, A. 1985. Tanzania: soils. In Bean production in Tanzania. Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 1p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Nitrogen fixation. Intercropping. Zea mays. Tanzania.

An expt. to study N fixation in different maize/bean intercropping systems in Tanzania is briefly outlined. (CIAT)

0157

27061 WARREN, A. 1985. Zimbabwe: bean cropping systems. In Bean production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 3p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Cultivation systems. Cultivation. Zimbabwe.

The main bean cropping systems in Zimbabwe are briefly described. Information is given on cultivated var., planting dates, cultivated area, yields, and production constraints. (CIAT) See also 0205 0289

D04 Seed Production

0158

27235 NICHOLLS, C.F. ; GLASSMAN, S.B. 1985. A portable bean size grader. Canadian Agricultural Engineering 27(1):55-57. En., Sum. En., 1 Ref., Il. [Food Production & Inspection Branch, Agricultural Inspection Directorate, Agriculture Canada, Toronto, Ontario, Canada M6A 3A6]
Phaseolus vulgaris. Seed. Seed characters. Agricultural equipment. Canada.

A convenient and portable system was designed for field use to classify small samples of bean seed. Seed is marketed in Canada according to standards of the Seed Act and Regulations. The uniformity of seed size is a quality factor for soybean and beans. (AS (extract))

0159

27054 WARREN, A. 1985. Zambia: bean seed. In Bean production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 1p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Seed production. Zambia.

The reasons why bean seed production has declined in Zambia are mentioned and planting and fertilization practices are briefly described. (CIAT)

D05 Varietal Trials

0160

27018 ADAMS, M.W. ; GHADERI, A.; KELLY, J.; TAYLOR, J. 1981. Bean yield tests in 1981. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1981 Report. pp.48-72. En.

Phaseolus vulgaris. Plant introductions. Cultivars. Adaptation. Drought. Yields. USA.

A total of 438 bean entries were evaluated for yield in 20 field tests in 1981. Although most of the entries were navies, 3 of the tests were for black beans and 1 each for pintos and for great northerns and small reds. In general, there was a low level of Xanthomonas phaseoli. The most important factor affecting yield, other than genetic differences, was the 25 days of drought with high daytime temp. Fleetwood, selected as the standard bush bean check in all navy bean trials, was severely affected by the drought and heat. On the other hand, var. Swan Valley and Neptune, selected as architypes, ranked near the top in yield in most trials. Regarding navy beans, new high yielding architypes have been detected that possess mosaic resistance and a high level of tolerance or resistance to rust and to air pollution. The alpha race of anthracnose is a potential problem because these types are not resistant to that race. The situation is similar for black beans. For pintos, great northerns, and small reds, there are serious problems with presently available var. because of lodging. In addition, bean rust can be severe on pinto and great northerns; pinto var. Olathe is rust-resistant. (CIAT)

0161

27345 ARAYA V., R. ; ALFARO M., R.; MORALES G., A. 1982. Programa cooperativo de investigación en las leguminosas de grano comestible UCR-MAG. (Cooperative research program in edible grain legumes UCR-MAG). In Universidad de Costa Rica. Estación Experimental Agrícola Fabio Baudrit. Informe Anual de Labores 1982. Alajuela, Costa Rica. pp.88-94. Es.

Phaseolus vulgaris. Cultivars. Adaptation. Seed color. Yields. Resistance. Rhizoctonia solani. Costa Rica.

The cv. selected during 1981 were included as the controls in 1982 to evaluate the genetic potential and adaptation of new materials. Red bean cv. Corobicí, Chorotega, R-79, Acacias 4, and BAT 789 were outstanding because of their earliness and yields. Among the black types, line D-145 was outstanding for its yields and tolerance to Rhizoctonia solani and rust. The results of the evaluations of the different var. (red- and black-seeded) in several localities of Costa Rica are given in table form. The results of the evaluation of 36 exptl. lines for their tolerance to R. solani and their adaptation are also included. (CIAT)

0162

27350 BORGES, F., O.L. ; MORA N., O.A. 1982. Mejoramiento genético de la caraota (Phaseolus vulgaris) avances durante el período 1980-81. (Genetic improvement of beans; progress during 1980-81). In Universidad Central de Venezuela. Instituto de Genética. Informe de Investigación 1980. Maracay. pp.57-67. Es., Il.

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Resistance. Uromyces phaseoli. Isariopsis griseola. Viroses. Injurious insects. Venezuela.

The performance of 155 bean cv. was evaluated in observation plots in the localities of Guarabo, El Tigre, and Maracay (Venezuela). The reactions of some selected cv. to diseases (rust, viruses, and angular leaf spot) and insect pests (mining insects) were also evaluated. In Guarabo, the av. yield was low, but superior to that of El Tigre. Cv. in Maracay had the highest av. yields (1945.1 kg/ha, av. for 80 var.). The black bean IBYAN-80 was evaluated in Guarabo in collaboration with CIAT. In this trial 14 var. were evaluated for their yields, reactions to diseases and pests, and some agronomic characters. (CIAT)

0163

27401 CASTILLO, R.M. 1984. Estabilidad en rendimiento de frijol Phaseolus vulgaris L. en la zona templada húmeda de México. (Yield stability of beans in the moist temperate zone of Mexico). Agricultura Técnica en México 10(2):133-151. Es., Sum. Es., 20 Ref., Il. [Inst. de Investigaciones Agrícolas, Campo Agrícola Experimental Los Altos de Jalisco, México]

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Mexico.

In a uniform trial at 10 sites of the moist temperate zone of Mexico during 1981, yield stability of 21 bean var. was evaluated to identify materials with general and specific adaptation. Sixteen stable var. were identified and of these, 8 gave high yields. Var. Canario Guanajuato 43 showed good response in the least favorable environments, and the materials Bayo 400 and 997-CH-73 showed good response only in favorable environments. (AS (extract)-CIAT)

0164

27348 MORA N., O.A. ; DE CORDOVA, O.; BORGES F., O.L. 1982. Estabilidad de rendimiento en el ensayo internacional de caraota (IBYAN-79) en Venezuela. (Yield stability in the international bean trial (IBYAN-79) in Venezuela). In Universidad Central de Venezuela. Instituto de Genética. Informe de Investigación 1980. Maracay. pp.91-105. Es., 11 Ref., Il.

Phaseolus vulgaris. Cultivars. Plant introductions. Adaptation. Yields. Venezuela.

Three expt. were carried out in the states of Aragua and Carabobo (Venezuela) to determine yield stability of commercial black bean var. in comparison with materials from the IBYAN-79 distributed by CIAT. A total of

18 IBYAN genotypes and 3 local checks (Cubagua, Coche, and Tacarigua) were planted in 3 localities (San Joaquín and Samán Mocho in Carabobo, and Turmero in Aragua). Genotype BAT-64 showed the highest yield stability. Genotypes BAT-448, DOR-15, BAT-58, BAT-140, and BAT-261 were outstanding for their high yields. Venezuelan var. Coche, although unstable, showed the best yield potential and it is recommended to be used as a parent in crosses. (CIAT)

0165

27031 TAYLOR, J. ; KELLY, J.; GHADERI, A.; ADAMS, M.W. 1982. 1982 dry bean variety and strain evaluation trials. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1982 Research Report. pp.23-52. En., Sum. En.

Phaseolus vulgaris. Cultivars. Germplasm. Seed color. Adaptation. Yields. USA.

A total of 316 entries, mostly navy beans with several blacks, were evaluated in 1982. In addition, there were special tests of pinto and great northern lines and var. The results of each test are briefly discussed. In general, the trials encountered cool and wet growing conditions after emergence, preventing the attainment of the early vigor so essential to high yields. Var. Fleetwood, which was planted in all but 1 nursery as a check, never quite produced 2273 kg/ha. Swan Valley did not attain the yields normally expected (2842 kg/ha) but outyielded Fleetwood by an av. of 15 percent in 7 trials. In the 7 navy bean trials, the av. increase of the top-yielding accessions over Fleetwood was 33 percent; it is considered that there may be a substancial no. of excellent yielding lines in the advanced material already available. In the black bean trial, 12 out of 49 lines (including var. Domino) yielded 2728 kg/ha or more. Among other bean types, the pintos had the best performance but all entries lodged severely and had to be hand-pulled at harvest. (CIAT)

0166

27419 VIEIRA, C. ; SILVA. C.C. DA; CHAGAS, J.M.; ARAUJO, G.A. DE A. 1985. Comportamento de cultivares de feijao (Phaseolus vulgaris L.) na Zona da Mata de Minas Gerais - IV. (Performance of bean cultivars in the Zona da Mata, Minas Gerais - IV). Revista Ceres 32(182):319-330. Pt., Sum Pt., En., 6 Ref. [Depto. de Fitotecnia, Univ. Federal de Vicosa, 36.570 Vicosa-MG, Brasil]

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Brazil.

Seventeen bean yield trials were carried out in 6 municipalities of the Zona da Mata area (Minas Gerais, Brazil) during 1982-83 and 1983-84. Twenty cv. were included in all or in most of the trials. The most productive cv. were the following black beans: Milionário 1732 (av. yield 1604 kg/ha, max. yield 2905 kg/ha), Rico 1735 (1501 and 2921 kg/ha), BAT 445 (1455 and 2774 kg/ha), BAT 304 (1455 and 2331 kg/ha), and BAT 1057 (1392 and 2690 kg/ha). Milionário 1732 and Rico 1735 were also little affected by diseases. Among the nonblack beans, CNF 10 (purple seeds) was the most productive cv. (av. yield 1317 kg/ha, max. yield 2278 kg/ha), ranking 7th overall. (AS) See also 0106 0286 0289

E00 PLANT PHYSIOLOGY

0167

27060 WARREN, A. 1985. Zimbabwe: bean diseases. In Bean production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 1p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Diseases and pathogens. Zimbabwe.

Bean disease problems are relatively few in Zimbabwe due to the planting of beans only during the dry winter season. However, at the 2 low veld research stations, spray irrigation has resulted in a higher incidence of blights, anthracnose, rust, and Rhizoctonia. The small-scale irrigation schemes using flood irrigation were not affected. In the high veld, bean rust, common bacterial blight, Alternaria leaf spot, BCMV, and anthracnose were important in 6 trials carried out over the last 2 yr. (CIAT) See also 0091 0275 0285

E02 Bacterioses

0168

27361 ALLAVENA, A. 1985. Infection of Phaseolus vulgaris with strains of Agrobacterium tumefaciens and A. rhizogenes. Bean Improvement Cooperative. Annual Report 28:90-91. En., 2 Ref. [Experimental Inst. of Vegetable Crops, Via Paullese, 28, 20075 Montanaso, Lombardo, Milan, Italy]

Phaseolus vulgaris. Agrobacterium tumefaciens. Agrobacterium rhizogenes. Pathogenicity. Inoculation. Italy.

T37 strain of Agrobacterium tumefaciens and strain 1855 of A. rhizogenes were applied separately in an in vivo expt. to primary leaves of each of the bean genotypes Giulia, Lena, Lodino, Bico de Ouro, and P263. For the in vitro expt., axenic plantlets of the genotypes Mary, Giulia, Lena, Bico de Ouro, Arcano, P263, Lodino, Morena, and Taylor, grown in test tubes, were infected with T37 strain. The possibility to transform bean cells with Agrobacterium strains was confirmed with all the bean genotypes tested. Considering the present difficulty in beans to build a reliable protocol for plant regeneration via in vitro tissue culture, the approach with Agrobacterium should be emphasized parallel to classical protocol. (CIAT)

0169

27353 DIAZ, W. ; BORGES F., O.L. 1983. Comparación de tres técnicas de inoculación para detectar resistencia intermedia a Xanthomonas campestris pv. phaseoli, en condiciones de campo. (Comparison of three inoculation techniques for the detection of intermediate resistance to Xanthomonas campestris pv. phaseoli under field conditions). In Universidad Central de Venezuela. Instituto de Genética. Informe de Investigación 1983. Maracay. pp.65-69. Es., 3 Ref.

Phaseolus vulgaris. Xanthomonas phaseoli. Inoculation. Cultivars. Venezuela.

Three inoculation methods of bean plants with Xanthomonas campestris pv. phaseoli were evaluated under field conditions at the Samán Mocho exptl. station (Carabobo, Venezuela). These were (1) infiltration by pressure, (2) leaf cutting with razor blades immersed in bacterial suspension, and (3) natural infestation. Var. Tacarigua (susceptible check), J.G. 5056 (resistant check), J.G. 6076 (Porrillo Sintético), J.G. 6086 (BAT-448), and J.G. 6138 (Selenco Cuva) were used. The infiltration by pressure method is the most adequate for detecting intermediate resistance in var. since it separates them into a greater no. of reaction types than the razor blade method. The method of natural infestation did not function since there was not enough dispersion of the pathogen in the field. (CIAT)

0170

27206 FERGUSON, I.B. ; MITCHELL, R.E. 1985. Stimulation of ethylene production in bean leaf dics by the pseudomonad phytotoxin coronatine. Plant Physiology 77(4):969-973. En., Sum. En., 28 Ref., Il. [Division of Horticulture & Processing, Dept. of Scientific & Industrial Research, Private Bag, Auckland, New Zealand]

Phaseolus vulgaris. Pseudomonas syringae. Toxins. Ethylene production. New Zealand.

The hypothesis that coronatine, a toxin produced by Pseudomonas syringae pv. glycinea that induces the same chlorotic response in bean leaves as does infection by the bacterial pathogen, may influence ethylene production in bean leaf tissue was tested. Although the structure of coronatine is known, the biological mode of action is not. When coronatine was applied to bean leaf discs in solution, or to intact leaves through prick application, a substantial stimulation of ethylene production was measured. This stimulation was concomitant with an increase in 1-aminocyclopropane-1-carboxylic acid content of the tissue, and occurred under the same conditions as did the chlorotic response to the toxin. The whole, unhydrolyzed coronatine molecule is probably necessary to elicit both the ethylene and chlorosis responses since neither hydrolysis product is effective alone. (AS (extract))

0171

27283 GUILLAUME, F.M. ; KENNEDY, B.W.; CARLSON, L.; KOUKKARI, W.L. 1986. Leaf movement alterations on bean plants with common bacterial blight. Phytopathology 76(3):270-272. En., Sum. En., 14 Ref., Il. [Dept. of Botany, Univ. of Minnesota, St. Paul 55108, USA]

Phaseolus vulgaris. Xanthomonas phaseoli. Leaves. Plant physiological disorders. USA.

Rhythmic movements of unifoliolate leaves of Phaseolus vulgaris Bush Blue Lake that develop wilt following inoculation with Xanthomonas campestris pv. phaseoli continue for several days following inoculation. Three types of patterns have been identified in movements of diseased leaves that distinguish them from the normal rhythmic patterns of healthy leaves. These special patterns occur during the light span, are absent in darkness, and continue for various duration of time prior to death of the plant. (AS)

0172

27098 KENNEDY, B.W. ; DENNY, R.L.; CARLSON, L.; KOUKKARI, W.L. 1986. Effect of bacterial infection on speed and horizontal trajectory of circumnutation in bean shoots. Phytopatholoy 76(7):712-715. En., Sum. En., 7 Ref., Il. [Dept. of Plant Pathology, Univ. of Minnesota, St. Paul, MN 55108, USA]

Phaseolus vulgaris. Xanthomonas phaseoli. Corynebacterium flaccumfaciens. Shoots. USA.

The effects of 2 bacterial pathogens, Xanthomonas campestris pv. phaseoli and Corynebacterium flaccumfaciens, on the speed and configuration of rotations (circumnutations) of the shoot tips of diseased plants of bean cv. Kentucky Wonder, were determined. The pattern of horizontal trajectory and speed of the shoot tip were influenced by length of free-moving shoot. In infected plants, the length of the shoot was often reduced, along with the speed of the tip; however, when shoots of healthy and infected plants were of equal length, speed was slower in infected plants. Results from these studies suggest that effects of the 2 bacterial pathogens on circumnutation movements of bean shoots involve more than a reduction in shoot length. (CIAT)

0173

27269 LAURENCE, J.A. ; REYNOLDS, K.L. 1986. The joint action of hydrogen fluoride and sulfur dioxide on the development of common blight of red kidney bean. Phytopathology 76(5):514-517. En., Sum. En., 19 Ref., Il. [Boyce Thompson Inst. for Plant Research at Cornell Univ., Ithaca, NY 14853-1801, USA]

Phaseolus vulgaris. Xanthomonas phaseoli. Air pollution. USA.

Three-wk.-old Phaseolus vulgaris California Light Red Kidney plants were exposed to fluoride as HF at 0, 1, or 3 micrograms/cubic meter in filtered air, SO2 at 0, 260, or 780 micrograms/cubic meter in filtered air, or all combinations of the 2 gases. Exposures were conducted continuously (HF) or for 6 h daily (SO2) for 5 days before, after, or before and after inoculation with Xanthomonas campestris pv. phaseoli. Diameters of lesions were measured when 1st visible and again 10 days after inoculation. Leaf-surface populations of the pathogen were established and assayed at 5-day intervals for 15 days. Preinoculation and postinoculation exposure to SO2 caused significantly smaller lesions and longer latent periods. Postinoculation exposure to HF resulted in significantly longer latent periods. Interactions between the 2 gases occurred only when the exposures were concurrent. In general, the joint action of the 2 gases resulted in smaller lesions and longer latent periods. The pollutants did not significantly alter the growth of the pathogen in the resident phase. (AS)

0174

27373 LEYNA, H.K. ; COYNE, D.P. 1985. The effect of inoculation methods, pathogenic variability and inoculum concentrations on reactions and genetics of resistance to isolates of Xanthomonas campestris p.v. phaseoli in leaves and pods of dry beans (Phaseolus vulgaris L.). Bean Improvement Cooperative. Annual Report 28:70-71. En. [Dept. of Horticulture, Univ. of Nebraska, Lincoln, NB 68583, USA]

Phaseolus vulgaris. Cultivars. Inoculation. Leaves. Pods. Isolation. Xanthomonas phaseoli. Resistance. Inheritance. USA.

Several methods of inoculation were evaluated on leaves and pods of 4 greenhouse-grown bean cv. using 3 isolates of Xanthomonas campestris pv. phaseoli. Multiple needle and dissecting needle techniques were more practical in evaluating cv. Five inoculum concn. of each of the 3 isolates were evaluated on fully developed 1st trifoliate leaves of 8 cv./lines. Significant differences were observed between overall means of leaf reactions for cv./lines, bacterial isolates, and inoculum concn. Also, significant interactions were observed between cv. x concn., cv. x bacterial isolate, isolate x concn., and cv. x isolate x concn. Leaf and pod reactions to all 3 isolates were quantitatively inherited. (CIAT)

0175

26276 LINDEMANN, J. ; UPPER, C.D. 1985. Aerial dispersal of epiphytic bacteria over bean plants. Applied and Environmental Microbiology 50(5):1229-1232. En., Sum. En., 24 Ref., Il. [Advanced Genetic Sciences, Inc., Oakland, CA 94608, USA]

Phaseolus vulgaris. Snap beans. Canopy. Leaves. Bacterioses. USA.

Bacterial concn., upward flux, and deposition onto exposed petri plates were measured over snap beans during 3 growing seasons. A net upward flux of bacteria occurred only during the warm part of sunny days, not at night when leaves were wet with dew or when a thermal inversion was present. Aerosol source strength was positively correlated with wind speed. Upward fluxes were higher on days after rain than on days when the soil was dry. Other unidentified sources of variability in source strength probably

exist. Canopy-level deposition, apparently due to intermediate-scale transport of bacteria in fairly concentrated clouds, can occur in the early evening. (AS)

0176

27311 RAVA, C.A. 1984. Patogenicidade de isolamentos de Xanthomonas campestris pv. phaseoli. (Pathogenicity of isolates of Xanthomonas campestris pv. phaseoli). Pesquisa Agropecuaria Brasileira 19(4):445-448. Pt., Sum. Pt., En., 13 Ref. [Empresa Brasileira de Pesquisa Agropecuaria, Centro Nacional de Pesquisa de Arroz e Feijao, Caixa Postal 179, 74.000 Goiania-GO), Brasil]

Phaseolus vulgaris. Isolation. Xanthomonas phaseoli. Pathogenicity. Cultivars. Resistance. Brazil.

In studies conducted at CIAT-Palmira, isolates of Xanthomonas campestris pv. phaseoli from Goiás and the Federal District (Brazil) were compared with isolates from other countries as to their pathogenicity. In the 1st inoculation test, isolates Xp CNF no. 3, 5, 6, 8, 15, 16, 17 (Brazil), Xp C-6 and Xp C-123 (Colombia), and Phaseolus vulgaris line L-32 were used. The inoculation method consisted of clipping the primary leaves. Symptoms recorded 7 days after inoculation allowed the isolates to be separated into 3 groups in decreasing order of pathogenicity: (1) Xp CNF no. 3, 5, 6, 8, 15, 16, Xp C-123; (2) Xp C-6; (3) Xp CNF no. 17. In the 2nd test, isolates Xp CNF no. 3, 15, 16, 17, Xp C-6, Xp C-123, Xp S (USA), Xp U-2 (Uganda), and Xp PR-033 (Puerto Rico) were used with P. vulgaris lines L-32 and P.I. 207.262, and cv. Jules, and P. acutifolius line P.597. Plants were inoculated and evaluated as in the 1st test. The isolates were separated into 4 groups in decreasing order of pathogenicity: (1) Xp CNF no. 3, 5, 16, Xp C-123, Xp PR-033, Xp U-2; (2) Xp C-6; (3) Xp CNF no.17; (4) Xp S. Large differences were observed in the behavior of the tested lines and cv. P.597 was highly resistant, Jules showed half the symptoms of the susceptible L-32, and P.I.207.262 was intermediate between Jules and L-32. (AS)

0177

27447 RUDOLPH, K. ; MENDGEN, K. 1985. Multiplication of Pseudomonas syringae pv. phaseolicola in planta. 2. Characterization of susceptible and resistant reactions by light and electron microscopy compared with bacterial countings. Phytopathologische Zeitschrift 113(3):200-212. En., Sum. En., De., 28 Ref., Il. [Inst. fur Pflanzenpathologie und Pflanzenschutz, Universitat Gottingen, Grisebachstr. 6, D-3400 Gottingen, Federal Republic of Germany]

Phaseolus vulgaris. Pseudomonas phaseolicola. Resistance. Cultivars. Cell structure. Hosts and pathogens. Germany Federal Republic.

In the compatible combination of the halo blight disease of bean, Pseudomonas phaseolicola was able to colonize large areas of the intercellular space of leaves, such that these confluent water congested areas became visible as water-soaked spots. Most of the plant cell walls in the infected region maintained their normal shape, even when the cytoplasm had collapsed. Some inward bending of plant cell walls preceded their rather slow degradation and final replacement by bacterial masses. Neighboring plant cells appeared to be metabolically active. In resistant leaves no indications of active bacterial attachment or encapsulation could be observed. However, bacteria appeared to be more densely packed in resistant leaves, and relatively more plant cells completely collapsed as compared with susceptible leaves. From 8-14 days after inoculation, the bacterial concn. did not change much in susceptible or resistant leaves, indicating the absence of bactericidal components. Even Pseudomonas pisi showed some multiplication in bean leaves (immune reaction), but its growth stopped earlier than that of P. phaseolicola in the resistant cv., probably due to a different mechanism of resistance. Although less bacteria were

determined in the intercellular washing fluid, compared with leaf homogenates, the high bacterial concn. in the intercellular washing fluid supported the observation that an effective encapsulation of bacteria in resistant leaves did not occur. (AS)

0178

27089 SAETTLER, A.W. ; CAFATI, C.R.; WELLER, D.M. 1986. Nonoverwintering of Xanthomonas bean blight bacteria in Michigan. Plant Disease 70(4):285-287. En., Sum. En., 16 Ref. [Research Plant Pathologist, Agricultural Research Service, United States Dept. of Agriculture, Michigan State Univ., East Lansing 48824-1312, USA]

Phaseolus vulgaris. Xanthomonas phaseoli. Isolation. Genotypes. USA.

A series of studies were conducted over 10 yr to determine survival of Xanthomonas campestris pv. phaseoli in Michigan, USA. Twenty isolates of X. campestris pv. phaseoli and 10 bean genotypes were used to minimize possible isolate and host effects. Pathogenic X. campestris pv. phaseoli were never isolated from 191 separate tissue samples that overwintered (Oct.-April) during the periods 1972-73, 1975-77, 1977-79, and 1980-82. Thus, crop debris infected with X. campestris pv. phaseoli does not constitute a source of primary inoculum for the bean common blight disease in Michigan. (AS)

0179

27037 SAETTLER, A.W. ; KELLY, J.; ADAMS, W. 1982. Bean pathology notes-1982. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1982 Research Report. p.63. En. [United States Dept. of Agriculture, Agricultural Research Service, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Bean common mosaic virus. Cultivars. Resistance. Isariopsis griseola. Epidemiology. Pseudomonas phaseolicola. USA.

Observations made on bean pathology during 1982 are briefly reported. A new necrotic strain of BCMV was detected in fields of Sanilac navy bean and efforts are underway to alter the type of genetic resistance to BCMV in var. Seafarer, Fleetwood, Swan Valley, Neptune, C-20, C-15, Tuscola, Black Magic, and Domino to thus avoid black root response. Isariopsis griseola caused serious leaf and pod spotting in several fields of the Montcalm dark red kidney bean var. The incidence of Pseudomonas phaseolicola was severe in Montcalm County yield tests (Michigan, USA), and the bacteria was isolated from var. Montcalm, Swan Valley, and Domino; the pathogenic isolates were shown to be race 2 biotype. (CIAT)

0180

27038 SAETTLER, A.W. 1982. Sources of Xanthomonas bacterial blight tolerance-1982. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1982 Research Report. pp.64-72. En. [United States Dept. of Agriculture, Agricultural Research Service, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Xanthomonas phaseoli. Xanthomonas phaseoli var. fuscans. Bean common mosaic virus. Resistance. Cultivars. Germplasm. Uromyces phaseoli. Whetzelinia sclerotiorum. USA.

Expt. were continued at the Saginaw Valley bean-beet research farm (Michigan, USA) to identify sources of tolerance to Xanthomonas phaseoli and X. phaseoli var. fuscans. Breeding objectives included the introduction of blight tolerance into white, black, red kidney, pinto, and great northern bean types. Data are presented of foliage blight on 4 dates, the reaction to BCMV, and leafhopper injury for 160 materials received from

the Mayaguez Institute of Tropical Agriculture, CIAT, and Cornell U. (New York, USA). Data are also included of the percentage of plants infected with Pseudomonas phaseolicola of 24 entries, the reactions of 28 entries to Uromyces phaseoli, and the incidence of Sclerotinia sclerotiorum in 45 and 46 entries, resp., at 2 different sites. (CIAT)

0181

27026 SAETTLER, A.W. 1981. Sources of Xanthomonas bacterial blight tolerance-1981. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet Research. East Lansing. 1981 Research Report. pp.112-115. En.

Phaseolus vulgaris. Germplasm. Cultivars. Resistance. Xanthomonas phaseoli. Xanthomonas phaseoli var. fuscans. Plant introductions. Ozone. Plant injuries. USA.

Detailed results of the bacterial blight nursery planted in 1981 in Saginaw (Michigan, USA) are presented. The pathogens evaluated were Xanthomonas phaseoli and X. phaseoli var. fuscans. Breeding objectives involve the introduction of blight tolerance into white, black, red kidney, pinto, and great northern bean types. All entries were sent from the Mayaguez Institute of Tropical Agriculture, CIAT, Cornell U., U. of California-Riverside, and U. of Nebraska (USA); commercial bean var. were also included for comparative purposes. These entries were inoculated with a mixture of pathogenic isolates. Observations made on 84 bean materials are presented, which include the incidence of foliage blight on different dates, 03 injury, presence of rust, and leafhopper injury. (CIAT) See also 0106 0107 0278 0302

E03 Mycoses

0182

27252 BOLKAN, H.A. ; RIBEIRO, W.R.C. 1985. Anastomosis groups and pathogenicity of Rhizoctonia solani isolates from Brazil. Plant Disease 69(7):599-601. En., Sum. En., 19 Ref. [Campbell Inst. for Research & Technology, Route 1, Box 1314, Davis, CA 95616, USA]

Phaseolus vulgaris. Isolation. Rhizoctonia solani. Pathogenicity. Host range. Etiology. Brazil.

Anastomosis groups (AG) of 130 Rhizoctonia solani isolates obtained from 31 plant species found in 11 states of Brazil were determined. Fifty-nine isolates were assigned to AG-4, 10 to AG-3, 42 to AG-2, and 11 to AG-1. Eight isolates did not anastomose with any of the test strains or among themselves, and no isolate was assigned to AG-5. Pathogenicity of 35 isolates from different anastomosis groups on hypocotyls and/or leaves of kidney bean, soybean, red pepper, radish, sugar beet, and cabbage varied considerably, from nonvirulent to highly virulent. In general, anastomosis groups lacked host specificity. The optimum growth temp. for isolates tested varied from 20 to 30 degrees Celsius. (AS)

0183

27251 CODE, J.L. ; IRWIN, J.A.G.; BARNES, A. 1985. Comparative etiological and epidemiological studies on rust diseases of Phaseolus vulgaris and Macroptilium atropurpureum. Australian Journal of Botany 33(2):147-157. En., Sum. En., 14 Ref., Il. [Dept. of Botany, Univ. of Queensland, St. Lucia, Qld. 4067, Australia]

Phaseolus vulgaris. Uromyces phaseoli. Etiology. Races. Australia. South America.

When rust collections from bean and Macroptilium atropurpureum cv. Siratro from Australia and South America were examined, telia of Siratro rust were not observed. Urediospores of the Siratro rust encompassed a broader range

in size than those of bean rust (Uromyces appendiculatus) but were generally within the accepted range for that species. The walls of the Siratro rust urediospores were significantly thicker than those from bean rust and were outside the given range. Although the Siratro rust produced small (160 microns) sporulating uredia on the bean rust differential cv. Golden Gate Wax, all members of the bean rust differential set were classified as resistant to it. The pathogens (Siratro rust and bean rust race egh) on their resp. hosts showed significantly different responses to dew period temp. for infection. Optimum environmental conditions for max. disease development during the prepenetration stage of the disease cycle were 20 degrees Celsius and 24 h of dew for Siratro rust and 15-20 degrees Celsius and 24 h for the bean rust. The optimum temp. range for max. disease development for the Siratro and bean rust pathogens in the postpenetration stage of infection was 20-26 degrees Celsius. While max. no. of uredia developed on bean at 14-24 degrees Celsius, this temp. range resulted in the latent period and generation time being extended by 1 day in comparison with those at 20-26 degrees Celsius and 24-32 degrees Celsius. It is suggested that the Siratro rust may be a previously undescribed race of U. appendiculatus. (AS)

0184

27096 FORSTER, R.L. ; SAMSON, R.O. 1984. Control of white mold of dry beans by fungicides applied via sprinkler irrigation. Bean Improvement Cooperative. Annual Report 27:106. En. [Univ. of Idaho Research & Extension Center, Kimberly, ID 83341, USA]

Phaseolus vulgaris. Whetzelinia sclerotiorum. Disease control. Chemical control. USA.

A 4-yr. study was conducted to evaluate control of the white mold (Sclerotinia sclerotiorum) of dry edible beans by fungicides (benomyl and thiophanate methyl) applied via sprinkler irrigation systems; the efficacy of benomyl applications made by conventional sprayer was also compared with that applied via a sprinkler system. Benomyl and thiophanate methyl applied via sprinkler irrigation systems are effective in controlling white mold. Disease control with benomyl applied with a conventional sprayer and via sprinkler was similarly effective; thiophanate methyl must be applied prior to infection for max. disease control. (CIAT)

0185

27330 FRANCE I., R. 1983. Patología de la semilla y enfermedades radiculares del poroto; plantas sanas producen un buen rendimiento. (Seed pathology and root diseases in beans; healthy plants produce good yields). Investigación y Progreso Agropecuario no.18:21-25. Es., Sum. Es., Il.

Phaseolus vulgaris. Plant injuries. Disease control. Fusarium solani. Rhizoctonia solani. Aspergillus. Penicillium. Rhizopus. Mucor. Alternaria. Chile.

The type of damage and control measures recommended for bean seed rot caused by Penicillium, Rhizopus, Alternaria, Mucor, and Aspergillus, and root rots caused by Fusarium solani and Rhizoctonia solani, are briefly described. (CIAT)

0186

27094 GONZALEZ A., M. ; CASTELLANOS L., J.J. 1984. Influencia de diferentes estadios del cultivo del fríjol en el desarrollo de la roya. (Influence of different stages of the bean crop on rust development). Ciencias de la Agricultura no.19:3-6. Es., Sum. Es., En., 8 Ref., Il. [Inst. de Investigaciones Fundamentales en Agricultura Tropical Alejandro de Humboldt, Academia de Ciencias, Cuba]

Phaseolus vulgaris. Developmental stages. Uromyces phaseoli. Cuba.

Through artificial inoculation, the influence of the different stages of the bean crop on rust (Uromyces phaseoli) development was verified to be dependent on the var. Therefore, in var. trials it is recommended to consider the period of greatest susceptibility as well as the date of arrival of the inoculum to the exptl. field. (AS)

0187

27381 HERRERA I., L. ; PEÑA P., L. 1984. Pruebas de patogenicidad de diversos aislados de Sclerotium rolfsii Sacc y Rhizoctonia solani. (Pathogenicity tests on some isolations of Solerotium rolfsii and Rhizoctonia solani). Centro Agrícola 11(3):91-98. Es., Sum. Es., En., 5 Ref., Il. [Depto. de Sanidad Vegetal, Facultad de Ciencias Agricolas, Univ. Central de Las Villas, Cuba]

Phaseolus vulgaris. Pathogenicity. Isolation. Sclerotium rolfsii. Rhizoctonia solani. Cuba.

The degree of pathogenicity of different isolates of Rhizoctonia solani and Solerotium rolfsii was determined through cross inoculations in bean, tomato, pepper, and potato. The inoculations were made in vitro using agar discs. Lesion size was determined on 10-day-old seedlings. The S. rolfsii isolate of bean was the most aggressive while that of tomato was the least virulent. Bean was the host plant most susceptible to both S. rolfsii and R. solani, and pepper the most resistant. (AS)

0188

27426 KIM, W.K. ; HEATH, M.C.; ROHRINGER, R. 1985. Comparative analysis of proteins of Uromyces phaseoli var. typica, U. phaseoli var. vignae, and U. viciae-fabae: polypeptide mapping by two-dimensional electrophoresis. Canadian Journal of Botany 63(12):2144-2149. En., Sum. En., Fr., 18 Ref., Il. [Agriculture Canada, Research Station, 195 Dafoe Road, Winnipeg, Manitoba, Canada R3T 2M9]

Phaseolus vulgaris. Uromyces phaseoli. Proteins. Canada.

Proteins were extracted from urediospores of the bean rust fungus (Uromyces phaseoli var. typica), of the cowpea pathogen (U. phaseoli var. vignae), and of the faba bean pathogen (U. vicia-fabae) and separated by 2-dimensional isoelectric focusing-polyacrylamide gel electrophoresis under denaturing conditions. The 2 isolates from cowpea had identical polypeptide patterns; the 2 isolates from P. vulgaris differed by 19 polypeptides. The polypeptide patterns of all of 3 fungi differed markedly from one another. There were 277 polypeptides in extracts of U. viciae-fabae, while 335 polypeptides were detected in extracts of each isolate of the other 2 fungi. While U. phaseoli var. typica and U. phaseoli var. vignae shared 183 polypeptides, U. viciae-fabae had only 149 and 146 polypeptides, resp., in common with the other 2 fungi. This is consistent with the view that the 2 var. of U. phaseoli are more closely related to each other than to U. viciae-fabae. However, when all detected polypeptides were compared the differences between these 2 var. were as extensive as those found between species. It is suggested, therefore, that the designation of the cowpea rust fungus as a separate species, U. vignae, is correct. (AS)

0189

27372 LINDGREN, D.T. ; STEADMAN, J.R. 1985. The effect of fungicide formulation, rate, and timing in control of bean rust in southwest Nebraska. Bean Improvement Cooperative. Annual Report 28:19-20. En. [Univ. of Nebraska, Lincoln, NE 68583-0772, USA]

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

The effect of different formulations, application rates, and spray timing of mancozeb on the yield and the percentage of leaf area infected with Uromyces phaseoli in bean cv. Pinto UI III was assessed. The fungicide was applied either 4 times at 7-day intervals or 2 times at 14-day intervals. All treatments increased yields and decreased visual rust ratings when compared with the unsprayed check. Bean rust is more effectively controlled with mancozeb applied at 7-day intervals; however, this is not always reflected in yield advantages. (CIAT)

0190

27370 LYONS, M.E. ; DICKSON, M.H.; HUNTER, J.E. 1985. Variability in response of blossoms of different bean genotypes to infection by Sclerotinia sclerotiorum. Bean Improvement Cooperative. Annual Report 28:96-98. En., 3 Ref. [New York State Agricultural Experiment Station, Geneva, NY, USA]

Phaseolus vulgaris. Cultivars. Flowers. Whetzelinia sclerotiorum. Resistance. USA.

A study was conducted to investigate the response of blossoms to infection by Sclerotinia sclerotiorum in 40 different bean lines. Blossoms were observed on a daily basis (2, 3, 4, and 5 days after the inoculation). Data are presented for 8 bean lines: Ex Rico 23, 189567, 4526, BBL92, Benton, 361520, 4722, and 4832. The results of this study indicate that there are statistically significant differences in response to infection in blossoms of different bean genotypes and that there is an association between hypersensitive flecking and reduced mycelial growth on the blossoms. (CIAT)

0191

27366 McFADDEN, W. ; HALL, R. 1985. Assessment of root rot potential of white bean fields in southwestern Ontario. Bean Improvement Cooperative. Annual Report 28:127-128. En., 2 Ref. [Dept. of Environmental Biology, Univ. of Guelph, Guelph, Ontario, Canada N1G 2W1]

Phaseolus vulgaris. Fusarium solani phaseoli. Pathogenicity. Canada.

The root rot potential of 54 southwestern Ontario bean fields (Canada) was determined. Soil was collected from each field from 17 sites, air-dried, and put into plastic pots, 3 pots/sample. Ten treated white bean seeds (cv. Seafarer) were planted/pot. After 14 days, plants were rated for disease on a scale of 0 (no disease) to 4 (dead or dying plants) and a root rot index (RRI) was calculated. In addition, 50 plants were collected from each field in the same area and rated for root rot using the same severity scale. Disease severity in the field ranged from 0 to 3 and the field RRI values were from 1 to 38 percent. The correlation between pot RRI and field RRI was 0.45 (P = 0.01). Pot RRI values of 0-40 were 73 percent successful in predicting mild root rot (RRI = 0-18) in the field. Pot RRI values greater than 40 were 76 percent successful in predicting more severe disease (RRI = 19-38) in the field. (CIAT)

0192

27414 MULLINS, C.A. ; HILTY, J.W. 1985. Evaluation of fungicide treatments for control of snap bean rust. Tennessee Farm and Home Science 135:9-10. En., 6 Ref. [Dept. of Plant & Soil Science, Univ. of Tennessee Plateau Experiment Station, Rt. 9, Box 363, Crossville, TN 38555, USA]

Phaseolus vulgaris. Snap beans. Uromyces phaseoli. Disease control. Chemical control. USA.

The effectiveness of 3 exptl. fungicides (triadimefon, bitertanol, and propiconazol) for the control of Uromyces appendiculatus in snap beans was evaluated in 1983-84 at the Plateau Expt. Station of the U. of Tennessee (USA). In addition, several formulations of maneb were evaluated at a 7-day

frequency. A randomized complete block design with 4 replications was used. All chemical treatments controlled rust, but some variations were observed among seasons for the individual treatments. Triadimefon applied at a 7-day frequency and bitertanol and propiconazol applied at a 14-day schedule gave excellent rust control both years. Treatments that were phytotoxic (triadimefon and propiconazol both applied at a 7-day frequency) usually resulted in lower yields. (CIAT)

0193

27368 MULLINS, C.A. ; HILTY, J.W. 1985. Evaluation of fungicides for control of snap bean rust in Tennessee. Bean Improvement Cooperative. Annual Report 28:109-110. En. [Depts. of Plant & Soil Science & Entomology & Plant Pathology, Univ. of Tennessee Plateau Experiment Station, Rt. 9, Box 363, Crossville, TN 38555, USA]

Phaseolus vulgaris. Uromyces phaseoli. Disease control. Chemical control. Plant injuries. Snap beans. USA.

Bean rust control trials have been conducted annually at the U. of Tennessee Plateau Expt. Station near Crossville (USA) for several years. In 1984, snap beans of the rust-susceptible cv. Eagle were planted. Fungicide treatments (maneb, RH 3866, propiconazol, triadimefon, and bitertanol) were applied at different dosis at a 7-day frequency. Propiconazol caused severe crop injury. Yields were highest with maneb, triadimefon (14-day frequency), and bitertanol (7- and 14-day frequencies). Rust ratings were intermediate with the treatments of maneb, triadimefon, and bitertanol. Maneb is the only satisfactory fungicide labeled for rust control of snap beans in Tennessee. (CIAT)

0194

27421 NITSCHE M., J. ; CAFATI K., C. 1985. Determinación de hongos internos, presentes en la semilla de poroto. (Identification of internal fungi, present in bean seeds). Agricultura Técnica 45(3):227-234. Es., Sum. Es., 12 Ref., Il. [Estación Experimental La Platina, Inst. de Investigaciones Agrícolas, Casilla 5427, Santiago, Chile]

Phaseolus vulgaris. Seed. Cultivars. Rhizopus stolonifer. Rhizoctonia solani. Botrytis cinerea. Fusarium oxysporum. Chile.

Seed samples of bean cv. currently grown in Chile were harvested from fields in commercial farms and exptl. stations of the Instituto Nacional de Investigaciones Agrícolas, located between the metropolitan region and Biobío, at 15, 30, and 45 days after crop physiological maturity. The internal fungi of the seed were subjected to in vitro and paper towel analyses and their counts were recorded. The isolated fungi were used in pathogenicity tests. Results showed excellent sanitary conditions of the seeds, especially in samples of the 2nd harvest. The isolated fungi, pathogenic in beans, were Rhizopus stolonifer, Rhizoctonia solani, Botrytis cinerea, and Fusarium oxysporum. Some saprophytic fungi genera were also isolated, namely, Alternaria, Stemphylium, Aspergillus, Penicillium, Epicoccum, Sclerotium, Macrophomina, Helminthosporium, and Chaetomium. (CIAT)

0195

27336 O'CONNELL, R.J. ; BAILEY, J.A.; VOSE, I.R.; LAMB, C.J. 1986. Immunogold labelling of fungal antigens in cells of Phaseolus vulgaris infected by Colletotrichum lindemuthianum. Physiological and Molecular Plant Pathology 28(1):99-105. En., Sum. En., 15 Ref., Il. [Dept. of Agricultural Sciences, Univ. of Bristol, Long Ashton Research Station, Long Ashton, Bristol, BS189AF, England]

Phaseolus vulgaris. Colletotrichum lindemuthianum. Antisera. Antibodies. United Kingdom.

An antiserum was raised against ammonium sulphate precipitates from culture filtrates of the hemibiotrophic fungus Colletotrichum lindemuthianum. It was used to locate fungal antigens within cells of Phaseolus vulgaris containing biotrophic infection hyphae, by means of electron microscopy following postembedding immunogold labelling. Good preservation of both antigenicity and ultrastructure was obtained by fixation with glutaraldehyde and osmium tetroxide and embedding in LR White acrylic resin. Biotrophic hyphae were intracellular, and a matrix layer similar to the extrahaustorial matrix of haustorial parasites separated the hyphal wall from the invaginated host plasmalemma. Gold labelling was confined to the fungal wall, matrix layer and, to a lesser extent, the fungal cytoplasm. Labelling was absent from the cytoplasm and walls of infected and uninfected bean cells. In contrast to the extrahaustorial matrices of obligate biotrophs, which are considered to be products of host cells, these results indicate that the matrix layer surrounding hyphae of C. lindemuthianum contains fungal material, probably (glyco)proteins. (AS)

0196

27453 PINEDA, J.B. ; DIAZ P., C. 1981. Control biológico de Sclerotium rolfsii Sacc. en Phaseolus vulgaris mediante la utilización de Penicillium notatum Westl. (Biological control of Sclerotium rolfsii in Phaseolus vulgaris using Penicillium notatum). Agronomia Tropical 31(1-6):265-281. Es., Sum. Es., En., 29 Ref., Il. [Fondo Nacional de Investigaciones Agropecuarias, Estación Experimental Araure, Apartado 102, Acarigua 3001, Venezuela]

Phaseolus vulgaris. Sclerotium rolfsii. Biological control. Predators and parasites. Venezuela.

The biological control of Sclerotium rolfsii with Penicillium notatum in unsterilized soil was shown under field conditions using bean plants. Ground plant material of Dichanthium aristatum was used as a substrate and as a medium to deliver Penicillium inoculum to the soil. Germination percentages and no. of damaged plants showed highly significative differences (0.01) between the treatments of S. rolfsii (alone) and P. notatum vs. S. rolfsii. The no. of viable S. rolfsii propagules in the soil maintained a 3:1 ratio between both treatments and was significative at 1 percent. (AS (extract)-CIAT)

0197

27025 SAETTLER, A.W. 1981. International bean rust nursery (IBRN). In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1981 Research Report. pp.109-111. En.

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

The International Bean Rust Nursery (IBRN), coordinated by CIAT, has 2 major objectives: (1) to identify the rust races prevalent in Michigan, USA, and (2) to identify bean lines resistant to rust under Michigan conditions. A total of 111 bean entries were planted and evaluated in the 1981 IBRN at the Saginaw Valley research farm. Bean entries, disease grades, and disease incidence are listed. (CIAT)

0198

27445 SEIJAS, C.A.R. ; SARTORATO, A.; CARVALHO, J.R.P. DE 1985. Yield losses in dry bean (Phaseolus vulgaris L.) caused by angular leaf spot (Isariopsis griseola Sacc.). Bean Improvement Cooperative. Annual Report 28:5-6. Pt. [Centro Nacional de Pesquisa de Arroz e Feijao, P.O. Box 179, 74.000 Goiania-GO, Brasil]

Phaseolus vulgaris. Cultivars. Isariopsis griseola. Yields. Resistance. Brazil.

During 1981-83 bean yield losses caused by Isariopsis griseola were evaluated at the Centro Nacional de Pesquisa de Arroz e Feijao (Goiania, Brazil). A split plot randomized complete block design was used with 5 replications. Subplots consisted of 9 cv.: Jalo EEP 558, Caraota 260, Ricopardo 896, Black Mexican, CNF 0010, Cuva 168-N, Turrialba 1, Turrialba 4, and Rosinha G-2. For all 9 cv. an av. yield loss of 31 percent over 2 yr. was obtained. Although not significantly different from all cv., Jalo EEP 558 was the most resistant. (CIAT)

0199

27439 SHAIK, M. 1985. Races of the bean rust fungus, Uromyces appendiculatus var. appendiculatus, from Jamaica. Bean Improvement Cooperative. Annual Report 28:20-21. En. [Dept. of Plant Pathology, Univ. of Nebraska, Lincoln, NE 68583-0722, USA]

Phaseolus vulgaris. Cultivars. Races. Uromyces phaseoli. Jamaica.

Seven U.S. differential bean cv. (Golden Gate Wax, KY Wonder no. 814, 780, and 765, Pinto 111, California Small White 643, and Bountiful 181) were used to identify 21 races of Uromyces appendiculatus among collections from 4 sites in Jamaica, during 1979 and 1980. Reactions of the differential cv. were graded on a 1-5 scale. These 21 races, which differ from the ones previously identified in the U.S. using the same differentials, were designated J1 through J21. (CIAT)

0200

27404 SILBERNAGEL, M.J. ; DOYLE, T.J. 1985. Interaction of genetic resistance to Fusarium root rot with cultural practices in a white-seeded bush snap bean. Bean Improvement Cooperative. Annual Report 28:1-2. En. [United States Dept. of Agriculture, Agricultural Research Service, Box 30, Prosser, WA 99350, USA]

Phaseolus vulgaris. Snap beans. Cultivars. Resistance. Fusarium solani phaseoli. Cultivation. USA.

A field study was undertaken to determine the interaction between bean cv. resistant to Fusarium solani sp. phaseoli and cultural practices. The white-seeded bush snap bean cv. Blue Mountain and Fusarium-resistant breeding line FR-264 were used. Treatments were 28-cm row spacing at 4 seeds/30 cm of row vs. 56-cm rows at 8 seeds/30 cm of row; deep subsoiling (46-51 cm) between rows vs. no subsoiling; and differential sprinkler irrigation from bloom to harvest. Emergence was about 13 percent better with Blue Mountain that with FR-264. FR-264 had a consistently lower disease index than Blue Mountain. Dry plant wt. were significantly increased by deep subsoiling in both cv.; however, the detrimental effect of not subsoiling was more severe on the susceptible cv. than on the resistant FR-264. Even under the worst field conditions, FR-264 yielded as well as Blue Mountain under the best conditions (2020 and 1906 kg/ha, resp.). (CIAT)

0201

27441 STAVELY, J.R. 1985. The modified Cobb scale for estimating bean rust intensity. Bean Improvement Cooperative. Annual Report 28:31-32. En., 3 Ref., Il. [United States Dept. of Agriculture, Agricultural Research Service, Beltsville Agricultural Research Center, West Beltsville, MD 20705, USA]

Phaseolus vulgaris. Uromyces phaseoli. USA.

A modified Cobb scale for estimating bean rust infection is described. It is based on the observation that the uredinial (pustule) area can be about 1/3 of the total infected area. Thus, at 100 percent severity only 1/3 of the surface is occupied by uredinia, but the host tissue is completely infected. Dark spots on a series of idealized diagrams represent

sporulating uredinia and each figure in the diagram represents the approx. rust percentage. The scale gives a reliable estimate of severity. (CIAT)

0202

27342 STAVELY, J.R. ; RYTTER, J.L.; ROYER, M.H. 1985. Virulence of the soybean rust pathogen, Phakopsora pachyrhizi, on Phaesolus vulgaris cultivars. Bean Improvement Cooperative. Annual Report 28:35-36. En., 6 Ref. [United States Dept. of Agriculture, Agricultural Research Service, Plant Pathology Laboratory, Beltsville, MD 20705, USA]

Phaseolus vulgaris. Glycine max. Phakopsora pachyrhizi. Pathogenicity. Cultivars. USA.

A total of 3-5 plants of several Phaseolus vulgaris cv. or lines having the broadest resistance to races of Uromyces appendiculatus, and soybean cv. Wayne, were inoculated with the Brazilian isolate BZ82-1 of Phakopsora pachyrhizi and with race 52 of Uromyces appendiculatus. The broadly bean rust-resistant bean cv. were also inoculated with P. pachyrhizi Taiwan isolate 72-1. Symptoms from P. pachyrhizi infection of P. vulgaris differ widely from those of U. apperdiculatus infection. P. pachyrhizi produced no single uredinia larger than grade 3 (above 0.3 mm in diameter) on Wayne or on any of the bean cv. P. vulgaris cv. V3249-13-1C Ecuador 299, IAN 5091, California Small White 643, Compuesto Negro Chimaltenango, B-190, Pinto 111, Great Northern 1140, Lake Shasta, Montcalm, Rufus, and Seafarer were as susceptible as Wayne soybean to the Brazilian P. pachyrhizi isolate. The 1st 4 of these cv. were also susceptible to the Taiwan 72-1 isolate, but Compuesto Negro Chimaltenango was highly resistant. Should P. pachyrhizi become an important pathogen of P. vulgaris, results suggest that resistance to U. appendiculatus will be of little or no value. (CIAT)

0203

27420 STOCKWELL, V. ; HANCHEY, P. 1985. Effect of cuticle treatments on infection of Phaseolus vulgaris by Rhizoctonia solani. Phytopathologische Zeitschrift 114(1):6-12. En., Sum. En., De., 12 Ref., Il. [Dept. of Plant Pathology & Weed Science, Colorado State Univ., Fort Collins, CO 80523, USA]

Phaseolus vulgaris. Rhizoctonia solani. Resistance. Hypocotyls. USA.

Rhizoctonia solani, the causal agent of stem canker of beans, does not commonly infect beans more than 2 wk. old. Treatment of the cuticular layer by abrasion or chloroform rinsing results in decreased cuticular autofluorescence and the ability of stains to penetrate the hypocotyl surface. Infection cushions preferentially formed near these treated areas on both young and old plants. The morphology of infection cushions on older plants is simpler than those found on young, susceptible plants, but they are fully competent to form lesions. (AS)

0204

27403 STOSSEL, P. 1985. Structure-activity relationship of some bean phytoalexins and related isoflavonoids. Physiological Plant Pathology 26(3):269-277. En., Sum. En., 27 Ref., Il. [Research Dept., Nestlé Products Technical Assistance Co., Ltd. CH-1814 La Tour-de-Peilz, Switzerland]

Phaseolus vulgaris. Colletotrichum lindemuthianum. Fusarium oxysporum. Rhizoctonia solani. Phaseollin. Resistance. Switzerland.

The antifungal activity of the 5 structurally related isoflavonoids (phaseollin, phaseollinisoflavan, 7-o-methylphaseollinisoflavan, 2'-o-methylphaseollinisoflavan, and 7,2'-di-o-methylphaseollinisoflavan) was tested in vitro using the bean pathogens Colletotrichum lindemuthianum, Fusarium oxysporum f.sp. phaseoli, Rhizoctonia solani, and Thanatephorus cucumeris, as well as pathogens which do not attack Phaseolus beans such as Aphanomyces euteiches, Phytophthora megasperma f.sp. glycinea, Pythium

paroecandrum, and Fusarium solani f.sp. pisi. Colony growth on solid medium and growth of sporelings in liquid medium were used to measure the effect of the isoflavonoids. The fungi differed in their sensitivity to these compounds. With the exception of C. lindemuthianum, however, the order of effectiveness of the 5 isoflavonoids was virtually the same in all target organisms. There appeared to be no clear relationship between lipophilicity and antifungal activity of these compounds. The substituent at position 7 of the isoflavans may chiefly affect biological activity. The basis for antifungal activity of this series of isoflavonoids is discussed. (AS)

0205

27063 SUMNER, D.R. ; SMITTLE, D.A.; THREADGILL, E.D.; JOHNSON, A.W.; CHALFANT, R.B. 1986. Interactions of tillage and soil fertility with root diseases in snap bean and lima bean in irrigated multiple-cropping systems. Plant Disease 70(8):730-735. En., Sum. En., 34 Ref. [Dept. of Plant Pathology, Univ. of Georgia, Coastal Plain Station, Tifton, GA 31793, USA]

Phaseolus vulgaris. Snap beans. Intercropping. Rotational crops. Rhizoctonia solani. Fusarium solani phaseoli. Pythium. Meloidogyne incognita. Soil fertility. Fertilizers. Pathogenicity. Land preparation. Yields. Zea mays. USA.

Snap bean or lima bean was planted each Aug. following maize in a multiple cropping system for 6 yr. Root and hypocotyl disease severity and postemergence damping-off (caused primarily by Rhizoctonia solani AG-4, Fusarium solani, a sterile white basidiomycete, and Pythium spp.) were greater in fall snap bean than in lima bean and in subsoiled or disked than in plowed treatments. In 1 yr of 3, postemergence damping-off was increased in snap bean by applying N broadcast preplant compared with applying it through overhead irrigation. Plowing reduced populations of R. solani AG-4 and Rhizoctonia-like fungi compared with disking but increased or had no effect on populations of Pythium spp. In spring snap bean, root disease severity was greater in single rows than in twin rows and with starter fertilizer than without. Subsoiling increased the no. of plants with reddish brown sunken cankers on the hypocotyls compared with plowing. No. of Meloidogyne incognita juveniles in the soil and root-gall indices were greater in fall lima bean than in snap bean. In most tests, no. of M. incognita juveniles and root-gall indices were not affected by tillage methods or fertilization treatments. Yield of snap bean was greater in the spring than in the fall. (AS)

0206

27075 TARIQ, V.N. ; JEFFRIES, P. 1985. Changes occurring in chloroplasts of Phaseolus following infection by Sclerotinia: a cytochemical study. Journal of Cell Science 75:195-205. En., Sum. En., 19 Ref., Il. [Biological Laboratory, Univ. of Kent, Canterbury, Kent CT2 7NJ, England]

Phaseolus vulgaris. Whetzelinia sclerotiorum. Proteins. Chloroplasts. Electron microscopy. Cytology. Phaseolus coccineus. United Kingdom.

Electron microscopy revealed dramatic changes in the ultrastructure of chloroplasts during infection of Phaseolus vulgaris and P. coccineus by Sclerotinia sclerotiorum and S. minor. Electron-opaque deposits developed initially in the peripheral region of the chloroplast stroma, in cells in advance of the hyphal front. As infection continued, the amount and intensity of deposition increased and spread throughout the chloroplast. The deposit possessed a high degree of structural integrity in the form of a crystalline square lattice with 10 nm periodicity. Enzyme digestion studies showed that the deposits were proteinaceous. Similar deposits were also induced by treatment with oxalic and citric acids, but not by the K salts of these acids buffered at pH 7.2. It is suggested that a pH change within the chloroplasts, resulting from oxalic secretion by the fungus, is

responsible for induction of protein deposition. The likelihood that the deposits are ribulose, 1,5-bisphosphate carboxylase-oxygenase is discussed. (AS)

0207

27302 VAN ALFEN, N.K. ; DRYDEN, P. 1984. Pinto bean root rot. Utah Science 45(2):56-58. En., Il. [Utah Agricultural Experiment Station, Utah State Univ., UMC 48 Logan, UT 84322, USA]

Phaseolus vulgaris. Fusarium solani phaseoli. Water stress. Epidemiology. USA.

Results are given of the research carried out by Utah Agricultural Expt. Station on bean root rot caused by Fusarium solani f. sp. phaseoli under dry land conditions. (CIAT)

0208

27245 VERMA, B.R. ; SHARMA, S.L. 1984. Variability in Phaeoisariopsis griseola the cause of angular leaf spot of beans. Indian Phytopathology 37(3):580-581. En., 6 Ref. [Dept. of Mycology & Plant Pathology, Himachal Pradesh Krishi Vishva Vidyalaya, Solan 173 213, India]

Phaseolus vulgaris. Isariopsis griseola. Isolation. Etiology. India.

Studies were conducted to determine whether the variation in size of leaf spots in bean var. White Panchmari was due to variability within the Phaeoisariopsis griseola pathogen. Single spore isolations were made from different types of spots from different localities in India. Seven isolates were taken which were maintained on PDA containing 1 percent leaf extract at 25 degrees Celsius. No significant differences were observed among the 7 isolates of the fungus. The temp. alone is responsible for producing lesions of different sizes. (CIAT) See also 0005 0106 0107 0123 0161 0179 0180 0270 0273 0274 0278 0280 0286 0290 0291 0293 0294 0297 0301 0305

E04 Viroses

0209

27264 ENGLISH, J. 1984. Stop the bean virus. Organic Gardening 31(12):65-67. En., Il.

Phaseolus vulgaris. Bean yellow mosaic virus. Symptomatology. Disease control. USA.

The symptomatology of BYMV in beans is briefly described. Some resistant cv. and cultural practices for its control in the USA are listed. (CIAT)

0210

27326 JIMENEZ G., E. 1985. Etiology, pathology and characterization of viruses from beans growing in the Sonora Desert of Mexico. Ph.D. Thesis. Tucson, The University of Arizona. 80p. En., Sum. En., 156 Ref., Il.

Phaseolus vulgaris. Cowpea chlorotic mottle virus. Bean common mosaic virus. Etiology. Symptomatology. Disease transmission. Yields. Mexico.

A survey of common bean crops in Sonora, Mexico, revealed the presence of 2 isometric viruses and 1 flexuous rod virus on the basis of host reaction, particle morphology, serology, and physicochemical properties. The isometric viruses were identified as BSMV and cowpea chlorotic mottle virus; the flexuous rod virus was identified as BCMV. Using bean cv. differentials, 2 strains of the potyvirus BCMV were identified, NY-15 and a previously undescribed strain designated YV-1. Host range, serological tests, and RNA electrophoresis indicated that the Sonoran BSMV cultures are similar to BSMV-strain A. Commercial seed lots from 2 major bean growing

regions of Sonora (Hermosillo Coast and Sonora River) were contaminated with the BSMV-cowpea chlorotic mottle virus mixture but not with BCMV. The av. contamination level was 13 percent. Two common weeds present in Sonoran agricultural areas were found to be potential alternate hosts of cowpea chlorotic mottle virus. Both Sisymbrium irio and Melilotus indica were infected systemically, although the infection in M. indica was latent. Potential losses due to Sonoran bean viruses were measured in greenhouse expt. with the cv. Pinto 111, BCMV strains caused a 29.4-60.1 percent reduction, whereas BSMV-cowpea chlorotic mottle virus mixtures induced a 22.5-74.6 percent yield reduction. (AS (extract))

0211

27220 KHAEMBA, B.M. ; LATIGO, M.W.O. 1981. Effects of infestation and transmission of the common bean mosaic virus (CBMV) by the black bean aphid A. fabae on the common bean P. vulgaris. East African Agricultural and Forestry Journal 47(1):1-4. En., Sum. En., 19 Ref.

Phaseolus vulgaris. Bean common mosaic virus. Aphis fabae. Disease transmission. Vectors. Kenya.

Damage caused to vegetative growth and yield of bean by Aphis fabae combined with BCMV was generally significant (P equal to or less than 0.05) when aphid infestation occurred during the early and late vegetative stages of plant development, and to a lesser extent during anthesis. Damage was aggravated by higher (6 aphids/plant) rather than lower initial A. fabae infestations (3 aphids/plant) and when the aphids transmitted BCMV. Regression analyses of bean responses to insect infestations showed that significantly (P equal to or less than 0.01) larger proportions were linear rather than quadratic or cubic. (AS (extract))

0212

27351 MORA N., O.A. 1982. Inoculación mecánica del BCMV en cultivares de caraota (Phaseolus vulgaris L.). Resultados preliminares. (Mechanical inoculation of BCMV in bean cultivars. Preliminary results). In Universidad Central de Venezuela. Instituto de Genética. Informe de Investigación 1980. Maracay. pp.55-61. Es., 8 Ref.

Phaseolus vulgaris. Cultivars. Disease transmission. Bean common mosaic virus. Venezuela.

The methodology used for the mechanical transmission of BCMV as well as some of the preliminary results of the evaluation of 8 bean cv. inoculated with 8 isolates of the virus are described. (CIAT)

0213

27390 PIERCE, W.H. 1934. Viroses of the bean. Phytopathology 24(2):87-115. En., Sum. En., 27 Ref., Il.

Phaseolus vulgaris. Cultivars. Resistance. Bean common mosaic virus. Bean yellow mosaic virus. Alfalfa mosaic virus. Tobacco mosaic virus. Tobacco ring spot virus. Etiology. Disease transmission. Host range.

The susceptibility of 24 bean var. to the following viruses was determined by means of artificial inoculations in the greenhouse: BCMV, BYMV, AMV, TMV, and tobacco ring-spot virus. Bean var. were grouped according to symptom expression and susceptibility to BCMV as either: I, susceptible; II, tolerant; or III, immune. In general, the same grouping held for reaction to BYMV, although none of the var. were found to be immune to this virus. The susceptibility to BCMV and BYMV was not correlated with susceptibility to the other viruses studied. The thermal inactivation point, resistance to aging in vitro, tolerance to dilution, and resistance to certain chemicals were determined for all viruses, except TMV. While specific viruses other than those described play a part in the virus infections occurring on leguminous plants, it is hoped that the data

presented will be of value in the ultimate differentiation of all the viruses affecting Leguminosae plants. (AS (extract))

0214

27450 RONALD, W.P. ; TREMAINE, J.H.; MacKENZIE, D.J. 1986. Assessment of southern bean mosaic virus monoclonal antibodies for affinity chromatography. Phytopathology 76(5):491-494. En., Sum. En., 8 Ref., Il. [Agriculture Canada, Research Station, 6660 N.W. Marine Drive, Vancouver, B.C. Canada V6T 1X2]

Phaseolus vulgaris. Bean southern mosaic virus. Analysis. Canada.

The dissociation of immunoprecipitates of 3 monoclonal antibodies (B5, B6, and B10) with BSMV was assessed at pH values between 7.00-2.25 by density gradient analysis and by indirect ELISA. Both methods showed that B10 did not dissociate appreciably, B5 dissociated at pH 2.75-2.25, and B6 dissociated at pH 3.50-2.25. Purified virus was recovered from a B6 affinity column by pH gradient elution at pH 3.4-2.2 or by elution of virus swollen with 2 millimolar EDTA in pH 7 buffered saline. Virus partially purified by polyethylene glycol or by chromatography on Sephacryl S-300 was recovered by pH gradient elution, but clarified sap of infected plants destroyed the reactivity of the B6 affinity column. Electron microscopy showed virus particles on B6 agarose beads at higher pH values and the release of virus into lower pH washes. (AS)

0215

27444 SARTORATO, A. ; SEIJAS, C.A.R. 1985. An approach to control of bean golden mosaic virus in dry beans (Phaseolus vulgaris L.). Bean Improvement Cooperative. Annual Report 28:26-27. En. [Centro Nacional de Pesquisa de Arroz e Feijao, Caixa Postal 179, 74.000 Goiania-GO, Brasil]

Phaseolus vulgaris. Cultivars. Bean golden mosaic virus. Disease control. Chemical control. Seed treatment. Resistance. Vectors. Yields. Brazil.

In Rio Verde (Goias, Brazil), the use of tolerant bean cv. and the chemical control of the white fly vector Bemisia tabaci were evaluated as methods of control of BGMV. Treatments were 5 bean cv. as sub-subplots (Miranda 5 MDS/76, Carioca, Turrialba 1, G 02495 MDS/76, and G 02447 MDS/76); seed treatment with carbofuran as subplots; and 0, 1, or 2 foliar sprays with monocrotophos, applied at 30 and 50 days after planting, as plots. As the no. of foliar sprays increased, the mean disease incidence decreased. There was a significant difference in yields among cv. Based on the results, cv. Miranda 5 MDS/76 and 1 foliar spray 30 days after planting should be indicated. (CIAT)

0216

27249 TREMAINE, J.H. ; MACKENZIE, D.J.; RONALD, W.P. 1985. Monoclonal antibodies as structural probes of southern bean mosaic virus. Virology 144(1):80-87. En., Sum. En., 18 Ref., Il. [Research Station, Agriculture Canada, 6660 Northwest Marine Drive, Vancouver, British Columbia V6T 1X2, Canada]

Phaseolus vulgaris. Bean southern mosaic virus. Antibodies. Disease physiology and biochemistry. Canada.

The reactivity of 6 monoclonal antibodies with native BSMV particles, swollen virus, swollen virus contracted by divalent cations or by pH adjustment to 5.0, and virus coat protein at pH 7.5 and 5.0 was assessed by antigen inhibition ELISA. Clones B4, B7, and B11 did not react with native virus but were inhibited by low levels of all nonnative virus antigens. B6 had a high reactivity only with the native virus. B5 and B10 reacted equally with native virus and swollen virus contracted by Ca(2+) or by pH adjustment, by reacted only weakly with swollen virus or swollen virus contracted by Mg(2+). B5 reacted with viral protein at pH 5.0 and

weakly with coat protein at pH 7.5, whereas B10 did not react with protein at pH 7.5 and had only limited reactivity with viral protein at pH 5.0. The reactivity of B5 and B10 with swollen virus increased as the pH was gradually decreased between 7.3 and 6.5; their reactivity with swollen-contracted virus decreased as the pH was increased within the same range. Reactivity vs. pH plots of these 2 transition forms showed hysteresis with B10 but did not with B5. (AS)

0217

27207 TU, J.C. 1986. Interaction of calcium with indole-3-acetic acid and kinetin during the formation of local lesions in bean (Phaseolus vulgaris) by alfalfa mosaic virus. Canadian Journal of Botany 64(6):1097-1100. En., Sum. En., Fr., 25 Ref., Il. [Research Station, Research Branch, Agriculture Canada, Harrow, Ontario, Canada NOR 1G0]

Phaseolus vulgaris. Alfalfa mosaic virus. Indoleacetic acid. Ca. Canada.

A study was conducted on the interaction of Ca(2+) with IAA and kinetin on local lesion formation by AMV on bean leaves. Local lesion no. was reduced when IAA solutions alone were applied as postinoculation sprays, as compared with water sprays. The reduction was slight at 0.0001 and 0.00001 molar but was large at 0.001 molar. Although addition of 0.03 molar CaCl2 to 0.0001 and 0.00001 molar IAA sprays reversed the effect of IAA on local lesion formation, addition of the same concn. of Ca to 0.001 molar IAA had little effect on local lesion production. Kinetin, except at the 0.0001 molar concn., caused no increase in the no. of local lesions, as compared with treatment with distilled water. However, with 0.03 molar CaCl2 added, the local lesion production at all kinetin concn. increased significantly over distilled water or 0.03 molar CaCl2. The sizes of local lesions on leaves sprayed with 0.001, 0.0001, and 0.00001 molar IAA were reduced by approx. 52, 26, and 10 percent, resp., and on leaves sprayed with kinetin by approx. 44, 26, and 24 percent, resp. Addition of 0.03 molar CaCl2 to IAA and kinetin lessened their effect on the size of local lesions but did not eliminate the effect totally. (AS)

0218

27204 VICENTE, M. ; KUDAMATSU, M.; FAZZIO, G.M. DE; ALEXANDRE, M.A. VAZ; CHAGAS, C.M. 1985. Incidencia do mosaico dourado do feijoeiro em tres municipios do Estado de Sao Paulo zoneados para o plantio do "feijao da seca". (Incidence of bean golden mosaic in three municipalities of the state of Sao Paulo, selected for dry season bean cultivation). Biológico 51(6):147-155. Pt., Sum Pt., En., 14 Ref.

Phaseolus vulgaris. Bean golden mosaic virus. Epidemiology. Bemisia tabaci. Yields. Brazil.

Field expt. to evaluate bean productivity in relation to BGMV infection were carried out during 3 yr in 3 areas of Minas Gerais, Brazil, selected for dry season bean cultivation. The possible correlation between virus infection and vector (Bemisia tabac.) infestation was also studied. In each location (Campinas, Itapetininga, and Taquarituba), plots of 30 square meters that had been recently planted to bean cv. Carioca were used. Vector population dynamics and BGMV incidence were evaluated at 3 times during the crop vegetative cycle. The lowest vector infestation and the highest no. of healthy plants, resulting in higher productivity, were observed in Itapetininga. Results indicate that the disease may become severe if the environmental conditions allow vector proliferation, even in the areas selected for dry season bean cultivation. (AS)

0219

27053 WARREN, A. 1985. Zambia: BCMV. In Bean production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 1p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Cultivars. Crop losses. Bean common mosaic virus. Resistance. Zambia.

Areas affected and crop losses caused by BCMV in Zambia are briefly mentioned. Of 3 officially released bean var. (BAT 331, Nep 2, and Carioka, BAT 331 had the highest level of resistance to the virus. (CIAT) See also 0116 0179 0180 0238 0259 0281 0286 0287 0292 0302

E05 Nematodes

0220

27219 IBRAHIM, I.K.A. ; REZK, M.A.; KHALIL, H.A.A. 1983. Resistance of some plant cultivars to root-knot nematodes, Meloidogyne spp. Nematologia Mediterranea 11(2):189-192. En., 2 Ref. [Dept. of Plant Pathology, College of Agriculture, Alexandria Univ., Alexandria, Egypt]

Phaseolus vulgaris. Meloidogyne arenaria. Meloidogyne incognita. Meloidogyne javanica. Resistance. Egypt.

A series of glasshouse tests were undertaken to evaluate the resistance of some Leguminosae, Graminae, Umbelliferae and tomato cv. to Meloidogyne arenaria (race 1), M. incognita (races 2, 3, and 4), and M. javanica. Among the Leguminosae, the common bean cv. Mengatot was resistant to M. arenaria, M. incognita race 3, and M. javanica; cowpea cv. Azmerli was resistant to M. incognita race 3 and garden pea cv. Perfection was resistant to M. incognita race 2. (CIAT)

0221

27086 MELAKEBERHAN, H. ; BROOKE, R.C.; WEBSTER, J.M. 1986. Relationship between physiological response of French beans of different age to Meloidogyne incognita and subsequent yield loss. Plant Pathology 35(2):203-213. En., Sum. En., 17 Ref., Il. [Dept. of Nematology, Univ. of California, Davis, CA 95616, USA]

Phaseolus vulgaris. Meloidogyne incognita. Snap beans. Plant physiological processes. Yield. Yield components. USA.

The effect of a single generation of the root-knot nematode, Meloidogyne incognita, on the growth of potted French bean plants inoculated at different stages of plant maturity was studied. In separate expt. 3-, 11-, and 13-day-old plants were inoculated before primary leaf expansion, at the appearance of trifoliate leaves, and at the flower bud stages, resp., with 0, 2000, 4000, or 8000 2nd-stage juvenile nematodes and maintained in a growth chamber under controlled conditions. The photosynthetic rate of the plants inoculated at the trifoliate leaves and flower bud stages decreased significantly with increasing inoculum level 7 days after inoculation. Although the respiration rate did not significantly change throughout the exptl. period, the ratio of photosynthetic to respiration rate decreased significantly with increasing nematode inoculum level and duration of infection. Chlorophyll content, plant dry wt., and the no. of buds, flowers, pods, and seeds were significantly lower in infected plants than in the controls; this effect increased with increasing levels of nematode inoculum for all 3 plant stages. The leaf area was significantly smaller only when nematode infection occurred before primary leaf expansion. The plants which were youngest at the time of nematode infection produced the lowest yield; this appeared to result from the effect of nematodes on photosynthesis and related physiological processes. (AS)

0222

2732 MELTON III, T.A. 1985. Host-parasite interactions on the soybean cyst nematode and snap beans compared to soybeans. Ph.D. Thesis. Urbana, University of Illinois at Urbana-Champaign. 55p. En., Sum. En., 56 Ref., Il.

Phaseolus vulgaris. Heterodera glycines. Nematodes. Glycine max. Snap beans. Resistance. Cultivars. USA.

Soybean cyst nematode (Heterodera glycines), a devastating parasite of soybean, was recently reported as damaging snap beans in an Illinois (USA) commercial snap bean field. Because little information concerning the host-parasite relations of snap bean and H. glycines exists, studies were conducted to: (1) discover sources of resistance in snap bean to H. glycines, (2) determine effects of temp. on SCN in resistant and susceptible snap beans and soybeans, and (3) determine pathogenicity of the H. glycines on snap bean. This study was divided into 3 sections. The 1st series of expt. was designed to screen snap bean lines for host suitability and resistance against 2 populations of H. glycines. The 2nd section was designed to represent 5 temp., 4 host genotypes (resistant and susceptible snap beans and resistant and susceptible soybeans), and 10 sampling times to investigate these effects on the nematode development and plant response. Thirdly, 1 expt. was designed with 5 inoculation treatments on 2 snap bean genotypes to compare the pathogenicity of H. glycines on snap bean with that on soybean. Several snap bean cv. were shown to be equally suitable hosts as the susceptible soybean control, whereas WIS (RRR) 36 breeding line was resistant to both populations. Temp. and host genotype had a profound effect on the nematode developmental rate. At 28 degrees Celsius development was most rapid, closely followed by 20 and 24 degrees Celsius. At 20, 24, and 28 degrees Celsius, most nematodes reached maturity. (AS (extract))

0223

27392 SANTO, G.S. ; PONTI, R.P. 1985. Host suitability and reaction of bean and pea cultivars to Meloidogyne chitwoodi and M. hapla. Journal of Nematology 17(1):77-79. En., 7 Ref. [Washington State Univ., Irrigated Agriculture Research & Extension Center, Prosser, WA 99350, USA]

Phaseolus vulgaris. Cultivars. Meloidogyne chitwoodi. Meloidogyne hapla. Host range. USA.

Host suitability of bean cv. Pinto UI-114, Rufus, and Viva Pink and several pea cv. grown in the Pacific NW (USA) to Meloidogyne chitwoodi and M. hapla was determined. Also, the adverse effect of these nematodes on bean and pea growth was studied. All bean and pea cv. were excellent hosts for both nematode species. The bean and pea cv. tested were tolerant to M. chitwoodi and M. hapla. Thus, growing these cv. after a root knot nematode-susceptible crop would not likely cause problems. (CIAT) See also 0205

E06 Physiological Disorders

0224

27093 BYTNEROWICZ, A. ; TEMPLE, P.J.; TAYLOR, O.C. 1986. Effects of simulated acid fog on leaf acidification and injury development of pinto beans. Canadian Journal of Botany 64(5):918-922. En., Sum. En., Fr., 21 Ref., Il. [Statewide Air Pollution Research Center, Univ. of California, Riverside, CA 92521, USA]

Phaseolus vulgaris. Air pollution. Plant physiological disorders. USA.

Pinto beans of cv. UI 111 were exposed for 8 h to simulated fog solutions made up of 2:1 nitric acid:sulfuric acid plus background ions, acidified to pH 3.2, 2.8, 2.4, and 2.0. Rate of fog deposition was ca. 1 mm/h. Examination of visible foliar injury development, scanning electron microscopy examination, and measurement of leaf extract pH were performed every 2 h. Both visual and scanning electron microscopy observations during exposure showed no change in leaf surface characteristics for plants exposed to pH 3.2 and 2.8 fog solutions but 1 wk. after pH 2.8 exposures, injury was seen on primary leaves and young trifoliate leaves. The 1st indications of injury at pH 2.4 were seen under scanning electron

microscopy after 8 h of exposure. Foliar injury was apparent after only 2 h of exposure at pH 2.0 and severe acid necrosis developed after 24 h. Changes in acidity of leaf extracts were closely correlated with subsequent injury development. No changes were observed in extracts of plants exposed to pH 3.2 simulated fog compared with controls. After 8 h of exposure, leaf extracts of plants exposed to pH 2.8 fog had dropped 0.05 pH units. Plants exposed to pH 2.4 and pH 2.0 for 8 h had leaf extracts that were 0.12 and 0.18 pH units lower, resp. Comparison of the 3 measured parameters of acid fog effects (visible injury development, scanning electron microscopy examination of leaf surfaces, and determination of leaf extract pH) showed extract pH to be a simple, quantifiable, and sensitive indicator of the negative effects of acid precipitation on plants. (AS)

0225

27267 EISINGER, B.A. ; BRADFORD, K.J. 1986. Role of seed mineral content in the occurrence of transverse cotyledon cracking of snap bean. Journal of the American Society for Horticultural Science 111(1):110-114. En., Sum. En., 19 Ref., Il. [Peace Corps Training, P.O. Box 126, Frogmore, SC 29920, USA]

Phaseolus vulgaris. Seeds. Cotyledon cracking. Cultivars. Mineral content. USA.

Seed Ca, Mn, and K contents of 4 snap bean cv. (Spartan Arrow, Astro, Avalanche, and Early Gallatin) were studied in relation to degree of susceptibility to transverse cotyledon cracking (TVC). TVC index no. ranged from a min. of 13 (resistant) to a max. of 111 (extremely susceptible). To determine whether seed Ca is related causally to TVC, seed Ca content was altered through foliar application of Ca polycarboxylate. Without supplemental Ca sprays, the seed Ca contents of the 4 cv. varied from 17.3 to 24.7 microequivalents/g. Ca sprays increased seed Ca contents by up to 18 percent. The TVC indices of the cv. remained unchanged, however, and multiple regression analyses indicated that seed Ca content was not significantly correlated with TVC (R(2) = 0.014). A significant negative correlation occurred between seed Mg contents and degree of TVC (R(2) = 0.298). This correlation, however, depended largely upon var. differences in seed Mg content and may not represent a causal relationship with TVC. Var characteristics other than seed mineral content apparently account for differences in susceptibility to TVC. (AS)

0226

27331 HASHIM, Z.N. ; CAMPBELL, W.F. 1984. Electrophoretic patterns of storage proteins in Phaseolus prone to cotyledonal cracking. Journal of Seed Technology 9(2):150-161. En., Sum. En., 24 Ref., Il. [Plant Science Dept., Utah State Univ., Logan, UT 84322, USA]

Phaseolus vulgaris. Snap beans. Cultivars. Cotyledon cracking. USA.

The hypothesis that cotyledonal- or transverse-cracking results from the swelling of storage proteins in seeds during imbibition is examined using 15 snap bean cv. A total of 100 seeds were selected at random from each of 17 seed lots. Each bulk sample weighed 225 g. Separated proteins were subjected to electrophoresis under denaturing and non-denaturing conditions, and the mol. wt. of the different protein bands were determined. Differences in patterns of polyacrylamide gel electrophoretograms of proteins from resistant and susceptible cv. are reported. Different protein banding patterns were identified and correlations with the cotyledonal- or transverse-cracking phenomenon were attempted. There were visual differences between banding patterns of resistant and susceptible cv., although it is not clear which protein bands are associated with the cotyledonal- or transverse-cracking phenomenon. The technique requires further refinement before plant breeders can use for screening for cotyledonal- or transverse-cracking resistance in snap bean cv. (AS (extract))

0227

27217 LEFOHN, A.S. ; TINGEY, D.T. 1985. Injury response of Phaseolus vulgaris to ozone flux density. Atmospheric Environment 19(1):206-207. En., 8 Ref. [A.S.L. & Associates, Helena, MT 59601, USA]

Phaseolus vulgaris. Ozone. Plant injuries. Plant physiological disorders. USA.

A brief literature review on the effect of O3 on bean plants is presented and discussed. Aspects such as O3 flux density, time of exposure, and foliar injury are covered. (CIAT)

0228

27394 LOPEZ-BELMONTE, F. ; DE LA ESPERANZA, P.; DIEZ, M.A. 1985. Acciones fisiológicas del fluor sobre el crecimiento y desarrollo de los vegetales. (Physiological action of fluorine on the growth and development of vegetables). Anales de Edafología y Agrobiología 43(9-10):1397-1411. Es., Sum. En., Es., 20 Ref., Il. [Depto. de Fisiología Vegetal, Facultad de Farmacia, Univ. Complutense de Madrid, España]

Phaseolus vulgaris. Growth. Air pollution. Toxicity. Spain.

The possible toxic effects produced by 4 fluorine concn. (10, 50, 100, and 150 ppm) on different growth and development parameters of Phaseolus vulgaris and on protein and chlorophyll contents during the entire biological cycle of the plant were studied. The greatest effects were observed on the length of the aerial part and on leaf surface area. Plants treated with solutions containing 100 and 150 ppm fluorine had a development similar to those of the check lot, regardless of the stage of development of the plant prior to treatment. No clear differences were found in protein and chlorophyll contents among the different lots. (AS)

0229

27270 MUSSELMAN, R.C. ; HUERTA, A.J.; McCOOL, P.M.; OSHIMA, R.J. 1986. Response of beans to simulated ambient and uniform ozone distributions with equal peak concentration. Journal of the American Society for Horticultural Science 111(3):470-473. En., Sum. En., 12 Ref. [Dept. of Botany & Plant Sciences, Univ. of California, Riverside, CA 92521, USA]

Phaseolus vulgaris. Ozone. Air pollution. Plant physiological disorders. USA.

Response of Phaseolus vulgaris cv. California Dark Red Kidney to 2 different O3 concn. distributions was examined at 2 dose levels in controlled fumigations in the greenhouse. When peak O3 concn. were equal and total doses equivalent, there was no difference in injury, growth, or yield between a simulated ambient distribution with normal diurnal O3 fluctuations and a uniform distribution typical of lab. fumigation at constant concn. Plant fumigated with either ambient or uniform O3 distribution had oxidant stipple leaf necrosis and reduced growth and yield. The data indicate that with equal peak concn. and equivalent total dose, the constant square-wave, O3 concn. distributions in lab. fumigations are adequate to describe mode of action and magnitude of response to ambient exposures. (AS) See also 0060

F00 PEST CONTROL AND ENTOMOLOGY

0230

27248 THRONE, J.E. ; ECKENRODE, C.J. 1985. Emergence patterns of the seedcorn maggot, Delia platura (Diptera: Anthomyiidae). Environmental Entomology 14(2):182-186. En., Sum. En., 22 Ref., Il. [Dept. of Entomology, North Carolina State Univ., 840 Method Rd., Unit 2, Box 7628, Raleigh, NC 27695-7628, USA]

Phaseolus vulgaris. Delia platura. Insect biology. Delia florilega. USA.

A study was undertaken to monitor the development of Delia platura in the field, Emergence traps were used to determine times of emergence of D. platura adults in 1981, 1982, and 1983 from pupae developing in beans planted in Geneva (New York, USA) during 1981. Adults emerged from pupae in April-Oct. 1982 and in May and June 1983. Adults of D. florilega also emerged in the plots, but in smaller no. than D. platura. D. florilega males emerged in 1981 only in plots planted during May 1981. (CIAT)

0231

27212 WEINZIERL, R.A. ; BERRY, R.E.; FISHER, G.C. 1986. Sweep-net sampling for western spotted cucumber beetle (Coleoptera:Chrysomelidae) in snap beans: daily fluctuations in beetle counts and correlation between relative and absolute density estimates. Journal of Economic Entomology 79(4):1100-1105. En., Sum. En., 9 Ref., Il. [Extension Entomology, Univ. of Illinois, 172 Natural Resources Bldg., 607 E. Peabody Dr., Champaign, IL 61820, USA]

Phaseolus vulgaris. Diabrotica undecimpunctata undecimpunctata. Entomology. Snap beans. USA.

Sweep net sampling was evaluated as a method of sampling populations of adult western spotted cucumber beetles, Diabrotica undecimpunctata undecimpunctata, in snap beans. Each of 18 fields was sampled initially between 0800 and 1000 h; 1-6 subsequent sets of samples were collected later on the same date. Field means of beetle counts in sweep net samples collected after the initial sampling episode (subsequent means) were significantly lower than the field mean of initial samples collected in the same field (initial mean) in 16 of 42 comparisons. Subsequent mean/initial mean ratios were negatively correlated (R(2) = 0.72) with the amount of increase in solar radiation intensity between initial and subsequent sampling episodes. When fluctuations in beetle counts in sweep samples were described in relation to an av. daily radiation curve, estimated counts were lowest for sampling conducted at 1300 h. Time-based correction factors used as multipliers to stabilize relative density estimates according to a standard (0900 h) sampling time ranged from 0.9 for 1800 h to 2.5 for 1300 h. The linear relationship between corrected counts of D. undecimpunctata undecimpunctata in sweep net samples and measures of D. undecimpunctata undecimpunctata absolute density (beetles/m of row) was described by the equation: y = 0.44 + 2.55x (R(2) = 0.69), where x = no. of D. undecimpunctata undecimpunctata/m of row and y = corrected no. of D. undecimpunctata undecimpunctata/10 sweeps. (AS)

0232

27322 WEINZIERL, R.A. 1985. Sampling methods and injury thresholds for western spotted cucumber beetle in snap beans. Ph.D. Thesis. Corvallis, Oregon State University. 120p. En., Sum. En., 104 Ref., Il.

Phaseolus vulgaris. Diabrotica undecimpunctata undecimpunctata. Snap beans. USA.

Sweep net sampling and pheromone trapping were evaluated to quantify adult Diabrotica undecimpunctata undecimpunctata population in snap beans. Economic injury levels, economic thresholds, and sequential sampling plans based on sweep net sampling were established. Differences in mean no. of D. undecimpunctata undecimpunctata in separate sets of sweep net samples collected from the same field on the same day were negatively correlated (R(2) = 0.72) with the difference between radiation intensity measurements taken during sampling. When changes in D. undecimpunctata undecimpunctata counts in sweep samples were described in relation to an av. diel radiation curve, estimated counts were lowest for sampling conducted at 1:00 p.m. Time-based correction factors that stabilized relative density estimates according to a standard (9:00 a.m.) sampling time ranged from 0.9 for 6:00 p.m. to 2.5 for 1:00 p.m. The linear relationship (R(2) = 0.69) between

corrected sweep net and absolute estimates of D. undecimpunctata undecimpunctata density indicated sweep net sampling efficiency varied from 15 to 41 percent depending on sampling time. (AS (extract))

0233

27425 WERMELINGER, B. ; OERTLI, J.J.; DEUCCHI, V. 1985. Effect of host plant nitrogen fertilization on the biology of the two-spotted spider mite, Tetranychus urticae. Entomologia Experimentalis et Applicata 38(1):23-28. En., Sum. En., De., 14 Ref., Il. [Swiss Federal Inst. of Technology (ETH) Zurich, Dept. of Crop Science, 8092 Zurich, Switzerland]

Phaseolus vulgaris. Nutrient solution. N. Tetranychus urticae. Insect biology.

The effect of nutritional conditions of the host plant on the development of Tetranychus urticae was evaluated. Mites were examined on apple trees and bush beans grown in nutrient solutions with varying amounts of N under controlled conditions. Wt., oviposition rate, and fecundity of the mites were higher on beans than on apple trees. At approx. the same N content of the leaves of beans and apple trees, the wt. of the mites on beans was much higher (300 percent). Results indicate that there are other factors besides total N content of the leaves that influence fecundity such as toughness of the leaves, water content, differences in N compounds and other substances. (CIAT) See also 0091

F01 Injurious Insects, Mites and their Control

0234

27433 COSTA, E.C. ; LINK, D. 1984. Estimativa de danos e estudo sobre o comportamento de Agrotis ipsilon (Hufnagel, 1767) em feijoeiro. (Estimation of damage and study of the behavior of Agrotis ipsilon in beans). Revista do Centro de Ciencias Rurais 14(1):9-17. Pt., Sum. Pt., En., 12 Ref., Il. [Depto. de Defesa Fitossanitária, Centro de Ciencias Rurais, Univ. Federal de Santa Maria, 97.100 Santa Maria-RS, Brasil]

Phaseolus vulgaris. Agrotis ipsilon. Plant injuries. Brazil.

The damage caused by cutworms in bean fields in the municipality of Sao Sepe (Rio Grande do Sul, Brazil) was estimated during the 1979-80 and the 1980-81 growing seasons. Insect behavior was also studied. The predominant species during both years was Agrotis ipsilon, accounting for 98 percent of the adults observed both in the field and in the lab. The initial populations in the field consisted exclusively of migratory cutworms in the 2nd-6th instar stages. To assess damage, the sites initially attacked were marked; sets of 4 hills were covered by nylon cages measuring 1.0 x 0.8 x 0.4 m. The duration of the attack depended on the age of the infesting cutworm; this varied, on av., between 3-23 days. The no. of plants attacked varied between 2.0-21.8 and depended on the duration of the attack and on the plant development stage. The population density was lower in fields that had been previously prairieland than in those that had been previously forestland (2.6 and 9.8 species/20 square meters, resp.). The depth of the galleries was also studied and it was observed that gallery depth depended on soil moisture. (AS)

0235

27434 COSTA, E.C. ; LINK, D. 1984. Estimativa de danos e observacoes sobre o comportamento de grilo em feijoeiro. (Estimation of damage and observation of the benavior of crickets in beans). Revista do Centro de Ciencias Rurais 14(1):3-8. Pt., Sum. Pt., En., 8 Ref., Il. [Depto. de Defesa Fitossanitaria, Centro de Ciencias Rurais, Univ. Federal de Santa Maria, 97.100 Santa Maria-RS, Brasil]

Phaseolus vulgaris. Anurogryllus muticus. Plant injuries. Brazil.

Damage caused by crickets (Anurogryllus muticus) in black bean fields in Sao Sepe (Rio Grande do Sul, Brazil) was estimated during the 1980-81 growing season. A. muticus behavior was studied during 1979-80 and 1980-81. The observations on damage were carried out inside nylon cages measuring 1.50 x 1.50 x 0.80 m and containing 16 hills with 3 plants each. Each cage had 1 insect. The mean cutting time was 17 days, but it varied according to plant conditions such as height, tissue lignification, and appearance of the 1st leaflets. The av. no. of plants damaged per cricket was 22. In fields that had been previously covered by trees, the av. no. of crickets/20 square meters over 2 yr was 8.7; where there had been pastures, the av. no. was 3.4 insects. (AS)

0236

27070 GAYNOR, D.L. ; LANE, G.A.; BIGGS, D.R.; SUTHERLAND, O.R.W. 1986. Measurement of grass grub resistance of bean in a controlled environment. New Zealand Journal of Experimental Agriculture 14(1):77-82. En., Sum. En., 19 Ref., Il. [Entomology Division, Dept. of Scientific & Industrial Research, Private Bag, Palmerston North, New Zealand]

Phaseolus vulgaris. Costelytra zealandica. Resistance. Phaseollin. New Zealand.

Controlled environment conditions were used to compare growth of individual 3rd-instar larvae of the grass grub Costelytra zealandica on bean with that on Lotus pedunculatus and Trifolium repens (resistant and nonresistant controls, resp.). Bean roots contain phaseollin, a highly active feeding deterrent to C. zealandica larvae. After 28 days, 94.6 percent of the larvae were recovered undamaged. Larval wt. gain on bean (78 mg) indicated that bean is resistant relative to T. repens (108 mg gain) but not as resistant as L. pedunculatus (62 mg gain). Root extracts were examined in toxicity and feeding deterrent bioassays and in chemical analyses. The use of controlled environment conditions provided a sensitive method for measuring plant resistance. (AS)

0237

27356 GRAVENA, S. ; BUSOLI, A.C. 1985. Ocorrencia de Migdolus sp. (Coleoptera: Cerambycidae) atacando feijoeiro (Phaseolus vulgaris L.) irrigado em Jaboticabal, Sao Paulo. (Occurrence of Migdolus sp. (Coleoptera: Cerambycidae) attacking irrigated beans in Jaboticabal, Sao Paulo). Anais da Sociedade Entomologica do Brasil 14(1):165. Pt. [Univ. Estadual de Sao Paulo, Depto. de Defesa Fitossanitária, Facultade de Ciencias Agrárias e Veterinárias, 14.870 Jaboticabal-SP, Brasil]

Phaseolus vulgaris. Migdolus. Plant injuries. Brazil.

In Aug. 1983 larvae of a species of Migdolus were found cutting the stems of plants of bean cv. Carioca 80 in a commercial field in the municipality of Jaboticabal (Sao Paulo, Brazil). This is the 1st report of this insect attacking beans at this site. The field had previously been used to grow sugarcane (up to Sept. 1982) and groundnuts (up to March 1983). (CIAT)

0238

26916 KITAJIMA, E.W. ; KIM, K.S.; SCOTT, H.A.; GERGERICH, R.C. 1985. Reovirus-like particles and their vertical transmission in the Mexican bean beetle, Epilachna varivestis (Coleoptera: Coccinellidae). Journal of Invertebrate Pathology 46(1):83-97. En., Sum. En., 35 Ref., Il. [Depto. de Biologia Celular, Univ. de Brasilia, 70.91 Brasilia DF, Brasil]

Phaseolus vulgaris. Epilachna varivestis. Vectors. Disease transmission. Brazil.

Examination of thin sections of organs and tissues from Epilachna varivestis adults and larvae revealed the consistent presence of isometric, reovirus-like particles in the cytoplasm and rarely in the

nuclei. Cytoplasmic inclusions having a dense and finely granular matrix with virus-like particles at their periphery were noticed occasionally. These inclusions were, however, very frequent in the nurse cells in the germarium of the ovariole. Virus-like particles were found in the cytoplasm of oocytes and eggs as well as embedded in the nuclei of sperm, thus suggesting vertical transmission of these particles, and explaining the 100 percent infection of the E. varivestis colony maintained at the Virology and Biocontrol Lab. of the U. of Arkansas (USA). Partially purified extracts from ovarioles or entire beetles contained particles which, in negatively stained preparations, resembled reoviruses without the external protein coat. It is suggested that these particles represent a latent virus of E. varivestis. (AS)

0239

27344 KORNEGAY, J.L. ; CARDONA, C.; SCHOONHOVEN, A. VAN 1986. The mechanisms of resistance in common beans to the leafhopper Empoasca kraemeri. Entomologia Experimentalis et Applicata 40(3):273-279. En., Sum. En., Fr., 14 Ref. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Resistance. Empoasca kraemeri. Cultivars. Colombia.

Greenhouse and field studies were conducted to determine the mechanisms of resistance (tolerance, antibiosis, and antixenosis) in common beans to the leafhopper Empoasca kraemeri. No antibiosis effects were detected in any of the bean lines investigated; however, in both free choice and no choice tests in the greenhouse, ovipositional antixenosis was detected and appeared to increase with increasing plant age in resistant bean lines. The results of the field study were similar to those obtained in the greenhouse and suggested that bean line EMP 81 possessed only tolerance as a mechanism of resistance to leafhoppers, while EMP 89, EMP 94, EMP 97, and EMP 82 were nonpreferred by ovipositing leafhoppers. (AS)

0240

27215 MAYSE, M.A. ; GONZALEZ, A.R. 1984. Leafminer may cause problems in Arkansas vegetable crops. Arkansas Farm Research 33(1):2. En., Il.

Phaseolus vulgaris. Liriomyza trifolii. Snap beans. Insect control. Chemical control. USA.

A new leafminer, Liriomyza trifolii, was found infesting bean plants in a fall 1980 var. trial at the U. of Arkansas Agricultural Expt. Station in Fayetteville, USA. Field tests conducted in California and Florida suggest that L. trifolii has developed resistance to many commercially available chemical insecticides. Thus, this leafminer, previously unrecorded in Arkansas, represents a potential pest to various vegetable crops. (Entomology Abstracts)

0241

27334 MURGUIDO, C. ; IZQUIERDO, D. 1982. Determinación de los índices de ataque de larvas para la señalización de las aplicaciones de insecticidas contra el saltahojas de los fríjoles (Empoasca fabae). (Determination of the indices of larval attack for indicating the application of insecticides to control the bean leafhopper (Empoasca fabae)). Ciencia y Técnica en la Agricultura 5(3):97-104. Es., Sum. Es., En., 6 Ref. [Inst. de Investigaciones de Sanidad Vegetal, Ministerio de la Agricultura, Ciudad de La Habana, Cuba]

Phaseolus vulgaris. Empoasca fabae. Insecticides. Insect control. Chemical control. Cuba.

The economic threshold of attack by larvae of Empoasca fabae on beans beyond which chemical treatments are required was determined in field trials in Cuba with bean var. Cueto 25-9. Indices were maintained with applications of methamidophos at 0.8 liters/ha, and a check. Assessments

were made 3 times a wk. by counting the larvae on 100 leaves; once the preestablished index was determined, the insecticide was applied. Results show that yields were not affected by an av. of 0.26 leafhoppers/100 leaves, but the presence of 4-6 larvae/100 leaves severely reduced the yield. The untreated plot showed a yield loss of 50 percent with respect to the 0.26 index. (AS)

0242

27085 MURGUIDO, C. ; RUIZ, I. 1982. Evaluación técnica y económica de un método nuevo para la señalización del saltahojas (Empoasca fabae, Homoptera:Cicadellidae) en el cultivo del frijol. (Technical and economic assessment of a new method for detecting the leafhopper (Empoasca fabae homoptera:Cicadellidae) in beans). Ciencia y Técnica en la Agricultura. Protección de Plantas 5(3):39-48. Es., Sum. Es., En., 5 Ref. [Inst. de Investigaciones de Sanidad Vegetal, Ministerio de la Agricultura, Ciudad de La Habana, Cuba]

Phaseolus vulgaris. Empoasca fabae. Insect control. Chemical control. Costs . Yields. Income. Cuba.

A method for detecting bean leafhoppers (Empoasca fabae) was compared with a program of insecticide treatments at 10-day intervals, beginning at seed germination, during a field trial at the Delicias Grandes Exptl. Station (Cuba). The index chosen for the emission of warning was a mean no. of 1.0-1.5 leafhoppers/checking point in the field. It was verified that methamidophos 600 CS at 0.6 liter/ha gives a suitable control of the pest with a high biological effect when applied following this pest detection method. The complementary expenditures/insecticide treatment could be reduced by 50 percent, and the profit for peso invested was higher with timely insecticide application. (AS)

0243

27323 OWN, O.S. 1983. Interactions of the hymenopterous parasite Pediobius foveolatus (Crawford) with two undescribed microsporidia pathogenic for the Mexican bean beetle, Epilachna varivestis Mulsant. Ph.D. Thesis. Raleigh, North Carolina State University. 124p. En., Sum. En., 160 Ref.

Phaseolus vulgaris. Epilachna varivestis. Biological control. Predators and parasites. USA.

The hymenopterous parasite Pediobius foveolatus proved to be highly susceptible to 2 undescribed microporidia that occur naturally as pathogens of the Mexican bean beetle Epilachna varivestis. After female parasites oviposited in late stage Mexican bean beetle larvae exposed previously to spores of each microsporidium as either early instar larvae or as late stage larvae 24 h prior to parasite oviposition, the progeny of the parasites were infected directly by the microsporidia and infection appeared to be systemic in nature. Upon development in heavily infected hosts, the incidence of infection by both microsporidia in the parasites' progeny approached 100 percent and percent mortality was also high. Parasite mortality occurred primarily in the pupal stage of development and the incidences of infection and mortality were directly related to degree of host infection and/or microsporidian virulence. Infection did not adversely affect the developmental period of the emerging adults but adult longevity was greatly reduced, especially in adults infected with the more virulent Mexican been beetle sp. no. 1. Adults were also susceptible to the microsporidia via oral means. Relatively few females of the P-generation that were infected with Mexican bean beetle sp. no. 1 were capable of ovipositing in host larvae and only one female transmitted the pathogen transovarially to some of its progeny. Females infected with Mexican bean beetle sp. no. 2 successfully transmitted the microsporidian transovarially to F6 individuals at rates varying from 5.8 to 70.0 percent. Both microsporidia were mechanically transmitted from diseased to healthy hosts during parasite oviposition. Transmission of Mexican bean beetle sp.

no. 1 occurred randomly but only those parasitized initially were found to be infected with Mexican bean beetle sp. no. 2. (Dissertation Abstracts International)

0244

27451 PEREZ, G. ; BONET, A. 1984. Algunas características biológicas de Stenocorse bruchivora (Crawford) (Hymenoptera:Braconidae), ectoparasitoide de Acanthoscelides obtectus (Say) (Coleoptera:Bruchidae). (Some biological characteristics of Stenocorse bruchivora (Hymenoptera:Braconidae), an ectoparasitoid of Acanthoscelides obtectus (Coleoptera:Bruchidae). Folia Entomológica Mexicana 62:59-74. Es., Sum. Es., En., 17 Ref., Il. [Inst. de Ecología, Apartado Postal 18-845, México 11800, D.F., México]

Phaseolus vulgaris. Predators and p ites. Insect biology. Biological control. Acanthoscelides obtectus. o.

Some biological aspects of Stenocorse bruchivora, a solitary ectoparasitoid of the buchid Acanthoscelides obtectus in Tepoztlán (Morelos, Mexico) are described. The preovipositional period lasts 4-5 days for virgin females and 14-18 days for mated ones. The embryonic and postembryonic development lasts 20-23 days for males and 22-24 days for females. Thus, males emerge before females and stay near the host plant, increasing the probabilities of sexual encounter. The fecundity of virgin females was greater than that of mated females. Sex ratio of progeny of mated females is biased to females. (AS)

0245

27454 PIMBERT, M.P. 1985. A model of host plant change of Zabrotes subfasciatus Boh. (Coleoptera: Bruchidae) in a traditional bean cropping system in Costa Rica. Biological Agriculture and Horticulture 3(1):39-54. En., Sum. En., 30 Ref., Il. [Inst. de Biocénotique Expérimentale des Agrosystemes, Université F. Rabelais, LA CNRS 340, Avenues Monge, Parc Grandmont, Tours, 37200, France]

Phaseolus vulgaris. Cultivation systems. Zabrotes subfasciatus. Cultural control. Insect control. Costa Rica.

Field studies in a traditional Costa Rican bean cropping system, covered beans, showed that an av. of 8 percent of the Phaseolus vulgaris pods harvested were attacked by Zabrotes subfasciatus. Levels of attack observed on wild P. lunatus vines, also present in the agroecosystem, were comparable (mean, 9 percent). Data obtained on the insect's reproductive biology, host plant records, adaptation, and field observations demonstrated the extreme host specificity of Z. subfasciatus in the local community context. A model of host plant switching by this bruchid in the province of Puntarenas was proposed. It predicts that the level of bean crop contamination could be reduced by controlling the insect's wild host plant (P. lunatus) around P. vulgaris fields and bean storage sites. (AS)

0246

27043 WARREN, A. 1985. Tanzania: entomology. In Bean production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 2p. En., [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Cultivars. Resistance. Ophiomyia phaseoli. Ootheca. Thysanoptera. Density. Planting. Timing. Intercropping. Zea mays. Insect control. Tanzania.

Brief information is presented of the bean entomology activities at the Sokoine U. (Morogoro, Tanzania). Emphasis has been made on plant resistance to the bean fly, Ootheca, and to Taenia thrips. Additionally,

studies have been conducted on the effect of plant density, time of planting, and intercropping on insect pests. (CIAT) See also 0218 0268 0269 0275 0276 0280 0285 0299 0300 0344

U00 OENETICS AND PLANT BREEDING

0247

27427 BASCUR B., G. ; HERRERA G., G. 1986. Coscorrón Granado-INIA: nueva variedad de poroto para consumo en vaina granada. (Coscorron Granado-INIA: a new bean variety for consumption as vaina granada). Agricultura Técnica 46(2):217-220. Es., Sum. En., 3 Ref., Il. [Estación Experimental La Platina, Inst. Nacional de Investigaciones Agrícolas, Casilla 439/3, Santiago, Chile]

Phaseolus vulgaris. Cultivars. Resistance. Bean common mosaic virus. Agronomic characters. Yields. Chile.

Coscorrón Granado-INIA is a bean var. developed at La Platina exptl. station (Santiago, Chile) by crossing var. Coscorrón Tuniche-1095 x Great Northern 164557. It is tolerant to the BCMV type, New York-15, and necrotic strains. Coscorrón Granado-INIA can be consumed as vaina granada (red-colored pod with light green stripes). Compared with the Coscorrón-type var. grown in the country, its period from sowing to 1st harvest is shorter (85-93 days) and its pod yield is higher. (AS)

0248

26992 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Bean germplasm activities. Biotechnology Research Unit. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no. 14. pp.14-22. En., Il. Also in Spanish.

Phaseolus vulgaris. Tissue culture. Propagation. Colombia.

In 1985, the activities of the Biotechnology Research Unit (CIAT) involved research in cell and tissue culture for clonal propagation and for the generation of useful variability. These activities included work carried out at CIAT and at collaborating institutions abroad. Work at CIAT concentrated on research to develop tissue culture applications with CIAT crops, including beans. (CIAT

0249

26991 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Bean germplasm activities. Germplasm collection, multiplication and distribution. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.5-13. En. Il. Also in Spanish.

Phaseolus vulgaris. Germplasm. Phaseolus lunatus. Phaseolus coccineus. Phaseolus acutifolius. Colombia.

The status of the Phaseolus collection held at the CIAT Genetic Resources Unit and the results of germplasm explorations in 1985 are presented in table form. Future plans include collection activities through expeditions in the Andean region. (CIAT)

0250

26993 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Bean germplasm activities. Germplasm data management. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.23-25. En. Also in Spanish.

Phaseolus vulgaris. Database. Germplasm. Colombia.

CIAT's bean database was designed to deal with 2 main groups of data: the identification and origins of bean accessions and their characteristics.

The 1st category is nearly complete, in terms of both storing data previously held in other files and of providing an on-line data management system. The 2nd category is incomplete, with no on-line data management yet available. The contents of the database are shown in table form, and the immediate and long-term future of the database are briefly discussed. (CIAT)

0251

27004 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Genetic improvement. Character development. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.131-156. En. Also in Spanish.

Phaseolus vulgaris. Germplasm. Transfer of technology. Colombia. Ecuador. Peru. Caribbean. Central America. Mexico. Argentina.

The flow of germplasm from CIAT to national programs is described for the following regions: Central America and the Caribbean, Mexican Highlands, Argentina, West Asia, and the Andean Region (Colombia, Ecuador, and Peru). This flow is channeled through Adaptation Nurseries (VA), each country receiving the VA that corresponds to local grain color preferences: black, mottled, or yellow/beige. Each VA of a given color class is a uniform nursery, thus facilitating compilation of data and observations over sites. Tables showing the distribution of VA by color and country, and yield vs. environment correlations are included. (CIAT)

0252

26912 DHALIWAL, A.S. ; POLLARD, L.H. 1962. Cytological behavior of an F1 species cross (Phaseolus lunatus L. var. Fordhook x Phaseolus polystachyus L.). Cytologia 27:369-374. En., Sum. En., 6 Ref., Il.

Phaseolus lunatus. Crossbreeding. Hybridizing. Cytogenetics. Chromosomes. Genes. Cell division. USA.

The cytological behavior of an F1 cross (Phaseolus lunatus var. Fordhook x P. polystachyus) under Utah environmental conditions (USA) is described. The germination behavior of parental and hybrid plants was studied. The flower buds were fixed in propiono-alcohol and were smeared in propiono-carmine. The meiotic behavior of chromosomes, as seen from the dividing pollen mother cells, was normal in parent species. A no. of meiotic irregularities such as nonpairing of chromosomes, early disjunction, the presence of bridges and laggards with unequal distribution of chromosomes at anaphase, and polyspory were recorded from hybrid plants. The meiotic irregularities in general seem to be responsible for high pollen sterility in F1 hybrid plants. (AS)

0253

27234 EDWARDS, K. ; CRAMER, C.L.; BOLWELL, G.P.; DIXON, R.A.; SCHUCH, W.; LAMB, C.J. 1985. Rapid transient induction of phenylalanine ammonia-lyase mRNA in elicitor-treated bean cells. Proceedings of the National Academy of Sciences of the United States of America 82(20):6731-6735. En., Sum. En., 44 Ref., Il. [Imperial Chemical Industries, Corporate Biosciences Laboratory, The Heath, Runcorn, Cheshire WA7 4QE, England]

Phaseolus vulgaris. Enzymes. DNA. RNA. Phytoalexins. Diseases and pathogens. Resistance. United Kingdom.

DNAs complementary to a size-selected fraction of poly(A)(+) RNA present in elicitor-treated cells of bean were inserted into pAT153 and used to transform Escherichia coli strain C600. Five clones were identified by hybrid-selected translation and cross-hybridization that contained sequences complementary to mRNA encoding phenylalanine ammonia-lyase, which catalyzes the 1st reaction of phenylpropanoid biosynthesis. RNA blot hybridization showed that elicitor caused a rapid, marked but transient

increase in phenylalanine ammonia-lyase mRNA that was closely correlated with changes in translatable mRNA activity in vitro and enzyme synthesis in vivo. (AS (extract))

0254

27033 GHADERI, A. ; ADAMS, M.W.; SAETTLER, A.W. 1982. 1982 progress report on the development of great northern beans. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1982 Research Report. pp.56-57. En.

Phaseolus vulgaris. Cultivars. Crossbreeding. Selection. USA.

The procedure followed to obtain great northern beans adapted to the conditions of Michigan, USA, is described. The ideal var. is visualized as one being upright in growth habit, high yielding, and possessing the great northern bean seed type. The status of the current breeding process at the greenhouse and field levels is summarized. (CIAT)

0255

27020 GHADERI, A. ; ADAMS, M.W. 1981. Breeding great northern beans for Michigan, objectives, strategies, and progress. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1981 Research Report. pp.77-79. En., Il.

Phaseolus vulgaris. Plant breeding. USA.

A description is given of the strategies and advances of the breeding program for great northern beans in Michigan, USA, whose objective is to develop an upright plant type with desirable adaptability and great northern seed characteristics. The breeding scheme for the development of great northern beans is given. The selections are under evaluation. (CIAT)

0256

27233 HOROWITZ, J. 1985. A Phaseolus mutation results in a reduced level of lectin mRNA. Molecular and General Genetics 198(3):482-485. En., Sum. En., 22 Ref., Il. [Dept. of Biology, Univ. of California, Los Angeles, CA 90024, USA]

Phaseolus vulgaris. Proteins. Phytohemagglutinins. Protein content. Genes. Seeds. USA.

The molecular basis of a lectin gene mutation in Phaseolus vulgaris cv. Pinto was investigated. Rocket immunoelectrophoresis studies showed that seed lectin is reduced approx. 40-fold in comparison with the normal P. vulgaris cv. Contender. DNA gel blot studies using a lectin cDNA probe suggested that var. Pinto and Contender contain similar no. of lectin genes, although qualitative differences were observed in the gel blot banding patterns. Hybridization of the lectin cDNA probe to gel blots containing normal and mutant embryo mRNAs produced a 1 kilobase mRNA band in both mRNA populations. However, the amount of lectin mRNA was reduced approx. 10-fold in the mutant cv. Pinto. Together, these findings suggest that the reduced seed lectin level is due, in part, to a reduction in seed lectin mRNA. (AS)

0257

27019 KELLY, J.D. 1981. Pinto, pink, red mexican breeding program. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1981 Research Report. pp.73-76. En.

Phaseolus vulgaris. Plant breeding. Crossbreeding. USA.

The objectives of the pinto, pink, and red mexican bean breeding program are briefly summarized, and the breeding strategies and mechanisms used are briefly described. The objective is to develop var. with an erect growth habit to reduce crop losses, improve seed quality in wet seasons, and minimize the infection caused by white mold; likewise, var. should be resistant to rust, BCMV, and air pollution caused by O3. To incorporate all these traits into a single var. and maximize the effectiveness of the program, the strategy presents 2 alternatives: (1) utilization of 3- and 4-way crosses, and (2) modification of the recurrent selection procedure. The advantages and disadvantages of both methods are indicated and data of the no. of planned crosses are included. (CIAT)

0258

27408 KOLAR, J.J. ; HAYES, R. 1985. Naming and release of a new cultivar of great northern beans, UI 425. Bean Improvement Cooperative. Annual Report 28:138-139. En. [Univ. of Idaho, Research & Extension Center, Kimberly, ID, USA]

Phaseolus vulgaris. Cultivars. Agronomic characters. Yields. USA.

The main characteristics of a new great northern dry bean cv., UI 425, developed by the U. of Idaho in Kimberly (USA), are presented. (CIAT)

0259

27409 KOLAR, J.J. ; HAYES, R. 1985. Naming and release of a new near navy bean, UI 158. Bean Improvement Cooperative. Annual Report 28:139-140. En. [Univ. of Idaho, Research & Extension Center, Kimberly, ID, USA]

Phaseolus vulgaris. Cultivars. Agronomic characters. Resistance. Curly top virus. Bean common mosaic virus. Seed characters. USA.

A description is given of the origin and characteristics of the new near-navy bean cv. UI 158, developed by the Research and Extension Center in Kimberly (Idaho, USA). This cv. is resistant to the curly top virus and prevalent types of BCMV; in regional nursery tests it showed some tolerance to bacterial diseases. (CIAT)

0260

27320 NAGATA, R.T. 1984. Inheritance and linkage relationships of induced mutants of common bean, Phaseolus vulgaris L. Ph.D. Thesis. Gainesville, University of Florida. 116p. En., Sum. En., 118 Ref., Il.

Phaseolus vulgaris. Seed. Irradiation. Mutation. Outcrossing. Cross-pollination. USA.

Dry seeds of common bean line 7-1404 were treated with 10 and 20 kilo roentgen (kR) of gamma rays to induce plant mutations suitable for use as genetic markers in mapping studies. The mutations changed leaf shape and texture, and produced dwarfism and various chlorophyll deficiencies. Mutants with highly visible phenotypic characteristics were tested for inheritance. Ten recessive mutants were selected for linkage testing in diallel crosses. Linkage was calculated using F2 data, employing the product method. The max. likelihood equation was employed to combine repulsion and coupling data to estimate a single linkage value. Two linkage groups involving 5 mutant characters were discovered. Round leaf (rnd), stipelless lanceolate leaf (sl), and dark green savoy (dgs) formed 1 linkage group (dgs-21-sl-12-rnd), while diamond leaf (dia) and progressive chlorosis (pc) formed the 2nd linkage group (dia - 6 - pc). Dgs was linked (38 map units) to the yellow wax locus, y, thereby tying the dgs - rnd linkage group into linkage group VII defined by Lamprecht. A coupling phase test has confirmed the linkage of rnd with dwarf seed (ds) at 29 percent recombination. Preliminary data suggest that the ds character may be the same gene as Lamprecht's tenuis (te), also of linkage group VII. If this is true, then the orientation of the dgs - sl - rnd linkage group is

determined with respect to v and P. In 1 M2 progeny 7 plants were discovered with a dwarf mutant phenotype. Tests of M3 progenies revealed outcrossing rates of 5-47 percent. Pollen staining tests of the mutant indicated no unusual pollen abortion rates. Pod set from plants grown in insect-proof enclosures were comparable with that of unprotected dwarf plants. Open flowers of dwarf plants manually crossed between 0630 h and 1430 h with either Sprite or 7-1404 pollen resulted in cross pollination of 26-86 percent. The frequency of cross pollination declined with time of day. Evidence is presented supporting the hypothesis that delay of anther dehiscence is responsible for the elevated levels of cross pollination. The proposed name for this mutant is dwarf outcrossing. (AS)

0261

27278 ROMERO-ANDREAS, J. ; YANDELL, B.S.; BLISS, F.A. 1986. Bean arcelin. 1. Inheritance of a novel seed protein of Phaseolus vulgaris L. and its effect on seed composition. Theoretical and Applied Genetics 72(1):123-128. En., Sum. En., 24 Ref., Il. [Dept. of Horticulture, Univ. of Wisconsin, Madison, WI 53706, USA]

Phaseolus vulgaris. Phaseollin. Proteins. Inheritance. Genetics. USA.

Gel electrophoresis of seed proteins from a wild bean accession of Mexican origin, PI 325690, revealed the presence of a novel 38 kD protein, designated arcelin. A plant of PI 325690 was selfed to give the pure line UW 325, which showed normal seed phenotype and germination, plant growth, pollen fertility, and percentage seed protein despite a reduced seed phaseollin content (14.6 percent) Analyses of F2 and F3 seeds from a single F1 plant of the cross Sanilac X PI 325690-3 showed that the presence of arcelin is controlled by a single dominant gene Arc. Mean phaseollin percentage in seeds of Arc/Arc F3 families (1[illegible].0 percent) was significantly lower than that of arc arc seed. (44.7 percent). Without exception, seeds containing arcelin had a lower percentage of phaseollin than seeds lacking arcelin. Arc/Arc and Arc/arc genotypes were similar for seed wt. and percentage total seed protein. (Plant Breeding Abstracts)

0262

27305 SANTOS, J.B. DOS ; VENCOVSKY, R.; RAMALHO, M.A.P. 1985. Controle genético da producao de graos e de seus componentes primários em feijoeiro. (Genetic control of grain yield and its primary components in bean plants). Pesquisa Agropecuaria Brasileira 20(10):1203-1211. Pt., Sum. Pt., En., 21 Ref., Il. [Dept. de Biologia, Escola Superior de Agricultura de Lavras, Lavras-MG, Brasil]

Phaseolus vulgaris. Cultivars. Crossbreeding. Yields. Yield components. Inheritance. Genes. Brazil.

Seven bean cv. were crossed following a diallel model and data were obtained from the parents and F2 generation in order to determine the genetic control of grain yield and its primary components. A random block design with 3 replications was used in 2 locations of the state of Minas Gerais, Brazil, in 1981. The method proposed by Jinks and Hayman for analyzing diallel crosses was used, and the data met the assumptions for the model, except in 3 cases, where adjustments were necessary to fit the model. The additive gene action was predominant in relation to dominance for all traits. Consequently, the mean behavior of the cv. and of the segregant populations should be considered in breeding programs. There was a significant interaction between gene action and locations. (AS)

0263

27347 STEAGALL, M.L. ; ANDO, A. 1982. Estudos sobre a ontogenia e alguns caracteres do feijoeiro (Phaseolus vulgaris L.) a partir de sementes irradiadas com neutrons rápidos. (Studies on ontogeny and some characters in beans using seeds irradiated with fast neutrons). In Universidade de Sao

Paulo. Instituto de Genética. Relatorio Cientifico no.16. pp.159-171. Pt., Sum. En., 16 Ref.

Phaseolus vulgaris. Irradiation. Seed. Seed characters. Plant fertility. Mutation. Germination. Brazil.

The ontogeny of the seed of bean var. Costa Rica, irradiated with different doses of fast neutrons, was studied. The mutations analyzed were chlorophyll, morphological characteristics, and hypocotyl color in the M3 generation. Segregation ratios of the heterozygous seeds for these mutations in the M2 generation were also considered. Topographical analysis of the M1 plants were made to elucidate the position of mutations within their inflorescences, allowing the verification of chimeric formation in the M1 plants that originated from the irradiated seeds. Additional studies were carried out to observe the effects of fast neutrons on the fertility of the M1 plants, germination and survival of the M2 plants, and germination and mutation frequencies in the M3 plants. The results showed that the treatment with 2 krad of fast neutrons was more effective than that with 1 krad, causing higher segregation ratios and consequent reduction of the initial cell no. in the embryo. The topographical analyses of the M1 plants showed that the same type of mutations occurred in various primary branches and that more than 1 type of mutation could be present in a single primary branch, indicating that a primary branch can be differentiated from more than 1 initial cell. Considering that mutations occur at random and that mutation rates determined through conventional methods are relatively low, the results of the present work showed that a relatively high mutation frequency/cell can be obtained by fast neutron irradiation. (AS)

0264

27231 VITALE, A. ; CERIOTTI, A.; BOLLINI, R. 1985. Molecular analysis of a phytohemagglutinin-defective cultivar of Phaseolus vulgaris L. Planta 166(2):201-207. En., Sum. En., 26 Ref., Il. [Instituto Biosintesi Vegetali, Consiglio Nazionale delle Ricerche, Via Bassini 15, I-20133 Milano, Italy]

Phaseolus vulgaris. Phytohemagglutinins. Cultivars. Genes. Proteins. DNA. RNA. Italy.

Using phytohemagglutinin complementary-DNA clones and monospecific antibodies, bean cv. Pinto III genomic DNA and cotyledonary proteins, synthesized both in vitro and in vivo, were analyzed. Genomic DNA sequences that hybridize with complementary-DNA clones for the 2 different classes of phytohemagglutinin polypeptides (E and L), at levels comparable with a normal bean cv., were detected. This indicated that the cv. Pinto III phenotype was not the result of a large deletion of the phytohemagglutinin structural genes. Messenger RNA isolated from cv. Pinto III developing cotyledons synthesized in vitro very small amounts of a protein which was recognized by antibodies specific for phytohemagglutinin, and gave, on SDS-polyacrylamide gel electrophoresis, a single band with mol wt. similar but not identical to that of phytohemagglutinin-L polypeptides. This protein was also synthesized in vivo at a very reduced level, less than 1 percent compared with phytohemagglutinin in normal cv., and had mitogenic activity comparable with that of the phytohemagglutinin-L subunit, while it showed very weak erythroagglutinating activity. The initial steps in the synthesis and processing of this protein were identical to those already identified for phytohemagglutinin polypeptides. The cv. Pinto III protein could be either a phytohemagglutinin-L polypeptide whose synthesis is not affected by the mutation or a phytohemagglutinin-like lectin present normally at low levels in beans. (AS)

0265

27059 WARREN, A. 1985. Zimbabwe: green beans. In Bean production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 1p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Snap beans. Cultivars. Zimbabwe.

Main green bean var. grown in Zimbabwe are Top Crop, Contender, Seminole, and Slender White. Major problems (diseases and pests) are mentioned. (CIAT)

0266

27064 WASSIMI, N.N. ; ISLEIB, T.G.; HOSFIELD, G.L. 1986. Fixed effect genetic analysis of a diallel cross in dry beans (Phaseolus vulgaris L.). Theoretical and Applied Genetics 72(4):449-454. En., Sum. En., 10 Ref. [Dept. of Crop & Soil Sciences, United States Dept. of Agriculture, Agricultural Research Service, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Genetics. Proteins. Yields. Heterosis. Crossbreeding. Cultivars. Genotypes. Dietary value. USA.

A full diallel cross among 4 diverse homozygous strains of dry edible beans was evaluated for yield, protein content, and culinary quality traits in the F2 and F3 generations in 2 locations: East Lansing and Saginaw (Michigan, USA). Interpretation of diallel effects (method 1 model I) using a fixed-effect genetic model made it possible to combine data from 2 generations into a single analysis and quantify the relative contributions of additive and dominance genetic effects to general and specific combining abilities. General combining ability was found to arise from 3 potential sources: additive effects, dominance interactions at homozygous loci, and av. dominance interactions in hybrids involving the parent in question. Specific combining ability was found to be a function solely of dominance. Additive effects were the primary determinant of general combining ability and were highly significant. Specific dominance interactions were significant for seed yield, cooked bean MC, and texture but not for protein content. Texture was the only trait for which the additive-dominance model failed to provide an adequate fit to the data, suggesting that texture is significantly affected by epistatic interaction. One cross (Brazil-2 x Sanilac) was identified that exhibited a large heterotic effect for seed yield although the parents' additive effects were nonsignificant. Such a nicking effect was attributed to complementation between the 2 parents. (AS) See also 0006 0086

G01 Breeding, Selection and Germplasm

0267

27022 ADAMS, M.W. ; GHADERI, A. 1981. A progress report on the development of high bulk density and halo blight resistant dark red kidney bean. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1981 Research Report. p.83. En.

Phaseolus vulgaris. Cultivars. Crossbreeding. Selection. Agronomic characters. USA.

The work done to recombine the desirable characteristics of bean var. Montcalm (resistant to Pseudomonas phaseolicola) and Charlevoix (high bulk density) to obtain a desirable dark red kidney bean is briefly described. A total of 150 plants with the desirable agronomic characteristics were selected and 38 F4 families were identified; these are currently under increase and field evaluation in Puerto Rico. The selected families from

this nursery will be grown in preliminary yield trials in 1982 at the Montcalm research farm. (CIAT)

0268

27088 ALVARADO-RODRIGUEZ, B. ; LEIGH, T.F.; FOSTER, K.W. 1986. Oviposition site preference of Lygus hesperus (Hemiptera:Miridae) on common bean in relation to bean age and genotype. Journal of Economic Entomology 79(4):1069-1072. En., Sum. En., 15 Ref. [Univ. of California, Davis, CA 95616, USA]

Phaseolus vulgaris. Lygus hesperus. Cultivars. Resistance. USA.

Oviposition site preference of Lygus hesperus on common bean in relation to plant phenological stage and plant genotypes was determined under field conditions in USA. Plants at peak flower production (50 days after emergence) were more susceptible to L. hesperus ovipositional pressure than were 2 other age classes. Significant differences were found in the no. of eggs laid on different genotypes. CIAT 5683 and Red Kidney received 4- and 3-fold more eggs, resp., than the less preferred entries BAT 1081 and BAT 1299. Neither phenological stage nor the genotypes used in this work had an effect on the plant structure selected for oviposition by L. hesperus. Three-day-old pods, inflorescence stem, leaf petiole, and leaf pulvinus were significantly preferred and received 80 percent or more eggs deposited by L. hesperus. These results strongly suggest that oviposition nonpreference is an important factor in common bean resistance to L. hesperus. (AS)

0269

27265 ALVARADO-RODRIGUEZ, B. ; LEIGH, T.F.; FOSTER, K.W.: DUFFEY, S.S. 1986. Resistance in common bean (Phaseolus vulgaris) to Lygus hesperus (Heteroptera:Miridae). Journal of Economic Entomology 79(2):484-489. En., Sum. En., 18 Ref., Il. [Univ. of California, Davis, CA 95616, USA]

Phaseolus vulgaris. Lygus hesperus. Cultivars. Resistance. Selection. USA.

Thirty-eight selection acquisitions of Phaseolus vulgaris were evaluated for resistance to the lygus bug, Lygus hesperus, a major pest of common beans in western USA. Estimates of gross increase, ovipositional preference, nymphal development, and survival of lygus bugs on those cv. were used as parameters to identify resistant germplasm and general mechanisms involved in resistance. The assessment of resistance depended on counting newly hatched nymphs as a measure of oviposition. Studies were also done to validate this by assessing survival of eggs. Resistance through ovipositional nonpreference was found in entries BAT 1258, DOR 42, Gloria, BLAN 7644, Bountiful, and C 15. Antibiosis was evidenced by reduced nymphal development rate on entries BAT 1081, BAT 1258, BAT 1299, BAT 1254, Gloria, 0425, and CIAT 5979, as well as by reduced survival on these same entries, with the exception of Gloria and CIAT 5979. Significant reduction in survival was also observed in T 39 and Michigan Improved Cranberry. These results suggest that at least 2 general mechanisms function to provide resistance: nonpreference by interference with oviposition and antibiosis by induction of reduced nymphal growth and survival. The findings will help in the selection of germplasm for breeding common beans resistant to L. hesperus. (AS)

0270

23137 BARRUS, M.F. 1911. Variation of varieties of beans in their susceptibility to anthracnose. Phytopathology 1(6):190-195. En., Il.

Phaseolus vulgaris. Cultivars. Races. Colletotrichum lindemuthianum. Resistance. USA.

Several bean var. were inoculated with 2 strains of Colletotrichum lindemuthianum to evaluate their resistance. No bean var. were found to be resistant to every strain of the fungus tested. (CIAT)

0271

27362 BAUDOIN, J.P. ; LEWINSON, E.; MARECHAL, R.; OTOUL, E. 1985. A breeding programme with the interespecific hybrids between Phaseolus vulgaris L. and Phaseolus acutifolius A. Gray. Bean Improvement Cooperative. Annual Report 28:66-67. En., 4 Ref. [Faculté des Sciences Agronomiques de l'Etat, 5800 Gembloux, Belgium]

Phaseolus vulgaris. Phaseolus acutifolius. Hybridizing. Crossbreeding. Belgium.

A crossing program was set up in the Department of Tropical Phytotechny to overcome the severe incompatibility barriers to genetic transmission from the species Phaseolus vulgaris and P. acutifolius. From this material, a breeding procedure was defined, which consists of maximizing the genetic exchange between the 2 genomes through an intensive self-crossing program. When a sufficient blending between the 2 genomes is likely to occur, backcrossing with P. vulgaris parents will be undertaken to reverse to the diploid stage. The objective is to introgress solely the useful characters from P. acutifolius into an elite P. vulgaris cv. (CIAT)

0272

27364 BAUDOIN, J.P. ; MARECHAL, R.; OTOUL E.; CAMARENA, F. 1985. Interspecific hybridizations within the Phaseolus vulgaris L. - Phaseolus coccineus L. complex. Bean Improvement Cooperative. Annual Report 28:64-65. En., 2 Ref. [Faculté des Sciences Agronomiques de l'Etat, 5800 Gembloux, Belgium]

Phaseolus vulgaris. Hybridizing. Phaseolus coccineus. Belgium.

Results of hybridizations in the genus Phaseolus within the Phaseolus vulgaris-P. coccineus complex are summarized in table form. These crosses were carried out at the Faculté des Sciences Agronomiques de l'Etat, Belgium, to improve the adaptation of beans to tropical conditions. (CIAT)

0273

26090 BURBANO L., J.E. ; MARROQUIN, J.A. 1983. Reacción de 500 cultivares de fríjol arbustivo de color a la roya (Uromyces phaseoli Arth) en el altiplano de Pasto, Departamento de Nariño. (Reaction of 500 color-seeded bush bean cultivars to rust (Uromyces phaseoli) in the Pasto altiplano, department of Nariño). Tesis Ing.Agr. Pasto, Colombia, Universidad de Nariño. 57p. Es., Sum. Es., En., 17 Ref., Il.

Phaseolus vulgaris. Germplasm. Cultivars. Resistance. Uromyces phaseoli. Yields. Colombia.

During 1982-83, 500 bush bean cv. were evaluated for their reaction to rust (Uromyces phaseoli) in the department of Nariño, Colombia. During the 1st semester of 1982, less than 25 percent foliar attack was obtained only in 36 cv. with natural inoculation. During the 2nd semester of 1982, these and other promising materials from the Instituto Colombiano Agropecuario were evaluated using artificial inoculation with the pathogen both in the field and in moisture chamber conditions. Less than 10 percent foliar attack was obtained in 21 cv. in the field and in 4 cv. in the moisture chamber. The productive capacity of these 4 resistant materials was determined in the 1st semester of 1983 and compared with that of Diacol Andino; yields of 956.00, 1303.77, 1006.27, 1376.00, and 582.77 kg/ha were obtained for G4704, G13854, G7946, G6500, and Diacol Andino, resp. (AS (extract)-CIAT)

0274

27343 CASCIANO, D.H. ; SCHWARTZ, H.F. 1985. Evaluation of new sources of dry bean germplasm for yield resistance to Sclerotinia sclerotiorum. Bean Improvement Cooperative. Annual Report 28:33-35. En. [Dept. of Plant Pathology & Weed Science, Colorado State Univ., Fort Collins, CO 80523, USA]

Phaseolus vulgaris. Cultivars. Whetzelinia sclerotiorum. Selection. Resistance. Plant breeding. USA.

A field expt. was carried out in 1984 at Colorado State U. (USA) with 12 bean cv. and breeding lines from national and international programs to evaluate the incidence of Sclerotinia sclerotiorum, apothecia production, and bean yields in fungicide-protected and unprotected plots infested with the disease. Fewer apothecia was generally associated with the more upright plant types such as A 51, 83 VEF MXA 222, P.I. 169787, and Black Valentine. Entries P.I. 169787, Black Valentine, A 51, and 83 VEF MXA 222 had less than 30 percent max. infection, and had low disease indices. Yield differences between cv. and treatments were significant, but percentage yield reduction data were not. It appears that P.I. 169787, A 51, 83 VEF MXA 222, and possibly Fiesta may provide some useful attributes for improvement of white mold resistance and disease avoidance in commercially acceptable beans in this region. (CIAT)

0275

26990 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Bean program. Annual report 1985. Cali, Colombia. Working Document no.14. 331p. En., Il. Also in Spanish.

Phaseolus vulgaris. Germplasm. Database. Propagation. Plant breeding. Diseases and pathogens. Injurious insects. Yields. Adaptation. Resistance. Drought. Nitrogen fixation. Hybridizing. Nutritive value. Transfer of technology. Latin America. South America. Africa. Caribbean.

The activities carried out by the CIAT Bean Program in 1985 are reported. Bean germplasm activities covered collection, multiplication, and distribution, biotechnology research, and data management. Character improvement studies were carried out on resistance to diseases and pests, yield potential, adaptation, drought tolerance, N fixation, interspecific hybridization, and nutritional quality. Breeding also aimed at character development for specific regions and evaluation in uniform nurseries. Agronomic practices were evaluated and improved. Scientific training and network activities were conducted in Central America, Brazil, Peru, and Africa. Individual papers are recorded in this publication under the following consecutive no.: 0097, 0098, 0127, 0248, 0249, 0250, 0251, 0276, 0277, 0278, 0279, 0280, 0281, 0282, 0283, 0284, 0285, 0286, 0311, 0337, 0338, and 0339. (CIAT)

0276

26996 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Genetic improvement. Character improvement. Entomology. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.54-68. En. Also in Spanish.

Phaseolus vulgaris. Cultivars. Resistance. Empoasca kraemeri. Apion godmani. Acanthoscelides obtectus. Zabrotes subfasciatus. Colombia.

Evaluations of host-plant resistance to Empoasca kraemeri, bruchids, and Apion godmani continued in 1985. Leafhopper-resistant breeding lines from 5 cycles were evaluated in the field to determine whether advances in overall resistance levels had been obtained over cycles of selection. The identification of wild Phaseolus vulgaris germplasm from Mexico with high levels of resistance to bruchids formed the bases of a bruchid breeding program, resulting in the development of 7 bean lines (coded BRU 3-10) with

intermediate to high levels of resistance to Acanthoscelides obtectus and Zabrotes subfasciatus. Concerning A. godmani, a preliminary Apion nursery (2 replications) was carried out with 198 lines selected from the 1984 red and black adaptation nurseries. (CIAT)

0277

27001 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Genetic improvement. Character improvement. Increased N fixation. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.107-116. En., Il. Also in Spanish.

Phaseolus vulgaris. Selection. Genotypes. Nitrogen fixation. Nodulation. Yields. Rhizobium. Colombia.

The selection criteria for N fixation at CIAT includes plant vigor, nodule no., mass at mid-flowering, acetylene reduction activity, total N, and grain yield of materials grown in sand culture and in field trials with mild N stress. The breeding program has yielded materials with improved N2-fixation, and with a greater understanding of the associated plant characters, choice of parents to combine these different characters, and refinement of the selection criteria, more progress is likely. In addition to these studies, evaluations were conducted with 2 sets of Rhizobium strains for their ability to compete against native strains. The results of these trials are presented in table form. (CIAT)

0278

26994 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Genetic improvement. Character improvement. Pathology. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.27-43. En., Il. Also in Spanish.

Phaseolus vulgaris. Isariopsis griseola. Fusarium solani phaseoli. Rhizoctonia solani. Macrophomina phaseolina. Fusarium oxysporum. Cultivars. Resistance. Pseudomonas phaseolicola. Germplasm. Colombia.

During 1985 work in bean pathology at CIAT was concentrated on angular leaf spot, root rot pathogens, and halo blight. The main activities regarding these 3 diseases was the identification of new and better sources of disease resistance. Work was also carried out with rust, Ascochyta, web blight, and common bacterial blight diseases. As in previous years, the principal activities were related to evaluation of bean germplasm for their reaction to disease pathogens. Both segregating and advanced uniform bean nurseries as well as international bean disease nurseries were evaluated mainly under field conditions in several locations. (CIAT)

0279

27000 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Genetic improvement. Character improvement. Tolerance to acid soils. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.93-106. En. Also in Spanish.

Phaseolus vulgaris. Cultivars. Selection. Al. P. pH. Plant physiological processes. Resistance. Colombia.

The CIAT agronomy-soils subprogram, carried out in Quilichao, Colombia, emphasized the screening of varieties for tolerance to high Al and/or low available soil P, and the design of expt. to better understand the physiological mechanisms involved in these tolerances. Another screening expt. for P efficiency was planted in Popayán (Colombia), and in Brazil CIAT carried out acid soil tolerance and root studies. The yields of the best performing var. under P and Al stress are presented in table form as well as the preliminary results of trials in Brazil. (CIAT)

0280

27002 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Genetic improvement. Character improvement. Variability from interspecific hybridization. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.117-122. En. Also in Spanish.

Phaseolus vulgaris. Crossbreeding. Phaseolus coccineus. Selection. Resistance. Ascochyta. Ophiomyia phaseoli. Colombia. Rwanda.

The objectives of the collaborative project between CIAT and the Faculty of Agronomy of Gembloux (Belgium) are focused on the improvement of Phaseolus vulgaris through a program of wide crosses with other Phaseolus species. Several species were evaluated and used in crosses, mainly of the group of P. coccineus. In addition, several accessions of the subspecies polyanthus were evaluated in Popayán, Colombia, for their reaction to Ascochyta leaf spot, and within the Great Lakes Project, 22 accessions of the subspecies coccineus and polyanthus were evaluated in Rwanda for their reaction to the bean fly. The results of these trials are presented in table form. (CIAT)

0281

26995 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Genetic improvement. Character improvement. Virology. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.45-53. En. Also in Spanish.

Phaseolus vulgaris. Bean common mosaic virus. Resistance. Cultivars. Seed transmission. Disease transmission. Bean yellow mosaic virus. Bean golden mosaic virus. Colombia.

The main emphasis of the BCMV research at CIAT-Palmira was the characterization of black root resistance mechanisms and identification of new resistance sources. Concerning BYMV, the main research effort in 1985 was the characterization of the new BYMV-OI (Orfeo-INIA) strain, which occurs in Chile. This new strain has been isolated to look for new sources of resistance and to learn more about the epidemiology of BYMV in Chile, particularly its origin. In relation to BGMV, a major revision of research strategies was initiated as the coordination of the BGMV project was centralized at CIAT headquarters. A pedigree analysis was carried out of all the golden mosaic-improved lines and other bred materials that have shown good agronomic performance under BGMV pressure. Substantial progress was made in the efforts to utilize sources of resistance to BGMV by using resistant lines such as A 429, DOR 302, and DOR 303. (CIAT)

0282

27005 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Genetic improvement. Evaluation in uniform nurseries. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.157-209. En. Also in Spanish.

Phaseolus vulgaris. Germplasm. Adaptation. Plant habit. Seed characters. Resistance. Mycoses. Plant breeding. Colombia.

The 3-stage progeny evaluation program at CIAT tested 2300 new materials distributed as follows: 1st stage (bean evaluation nursery-VEF), 1451 entries; 2nd stage (preliminary trials-EP), 394 entries; and 3rd stage (IBYAN), 210 entries. The following data are included in table form for these 3 uniform nurseries: no. of sets of international nurseries (IBYAN, VEF, and EP) dispatched during 1985 to different countries; distribution of the VEF entries; no. of bean entries in the VEF arranged according to growth habit and seed characteristics; no. of bean entries in each group of VEF/85 arranged according to resistance to diseases (angular leaf spot, anthracnose, and Ascochyta leaf spot); exptl. lines with above-av. yields at 2 sites in Colombia (EP/85); yields of the top IBYAN lines arranged

according to color class, seed size, growth habit, and location. A summary of the worldwide results of the IBYAN of the previous year is also included. (CIAT)

0283

27012 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Scientific training and network activities. Africa. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.282-318. En. Also in Spanish.

Phaseolus vulgaris. Plant breeding. Development. Transfer of technology. Plant introductions. Pest control. Germplasm. Cooking. Timing. Protein content. Africa.

Detailed information on the activities of the CIAT breeding program and African regional and national programs is presented, with special emphasis on the Great Lakes Regional Project in central Africa. The main activities carried out in 1985 in the areas of training, var. development and introduction, cultural and chemical control of diseases and pests, nutritional studies (cooking time and protein content), on-farm research, bean consumption preference surveys, and on-farm var. trials are summarized and major results are given. Future plans for 1986 are included. (CIAT)

0284

27010 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Scientific training and network activities. Brazil. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.253-275. En. Also in Spanish.

Phaseolus vulgaris. Cultivars. Plant introductions. Adaptation. Yields. Crossbreeding. Plant breeding. Colombia. Brazil.

A total of 1407 advanced breeding lines entered Brazil in 1985. After inspection for the presence of unknown diseases, the advanced lines were field-evaluated for their adaptation to different environments. A list is given of the 10 best red/purple, black, cream, and red advanced lines and common and local checks tested in preliminary yield trials over the different locations. Also, a total of 1009 crosses were made at CIAT and F2 and F3 populations were shipped to Brazil in Dec. 1985. These crosses were made to incorporate resistance to drought, anthracnose, angular leaf spot, rust, and common bacterial blight. (CIAT)

0285

27009 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Scientific training and network activities. Central America. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.243-251. En. Also in Spanish.

Phaseolus vulgaris. Transfer of technology. Germplasm. Resistance. Apion godmani. Bean golden mosaic virus. Rhizoctonia solani. Xanthomonas phaseoli. Adaptation. Central America.

In 1985 the Bean Project for Central America and the Caribbean, including tropical Mexico and Panama, continued to generate technology for national programs. On-farm trials and planting of nurseries were increased in each country; this resulted in the identification of promising materials superior to those which are presently in use. Good progress was made in incorporating resistance to Apion godmani and in increasing the levels of resistance to BGMV, web blight, and common bacterial blight. Training was also increased through regional courses, in-country courses, and workshops (CIAT)

0286

27011 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Scientific training and network activities. Peru. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.277-281. En. Also in Spanish.

Phaseolus vulgaris. Cultivars. Resistance. Bean common mosaic virus. Uromyces phaseoli. Adaptation. Yields. Selection. Drought. Seed color. Peru.

The CIAT regional project in Peru has given max. priority to the improvement of bean var. Substantial progress was made in developing var. resistant to BCMV and rust (CIFAC 1277 and CIFAC 1288), with good adaptation in the Valle de Chincha. Another significant advance was the establishment of the 1st network expt.: the uniform yield trial for climbing and bush beans for the Sierra/1985. In both trials the best advanced lines were included in the regional programs of Cuzco and Cajamarca. To date, 6 lines (A 59, San Cristóbal 83, BAT 1393, G 4523, V 8025, and G 4495) have been selected for their good adaptation and yields under drought conditions. In the Valle de Chincha, 5 lines (G 6278, G 2587, G 3736, A 211, and FR 2811) were selected for their resistance to nematodes (Meloidogyne sp.). (CIAT)

0287

27375 CHIRCO, E.M. ; PROVVIDENTI, R. 1985. Reaction of purple-podded bean cultivars to viruses. Bean Improvement Cooperative. Annual Report 28:45-46. En., 6 Ref. [New York State Agricultural Experiment Station, Cornell Univ., Geneva, NY 14456, USA]

Phaseolus vulgaris. Bean common mosaic virus. Bean yellow mosaic virus. Cucumber mosaic virus. Clover yellow vein virus. Peanut mottle virus. Cultivars. Resistance. Selection. USA.

The reactions of purple-podded bean cv. to BCMV, BYMV, cucumber mosaic virus, clover yellow vein virus, and peanut mottle virus were studied under greenhouse conditions at the New York State Agricultural Expt. Station in Geneve (USA). Seed of 3 lines of Royalty Purple Pod and 4 of Royal Burgundy obtained from commercial sources were used. Results indicated a remarkable uniformity in reaction of the 2 purple-podded cv. to the most common bean viruses. All 7 lines are resistant to the NY-15 strain of BCMV, but as expected, they are susceptible to the type strain of BYMV, to the bean strain of cucumber mosaic virus, and to the clover yellow mosaic virus. (CIAT)

0288

27376 DICKSON, M.H. ; THODE, R. 1985. Breeding for cold tolerance in beans. Bean Improvement Cooperative. Annual Report 28:103. En. [New York State Agricultural Experiment Station, Geneva, NY, USA]

Phaseolus vulgaris. Resistance. Plant breeding. USA.

Bean plants were kept at 16 degrees Celsius after bloom to observe a wide range of segregation for ability to set under this condition. Plants were classified as setting, setting poorly, and not setting. Results were based on analysis of F3 lines from each F2 plant and BC2 lines from BC1 plants. The results on the F2 of the NY 23 x BL 92 cross indicate poor correlation between plant vigor, days to bloom, and pod set. From the large collection of lines tested, several with good set and straight-round pods were obtained. (CIAT)

0289

27354 EMPRESA GOIANA DE PESQUISA AGROPECUARIA. 1983. Projeto feijao. (Bean project). In _____. Relatorio Técnico 1982. Goiania-GO, Brasil, Departamento de Difusão e Informacao. pp.75-84. Pt.

Phaseolus vulgaris. Cultivars. Selection. Plant introductions. Adaptation. Intercropping. Zea mays. Technology evaluation. Brazil.

Results of bean research carried out by the Empresa Goiana de Pesquisa Agropecuaria, Brazil, are presented regarding selection of cv. for disease and pest resistance and good commercial acceptance, germplasm introduction, and determination of more efficient technology for the maize-bean associated cropping system. (CIAT)

0290

27032 GHADERI, A. ; SAETTLER, A.W.; ADAMS, M.W. 1982. 1982 progress report on breeding for resistance to anthracnose. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1982 Research Report. pp.53-55. En.

Phaseolus vulgaris. Cultivars. Germplasm. Resistance. Colletotrichum lindemuthianum. Selection. Crossbreeding. USA.

During 1982, evaluation and selection of breeding materials of black, navy, and kidney beans for resistance to anthracnose (Colletotrichum lindemuthianum) were continued. The procedures used for breeding in each of the named bean types are described. Regarding black and navy beans, only those materials that show resistance to alpha and delta races were selected. In the case of kidney beans, the genetic materials consisted of segregating materials derived from a backcrossing procedure involving C-49242 as the donor, and Montcalm as the recurrent parent. (CIAT)

0291

27021 GHADERI, A. ; SAETTLER, A.W.; ADAMS, M.W. 1981. Progress report on anthracnose breeding program. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1981 Research Report. pp.80-82. En.

Phaseolus vulgaris. Cultivars. Resistance. Colletotrichum lindemuthianum. Selection. Plant architecture. Plant breeding. USA.

The strategies of the breeding program for resistance to anthracnose (Colletotrichum lindemuthianum) in navy, black, and kidney beans are briefly discussed. In addition, the method used to improve plant architecture using 2 sources of resistance against anthracnose is described and the possibility of shifting of pathogenic races in the future is discussed. All advanced materials are currently screened for resistance to the delta and alpha races of anthracnose. Any group of homozygous plants resistant to the alpha and delta races could be carrying: the Are gene, the Are and Nep-2 genes, the resistant genes from Tuscola and Are gene, and the resistant genes from Tuscola and Nep-2. Hopefully, selection will be feasible for resistance to the delta race, which is conferred by the Are gene from C-49242. (CIAT)

0292

27428 HERRERA G., G. ; BASCUR B., G. 1986. Bases del programa de mejoramiento genético del poroto en el INIA. Agricultura Técnica 46(2):203-207. Es., Sum. Es., En., 7 Ref. [Estación Experimental La Platina, Inst. Nacional de Investigaciones Agrícolas, Casilla 439/3, Santiago, Chile]

Phaseolus vulgaris. Plant breeding. Resistance. Bean common mosaic virus. Bean yellow mosaic virus. Cultivars. Chile.

The main objective of the bean breeding program at the Instituto Nacional de Investigaciones Agricolas is to increase the yield potencial and the quality of the var. cultivated in Chile. The program emphasizes the resistance to both BCMV and BYMV, the main production constraints. As new strains of these viruses have been identified, several methods are being

used among which the most used are crosses and backcrosses between established susceptible var. and resistant ones. Several improved bean var. have been released by the program. (AS)

0293

27028 ISSA, E. 1985. Resistencia varietal de cultivares paulistas de feijao Phaseolus vulgaris L. a quatro enfermidades. (Varietal resistance of bean cultivars from Sao Paulo to four diseases). Biológico 51(5):113-117. Pt., Sum. Pt., En., 9 Ref.

Phaseolus vulgaris. Cultivars. Resistance. Colletotrichum lindemuthianum. Uromyces phaseoli. Isariopsis griseola. Fusarium solani phaseoli. Selection. Brazil.

The resistance of 7 bean var. (Aysó, Carioca, Catú, Aroana 80, Carioca 80, Moruna 80, and Aeté 3) and 3 mixed populations (RH Collection, RH Selection, and RH Black) to spontaneously occurring diseases was assessed in the field in Campinas (Sao Paulo, Brazil) in May 1983. All the materials except Carioca, Catú, and the population RH Selection were resistant to Colletotrichum lindemuthianum. Catú and Carioca 80 were resistant to Uromyces appendiculatus. The population RH Black alone showed some resistance to Isariopsis griseola. Though no resistance to Fusarium solani f. sp. phaseoli was found, damage to roots and effects on yield were less in Aysó, Carioca 80, Moruna 80, RH Collection, and RH Black than in the rest of the material. (AS (extract))

0294

26932 ISSA, E. 1985. Resistencia varietal em feijoeiro, Phaseolus vulgaris L., a queima cinzenta da haste causada por Macrophomina phaseoli (Maubl.). (Varietal resistance of French bean to ashy stem blight caused by Macrophomina phaseoli). Biológico 51(5):125-127. Pt., Sum. En., 6 Ref. [Secao de Doencas das Plantas Alimenticias Básicas e Olericolas, Inst. Biológico Campinas, SP, Brasil)]

Phaseolus vulgaris. Snap beans. Cultivars. Resistance. Macrophomina phaseoli. Selection. Brazil.

Seven French bean var. (Aysó, Carioca, Catú, Aroana 80, Carioca 80, Moruna 80, and Aeté 3) and 2 breeding populations (RH Collection and RH Black), these already selected for general disease resistance, were studied to determine their resistance to ashy stem blight (Macrophomina phaseoli) at 20 days after sowing in Sao Paulo, Brazil. Seeds were selected and treated with solution of sodium hypochloride, and then inoculated with a spore suspension of M. phaseoli. Moruna 80 was the most resistant. (CIAT)

0295

27034 KELLY, J.D. 1982. Crossing program. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1982 Research Report. pp.58-59. En.

Phaseolus vulgaris. Germplasm. Cultivars. Crossbreeding. USA.

During 1981-82, 2130 successful crosses were made, which are broken down by seasons. The breeding objectives are given for each case. (CIAT)

0296

27035 KELLY, J.D. 1982. Early generation populations. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1982 Research Report. p.60. En.

Phaseolus vulgaris. Crossbreeding. Cultivars. Selection. USA.

Brief information is presented of the advances in research to obtain early generation populations, specifically regarding F4 navy bean populations, F2 pinto, pink, and red mexican bean populations, and F1 populations of 9 commercial classes. (CIAT)

0297

27036 KELLY, J.D. 1982. Winter nursery program. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1982 Research Report. pp.61-62. En.

Phaseolus vulgaris. Cultivars. Germplasm. Selection. Resistance. Uromyces phaseoli. Macrophomina phaseoli. Isariopsis griseola. Plant architecture. Adaptation. USA.

Information is presented on the type, no., generation, and selection of bean materials grown in the 1981-82 winter nursery program in Isabela, Puerto Rico. The selection of navy and black beans for resistance to Uromyces phaseoli, Macrophomina phaseoli, and Isariopsis griseola, architectural characteristics of the plant, and adaptation was accomplished. Data of the materials to be collected during the 1982-83 season are presented. (CIAT)

0298

27023 KELLY, J.D. 1981. Winter nursery program. In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1981 Research Report. pp.84-85. En.

Phaseolus vulgaris. Cultivars. Germplasm. Selection. Resistance. Diseases and pathogens. Plant architecture. USA.

The advances made in 1981 by the winter nursery program carried out in Puerto Rico are briefly described. A total of 1577 breeding lines were planted for their selection for disease resistance and plant architectural characteristics. Approx. 30 percent or 467 lines were selected. General data of the bean types planted (navy, black, great northern, kidney, pinto, cranberry, and others) are presented. (CIAT)

0299

27286 KIM, T.H. ; ECKENRODE, C.J.; DICKSON, M.H. 1985. Resistance in beans to bean seed maggots (Diptera:Anthomyiidae). Journal of Economic Entomology 78(1):133-137. En., Sum. En., 15 Ref. [Dept. of Agricultural Biology, Jeon-Bug National Univ., Jeonju, Korea]

Phaseolus vulgaris. Delia florilega. Resistance. Plant injuries. Seed. Crossbreeding. Inheritance. USA.

In lab. and field-cage studies in New York, USA, on the resistance of bean seeds to larvae of Delia florilega, females of the anthomyiid preferred to oviposit near the planted seeds of certain lines, especially those with heavier seeds. Germinating seeds were susceptible to larval attack from the time seed coats split until seedlings emerged from the soil. Leaf damage resulting from larval feeding on germinating seeds was lowest on lines with rapidly germinating, colored seeds. The colored seed lines Viva, PI 165435, and PI 165426 were less susceptible to larval attack than the white-seeded types Bonanza, Bush Blue Lake 47, and Early Gallatin. Resistant germinating seeds did not protect susceptible types when the 2 types were planted together. Broad sense heritabilities for leaf damage were 0.55 for Early Gallatin x PI 165435 and 0.53 for Early Gallatin x PI 165426, and narrow sense heritabilities for the same crosses were 0.13 and 0.16, resp.; the resistance trait was quantitatively inherited. (AS)

0300

27352 LOZADA, C. ; BORGES F., O.; MONTAGNE, A.; TORO, A. 1983. Evaluación de la resistencia a Empoasca kraemeri Ross y Moore en cultivares de caraota (Phaseolus vulgaris L.) y su interacción con dosis de insecticida. (Evaluation of the resistance to Empoasca kraemeri in bean cultivars and its interaction with insecticide rates). In Universidad Central de Venezuela. Instituto de Genética. Informe de Investigación 1983. Maracay. pp.62-64. Es., Il.

Phaseolus vulgaris. Cultivars. Resistance. Empoasca kraemeri. Insecticides. Chemical control. Insect control. Venezuela.

A trial was conducted during 1983-84 at the exptl. field of the Instituto de Genética of the U. Central de Venezuela to evaluate the resistance of 5 bean cv. (J.G. 6101, J.G. 6118, J.G. 6119, J.G. 6483, and Tacarigua) to Empoasca kraemeri and its interaction with the systemic insecticide demeton-S-methyl applied at rates of 0, 0.1875, 0.3750, and 0.7500 liters/ha. At low insecticide rates, cv. J.G. 6118 showed the lowest nymph populations. The susceptible var. Tacarigua required high rates for the control of the insect. Cv. J.G. 6119 (intermediate resistance) also required high rates but the population level is lower than in susceptible cv. (CIAT)

0301

27371 LYONS, M.E. ; DICKSON, M.H.; HUNTER, J.E. 1985. The use of recurrent selection in breeding for white mold resistance in beans. Bean Improvement Cooperative. Annual Report 28:99-100. En, 6 Ref. [New York State Agricultural Experiment Station, Geneva, NY, USA]

Phaseolus vulgaris. Crossbreeding. Whetzelinia sclerotiorum. Cultivars. Selection. Resistance. Inheritance. USA.

Two cycles of recurrent selection for physiological resistance were completed to prove it's effective in breeding for higher levels of resistance to white mold (Sclerotinia sclerotiorum) in beans. Twenty diverse genotypes were chosen to serve as parents. The parental lines were crossed in a partial diallel which resulted in 30 unique crosses. It was confirmed that there is additive genetic variation involved in the expression of the physiological resistance to white mold in beans, and that recurrent selection can be used effectively in breeding for increased levels of this type of resistance. (CIAT)

0302

27369 MILLS, L.J. ; SILBERNAGEL, M.J. 1985. A dual screening technique for halo blight and bean common mosaic virus in beans. Bean Improvement Cooperative. Annual Report 28:76-77. En. [Washington State Univ., Research Technologist, United States Dept. of Agriculture, Agricultural Research Service, Prosser, WA 99350, USA]

Phaseolus vulgaris. Cultivars. Pseudomonas phaseolicola. Bean common mosaic virus. Resistance. USA.

A study was conducted to determine if simultaneous inoculation with Pseudomonas syringae pv. phaseolicola and BCMV would yield the same information as separate inoculations and thus shorten the recurrent selection cycle. The bean cv. used (8BP-8, Royal Red, Valliant, Montcalm, 81CT62, Red Kloud, and NY76-2812-15) were selected on the basis of known reactions to both diseases. In all the expt. the progress of each individual disease in the susceptible cv. was distinguishable. NY76-2812-15 and Red Kloud remained resistant to both diseases when dually screened. Dual screening with P. syringae pv. phaseolicola and BCMV yields the same results as screening separately. This ability dramatically speeds up the recurrent selection-screening process, allowing more rapid stabilization of resistance. (CIAT)

0303

27082 NIENHUIS, J. ; SINGH, S.P. 1986. Combining ability analyses and relationships among yield, yield components, and architectural traits in dry bean. Crop Science 26(1):21-27. En., Sum. En., 27 Ref.

Phaseolus vulgaris. Heterosis. Seed characters. Plant habit. Plant architecture. Yield. Yield components. Inheritance. Genes. Cultivars.

Expt were carried out to identify the principal types of gene action involved in the inheritance of yield, yield components, and some architectural traits, and to estimate the phenotypic and genotypic correlations among these traits in dry bean populations adapted to monoculture. Lines with small seed (less than 26 g/100 seeds), medium (26-40 g/100 seeds), and or large (more than 40 g/100 seeds) from each of 3 growth habits (I, II, and III), which are commonly grown in monoculture, were crossed in a diallel fashion to obtain a complete set of 72 crosses. The F1 and F2 generations were evaluated in separate consecutive seasons at 2 locations, Palmira (Mollisols) and Popayan (Inceptisols), in Colombia. All traits studied showed F1 heterosis over the midparent. Yield heterosis of the F1 over the high parent averaged 36 percent in Palmira and 23 percent in Popayan, and heterosis values tended to increase in crosses between parents of increasingly divergent growth habits. General combining ability, determined by Griffing's method 4, model 1 analysis, was more important than specific combining ability for yield and yield components in both the F1 and F2 analyses. In both the F1 and F2 diallel analyses, the same parents, A375 and A457, were identified as having the largest positive general combining ability effects for both yield and seed wt. Determinate (type I) parents tended to have positive general combining ability effects for branches/plant, and negative general combining ability effects for the remaining architectural traits in either one or both locations, whereas the opposite was true for the indeterminate (types II and III) parents. Yield was positively correlated with pods/square meter, seeds/pod, and all architectural traits except branches/plant. In contrast, seed wt. was negatively correlated with yield, nodes/branch, nodes/plant, and nodes on the main stem, and positively correlated with main stem internode length and main stem length. The genetic correlations among traits suggest that selection for increased main stem internode length and main stem length should result in simultaneous improvement in both yield and seed wt.; however, the resulting plant type may prove too viny and prostrate for monoculture cropping systems. (AS)

0304

27337 OSBORN, T.C. ; BLAKE, T.; GEPTS, P.; BLISS, F.A. 1986. Bean arcelin. 2. Genetic variation, inheritance and linkage relationships of a novel seed protein of Phaseolus vulgaris L. Theoretical and Applied Genetics 71(6):847-855. En., Sum. En., 12 Ref., Il. [Dept. of Agronomy, Univ. of Wisconsin, Madison, WI 53706, USA]

Phaseolus vulgaris. Proteins. Seed. Inheritance. Germplasm. Cultivars. Genetics. Crossbreeding. Resistance. Stored grain pests. USA.

Crude proteins from seeds of wild bean accessions of Mexican origin were analyzed by 1-dimensional SDS-polyacrylamide gel electrophoresis. Several accessions had electrophoretic patterns showing unique protein bands. When analyzed by 2-dimensional isoelectric focusing-SDS-polyacrylamide gel electrophoresis, 4 protein variants that had electrophoretic mobilities similar to each other but different from the other major seed proteins, phaseolin and lectin, were observed. All 4 variants, which have not been described in cultivated beans, were tentatively named arcelin proteins and designated as arcelin 1, 2, 3, and 4. Arcelins 3 and 4 had polypeptides that comigrated on 2-dimensional gels and these variants occurred in accessions that were collected in the same location. Analysis of single F2 seeds from crosses among arcelin-containing lines and from crosses between cultivated bean lines without arcelin and arcelin-containing lines revealed

that differences in arcelin polypeptide expression were inherited monogenically. The alleles for different arcelin variants were codominant to each other and dominant to the absence of arcelin. The gene(s) controlling arcelin proteins were unlinked to those controlling phaseolin expression and tightly linked to genes controlling the presence of lectin proteins (less than 0.30 percent recombination). The possible origins of arcelin genes and their potential role in bruchid resistance are discussed. (AS)

0305

27438 SAETTLER, A.W. ; CORREA, F.J. 1985. Reactions of commercial dry bean cultivars and lines to Michigan isolate 5 of Isariopsis griseola. Bean Improvement Cooperative. Annual Report 28:78-79. En. [United States Dept. of Agriculture, Agricultural Research Service, Dept. of Botany & Plant Pathology, Michigan State Univ., East Lansing, MI 48824-1312, USA]

Phaseolus vulgaris. Cultivars. Isariopsis griseola. Resistance. Selection. Plant breeding. USA.

The reaction of 90 bean cv. and lines to Isariopsis griseola (Michigan 5 isolate) was studied under greenhouse conditions at Michigan State U. (USA). All commercial light and dark red kidney, and cranberry bean cv. were very susceptible to the Michigan 5 isolate of I. griseola. Resistance was associated mainly with navy, black, and pinto bean types. Excellent resistance was found in CIAT line G-05686. (CIAT)

0306

26551 SPONCHIADO, B.N. 1985. Avaliacao do sistema radicular do feijoeiro (Phaseolus vulgaris L.) como um mecanismo de tolerancia ao deficit hídrico. (Evaluation of the root system of beans as a tolerance mechanism to water stress). Tese Mestrado. Pelotas-RS, Brasil, Universidade Federal de Pelotas. 150p. Pt., Sum. Pt., En., 89 Ref., Il.

Phaseolus vulgaris. Resistance. Cultivars. Water stress. Drought. Plant breeding. Roots. Growth. Yields. Brazil.

Root system development of bean cultivated in 2 soil types as affected by water stress was evaluated at CIAT-Palmira and CIAT-Quilichao (Colombia). Genotypes BAT 85 and BAT 477 (promising) and BAT 1224 and A 70 (susceptible to water stress) were used. In CIAT-Palmira conditions, the highest leaf water potential and the least canopy temp. of BAT 85 and BAT 477 were associated with the highest absorption of available water in the soil profile and the greatest depth of the root system. The exploration of the soil profile at 130-cm depth showed that these genotypes had a superior physiological performance than BAT 1224 and A 70. BAT 85 and BAT 477 showed a higher LAI, LAD, and leaf area efficiency and outyielded BAT 1224 and A 70 by more than 750 kg/ha. Yield components that most affected final yield were, in descending order, percentage of aborted seeds, no. of seeds/pod, and no. of pods/plant. On the other hand, there were no differences among the 4 genotypes regarding root system development at CIAT-Quilichao; likewise, there were no differences in the percentage of available water in the soil profile. At this site, chemical limitations of the soil restricted root system penetration. No differences were detected in the LAI, LAD, and leaf area efficiency except for genotype A 70, which showed adaptation problems. At CIAT-Quilichao, the yield components that most affected final yield were, in descending order, no. of pods/plant and no. of seeds/pod. (AS (extract))

0307

27047 WARREN, A. 1985. Tanzania: breeding. In Bean production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 3p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Plant breeding. Germplasm. Cultivars. Tanzania.

Bean breeding activities at Sokoine U. and Uyole Agricultural Center (Tanzania) are briefly described. Special emphasis is made on the preliminary and advanced yield trials, uniform cv. trials, and on-farm trials. Material entering these trials was obtained mainly from local collections and from CIAT. Var. released were Kabanima, T 3, and Uyole 84. (CIAT)

0308

27247 WEAVER, M.L. ; TIMM, H.; SILBERNAGEL, M.J.; BURKE, D.W. 1985. Pollen staining and high-temperature tolerance of bean. Journal of the American Society for Horticultural Science 110(6):797-799. En., Sum. En., 13 Ref., Il. [Western Regional Research Center, United States Dept. of Agriculture, Agricultural Research Service, Albany, CA 94710, USA]

Phaseolus vulgaris. Resistance. Temperature. Pollen. Snap beans. Plant breeding. USA.

Viability of pollen grains of isogenic sibling Phaseolus vulgaris selections of known tolerance and sensitivity to high temp. was compared with that of a common parent bean selection (5BP7) and a cowpea cv. Exposure of newly opened flowers to 35 or 41 degrees Celsius reduced the viability of pollen grains in all bean selections. Pollen of all sibling selections was less affected by high temp. than pollen of their common parent, suggesting transgressive segregation of factors for high temp. tolerance. At 41 degrees Celsius, most pollen grains were destroyed in the parent bean selection and the 2 high temp.-sensitive siblings, whereas 44-55 percent of the pollen grains appeared to be viable in the 2 high temp.-tolerant siblings. Pollen viability of the high temp.-tolerant cowpea cv. was not reduced by temp. to 41 degrees Celsius. Pollen staining indicated an interrelationship between pollen viability and tolerance to high temp. stress among the selections. The technique described is thought to have the potential for rapid selection of high temp.-tolerant genotypes in hybrid populations. (AS)

0309

27211 WEEDEN, N.F. ; LIANG, C.Y. 1985. Detection of a linkage between white flower color and Est-2 in common bean. Bean Improvement Cooperative. Annual Report 28:87-88. En., 3 Ref. [Dept. of Horticultural Sciences, New York State Agricultural Experiment Station, Geneva, NY 14456, USA]

Phaseolus vulgaris. Flowers. Genes. USA.

Two F2 populations, 1 derived from the cross Miami x Horsehead (cross #5) and the other from a reciprocal cross (cross #6) were analyzed for segregation for 2 morphological characters and 5 isozyme polymorphisms. The F2 populations were grown under artificial light in the greenhouse. For each isozyme the F1 generation exhibited an additive, heterozygous phenotype in which both parental forms were present. In the F2 populations 3 phenotypes were observed for each polymorphic zone. The no. of individuals possessing each phenotype is presented in table form as well as joint segregation data for flower color and Est-2. (CIAT)

0310

27397 ZAVALA, M.E. ; SUSSEX, I.M. 1986. Survival of developing wheat embryos and bean axes following cryoprotection and freezing in liquid nitrogen. Journal of Plant Physiology 122(3):193-197. En., Sum. En., 9 Ref. [Dept. of Biology, Yale Univ., New Haven, CT 06511, USA]

Phaseolus vulgaris. Germplasm. Storage. USA.

Developing zygotic embryos of wheat cv. INIA R66 and embryonic axes of bean cv. Taylor's Horticultural were protected with a cryoprotectant mixture

containing polyethylene glycol, glucose, and dimethylsulfoxide, frozen in liquid N, rapidly thawed and placed on various media. Seventy percent of the wheat embryos and 59 percent of the bean axes survived this treatment. Embryos that were frozen without being cryoprotected died. Recovered embryos maintained their embryo-like morphology when cultured on media containing ABA, germinated precociously on media with no hormones or IAA, or proliferated into callus on media containing 2,4-D. (AS) See also 0003 0067 0097 0106 0107 0119 0120 0129 0162 0174 0180 0181 0197 0198 0200 0215 0219 0226 0239 0246

H00 NUTRITION

0311

27003 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Genetic improvement. Character improvement. Nutritional quality. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.123-130. En. Also in Spanish.

Phaseolus vulgaris. Cultivars. Seed characters. Cooking. Timing. Protein content. Colombia.

Several groups of EP (preliminary trials) var. were evaluated in the nutrition and quality lab. for grain quality, percentage water absorption from dry wt., presence of hard and broken grains, av. cooking time, broth quality, and protein content. Significant differences were found in the av. values of all the characteristics measured in the EP/82, 84, and 85 with the exception of protein content of the EP/82 and 84 and for solids in the broth. In addition, a comparative study was conducted on the influence of the location, harvest period, and var. on cooking time, hardness, and protein content to determine whether genetic variability or environmental variability or their interaction exists. The results of the various trials are presented in table form. (CIAT)

0312

27299 CHANG, K.C. ; ETHEN, S.; HARROLD, R.; BROWN, G. 1986. Effect of feeding dry beans on rat plasma cholesterol. Nutrition Reports International 33(4):659-664. En., Sum. En., 15 Ref. [Dept. of Food & Nutrition, North Dakota State Univ., Fargo, ND 58105, USA]

Phaseolus vulgaris. Animal nutrition. Diets. Bean flour. USA.

The ability of various dry beans to lower plasma total cholesterol in outbred rats fed a high lipid, high cholesterol diet was investigated. Male rats 90 days old were fed casein or wet-autoclaved dry bean flour for 4 wk. Plasma total cholesterol was determined by an enzymatic procedure. Results show that the replacement of casein by the wet-autoclaved bean flours did not cause any significant reduction in plasma cholesterol in rats fed the high lipid, high cholesterol diet. (AS)

0313

26100 DEL POZO, R. ; TORRICELLA, R.; IGLESIAS, I. 1984. Efecto de las radiaciones gamma en algunos componentes nutricionales y propiedades organolépticas del fríjol negro. (Phaseolus vulgaris L.). Estudio preliminar. (Effect of gamma radiation on some nutritional components and organoleptic properties of black beans. Preliminary study). Revista de Ciencias Biológicas 15(1):163-170. Es., Sum. En., Es., 21 Ref., Il. [Centro Nacional de Investigaciones Científicas, Ciudad de La Habana, Cuba]

Phaseolus vulgaris. Irradiation. Nutritive value. Storage. Starch content. Sugar content. Protein content. Organoleptic properties. Cuba.

A preliminary study was carried out on the effect of Co-60 gamma rays on the main nutritional components and organoleptic properties of black bean var. ICA Pijao, cultivated and stored under Cuban conditions. Beans

irradiated with doses of 15, 30, and 60 krad did not vary significatively in starch, total soluble sugars, and total protein contents. The organoleptic evaluation did not detect significative differences between irradiated and nonirradiated samples as to odor and consistency, but tastewise the irradiated samples had a better panel acceptance than check samples after 4 mo. of storage. (AS (extract))

0314

27290 SANTIDRIAN, S. ; REYES, E.; LARRALDE, J. 1986. Liver hydrolytic activity in growing male rats fed a raw kidney bean (Phaseolus vulgaris L.) diet. Nutrition Reports International 33(5):821-829. En., Sum. En., 27 Ref. [Dept. of Physiology, School of Pharmacy. Univ. of La Laguna, Tenerife, Canary Islands, Spain]

Phaseolus vulgaris. Animal nutrition. Diets. Enzymes. Spain.

Liver cathepsin A and D and acid phosphatase activities, both total and free, were measured in growing male rats fed ad libitum over periods of 7, 15, 30, and 45 days on diets containing either heated soybean alone or with raw kidney bean as the sole sources of protein. Diets were isocaloric and contained about 12 percent protein. Compared with rats fed heated soybean alone, those fed the diet containing kidney bean showed a significant reduction (P less than 0.05) in growth rate and liver wt. with no changes in the amount of food intake (per 100 g body wt.); these effects were accompanied by a significant increase (P less than 0.05) in the activities of the 2 liver cathepsins, as well as in the activity of liver acid phosphatase. (AS)

0315

27300 TAJIRI, H. ; LEE, P.C.; LEBENTHAL, E. 1986. Small intestinal mucosal hyperplasia caused by an enterokinase inhibitor from red kidney bean in rats. Journal of Nutrition 116(5):873-880. En., Sum. En., 25 Ref., Il. [International Inst. for Infant Nutrition & Gastrointestinal Disease, Children's Hospital of Buffalo, 219 Bryant Street, Buffalo, NY 14222, USA]

Phaseolus vulgaris. Enzymes. Diets. Inhibitors. USA.

A specific enterokinase inhibitor (EKI) was purified from red kidney bean. Male weanling rats fed a diet containing this purified EKI (0.06 percent) for 6 days showed increases in mucosal wt., protein, DNA, and lactic dehydrogenase contents in their small intestines compared with age-matched control rats fed a standard diet. Total mucosal enterokinase and disaccharidase activities were, however, decreased in EKI-fed rats. Thus, oral consumption of EKI from red kidney bean led to small intestinal mucosal hyperplasia in rats. The mucosal hyperplasia observed in EKI-fed rats is not likely due to decreased turnover of mucosal proteins as a result of reduced luminal proteases since luminal contents of trypsin, chymotrypsin, and elastase in EKI-fed rats were similar to those of control rats. Enterokinase inhibitor may have a direct hyperplastic effect on the small intestine of rats. (AS)

0316

27266 VARGAS, E. ; BRESSANI, R.; NAVARRETE, D.A.; BRAHAM, J.E.; ELIAS, L.G. 1985. Nueva alternativa para el cálculo de recomendaciones de ingesta de proteína en humanos. Necesidades de proteína de una población adulta alimentada con dietas a base de arroz y fríjol. (A new approach to estimate recommended dietary protein intake in man. Protein requirements of an adult population given diets based on rice and beans). Archivos Latinoamericanos de Nutrición 35(3):394-405. Es., Sum. Es., En., 12 Ref. [Inst. Costarricense de Investigación y Enseñanza en Nutrición y Salud, Tres Ríos, Costa Rica]

Phaseolus vulgaris. Diets. Human nutrition. Proteins. Costa Rica.

A new approach to estimate the protein needs of a population is proposed; recommendations are made on the protein intake of adults given diets based on rice and beans. N balance data previously reported for 40 adults who had participated in 160 N balance periods given diets based on rice and beans, with and without animal protein and/or energy supplementation, were used. The method is based on the curvilinear response between N intake and N balance. The 2nd-degree equation describing the relation between N balance and intake is calculated. When values obtained by means of the quadratic equation were compared with those obtained by the traditional linear equation, they were similar (P less than 0.05) for the 2 calculation methods. The recommended protein intake of an adult population given a diet based on rice and beans was 0.80 and 0.77 g/kg daily for the quadratic approach and the conventional method, resp. When this diet was supplemented with 10 percent milk protein and with the same energy value, the calculated protein values were 0.64 and 0.71 g/kg daily for the 2 methods. Intakes of each and all essential amino acids met values, with the exception of isoleucine and the S-containing amino acids. (AS (extract))

0317

27039 WASSIMI, N.N. ; HOSFIELD, G.L.; UEBERSAX, M.A.; ADAMS, M.W. 1982. Consumer color acceptability of dry edible beans (Phaseolus vulgaris L.). In Michigan State University. Agricultural Experiment Station. Saginaw Valley bean-beet research farm and related bean-beet research. East Lansing. 1982 Research Report. pp.73-81. En., 4 Ref.

Phaseolus vulgaris. Cultivars. Seed color. Palatability. USA.

Two expt. were conducted to determine the importance of the color in navy beans and evaluate color in Black Turtle Soup beans using consumer preference test panels. In the 1st expt., a comparison was made of the degree of whiteness of 3 navy bean lines maintained by the bean breeding program of Michigan State U. (cv. Sanilac and lines 61618 and 790053) and 2 commercially packed dry samples of navies purchased at local markets in Michigan (USA). The 5 lines were evaluated in a triangle test and 51 judges were instructed to select the sample they perceived different and to classify each sample according to its acceptability. The seed coat color of Sanilac was judged as the most acceptable and 61618 was considered as the different sample although it showed little difference in appearance from some commercial samples found in supermarkets in the Lansing area. The 2nd expt. evaluated the degree of lightness of 24 dry bean samples consisting of 10 navy bean strains and 7 strains of Black Turtle Soup-type beans. Fleetwood had the highest acceptability while 61618 had the lowest. Samples were separated into 3 preference groups; the degree of lightness given to a line had little influence on the acceptability score it received. For the Black Turtle Soup group, Midnight was the most preferred black-seeded bean while Black Turtle Soup was the least preferred. (CIAT) See also 0070 0077 0106 0275 0283 0304 0354 0357

H01 Foods and Nutritive Value

0318

27399 APOSTOLATOS, G. 1984. Nutritional significance of trypsin inhibitors from edible dry beans (Phaseolus vulgaris L.). Journal of Food Technology 19(5):561-567. En., Sum. En. 17 Ref., Il. [Hellenic Republic, Ministry of Agriculture, Seed Production & Fertilizer Division, 2 Acharnon St, GR 101-76, Athens, Greece]

Phaseolus vulgaris. Inhibitors. Cultivars. Amino acids. S. Proteins.

Specific and nonspecific trypsin inhibitors were isolated by means of affinity chromatography from 3 edible dry bean cv. (Swedish Brown, Sutter Pinto, and Bonus) to determine their S-containing amino acid content, and to evaluate these protein fractions as potential sources of nutritional improvement. Qualitative differences were found among these protein

fractions by gel electrophoresis and amino acid analyses. Resistance to heat varied significantly. (AS)

0319

27423 BENSHIMOL A., L. ; STEIN, R.I. DE; MARQUEZ, C.G.; JAFFE, W.G. 1985. El valor bioquímico y nutricional de las semillas del haba de Lima (Phaseolus lunatus) en comparación con las del fríjol común (Phaseolus vulgaris). (Biochemical and nutritional value of lima bean seeds as compared to those of common beans). Archivos Latinoamericanos de Nutrición 35(1):70-79. Es., Sum. Es., En., 18 Ref. [Escuela de Biología de la Facultad de Ciencias, Univ. Central de Venezuela, Apartado Postal 2101, Caracas 1020, Venezuela]

Phaseolus vulgaris. Antinutritional factors. Water content. Fat content. Fiber content. Ash content. Mineral content. Amino acids. Vitamin content. Nutritive value. Animal nutrition. Venezuela.

Nutrient composition and antinutritional factors, digestibility, and growth were compared in rats fed diets prepared with a black cv. of Phaseolus vulgaris, Tacarigua, and a black cv. of P. lunatus, Tapiramo. Cooked grains from both cv. are similar in appearance, taste, nutritional value, and acceptability. Protein and P contents were greater in P. vulgaris than in P. lunatus seeds. The chemical score and availability of lysine were greater for P. lunatus. Diets prepared with raw P. lunatus were nontoxic for the rats during a 12-day feeding period. All rats fed with raw P. vulgaris died in the same period of time. Protein efficiency was better with cooked P. lunatus. The production of cv. Tapiramo is recommended for self-consumption by small farmers. (AS)

0320

27325 GARCIA-LOPEZ, J.S. 1984. Binding of minerals by cooked pinto beans (Phaseolus vulgaris) fiber, influence of fiber on iron absorption by normal and anemic rat intestinal segments. Ph.D. Thesis. Madison, University of Wisconsin-Madison. 139p. En., Sum. En., 159 Ref., Il.

Phaseolus vulgaris. Cooking. Nutritive value. Dietary value. USA.

Neutral (NDF) and acid (ADF) detergent fiber obtained from cooked pinto beans bound Fe, Cu, and Zn but not Mg at pH 6.50 plus or minus 0.05 and 25 degrees Celsius. Binding depended on the mineral concn. Bound Fe (micrograms Fe/mg fiber) increased with increasing pH and smaller fiber particle size, but decreased as the fiber concn. increased. Cu decreased Fe bound by NDF but increased Fe bound by ADF. Zn decreased Fe bound to both NDF and ADF. Scatchard plots suggested the presence of 2 types of binding sites for Zn, one type for Fe and one type for Cu. Oxidation of ferrous to ferric Fe may have occurred in the presence of fiber as pH increased. Polyphenolic compounds were associated with NDF and ADF and their presence may have enhanced the ability of fiber to find minerals. NDF did not significantly decrease the absorption of (59)Fe in noneverted intestinal segments from normal and anemic rats, but a trend towards lower absorption of Fe as fiber concn. increased was observed. Normal rat intestinal segments absorbed more Fe when exposed to a smaller fiber particle size (0.125 mm vs. 0.180 mm NDF particle size). The ability of fiber to decrease Fe absorption seems to depend on: fiber source, particle size, and concn.; the presence of competing minerals; and the Fe status of the animal. (Dissertation Abstracts International)

0321

27074 HABESA, L.B. ; ATUTUBO, E.O.; DAQUIL, M.M. 1984. Sensory quality attributes of products prepared from flours of germinated legumes. NSTA Technology Journal 9(4):48-57. En., 7 Ref.

Phaseolus vulgaris. Bean flour. Organoleptic properties. Nutritive value. Philippines.

To evaluate whether the consumer would accept nutritionally superior flours from germinated legumes, among them beans, their organoleptic properties were studied. Products developed from flours were subjected to sensory evaluation, employing at least 12 experienced panel members, and the consumer evaluation was conducted employing preschool and school children. The panel members were confronted with products from germinated and ungerminated legumes, and wheat; the children only evaluated germinated legumes. The results from the sensory evaluation indicated that, generally germinated legumes were superior to ungerminated legumes and comparable with wheat. Consumer evaluation indicated that most products of germinated legumes will be accepted. (Food Science and Technology Abstracts)

0322

26901 NABHAN, G.P. ; WEBER, C.W.; BERRY, J.W. 1985. Variation in composition of Hopi Indian beans. Ecology of Food and Nutrition 16(2):135-152. En., Sum. En., 26 Ref., Il. [Office of Arid Lands Studies, Univ. of Arizona, Tucson, AZ 85721, USA]

Phaseolus vulgaris. Proteins. Dietary value. Amino acids. Nutritive value. Phaseolus coccineus. USA.

Dry Phaseolus beans grown on the Hopi Indian reservation (Arizona, USA) by traditional agricultural techniques were collected and compared with beans utilized by the Hopis but grown off the reservation. Species included P. vulgaris, P. acutifolius var. latifolius, P. coccineus, and P. lunatus. Ethnobotanical information, morphological and chemical data were obtained. Beans grown on the reservation were generally, but not always, found to be superior in protein content, but no clear differences in protein quality could be attributed to bean types or field environments. Legumes are consumed at the same level (30 g/day/person) but native beans contribute less protein to the Hopi diet than during the 1930's, as a consequence of reduced diversity in var. locally produced and consumed. Much variation occurs in mineral levels in Hopi beans, but the wide range in soil composition found in Hopi fields gave no clear correlation with bean composition. (AS)

0323

27232 OCHETIM, S. ; BOGERE, C.; KATONGOLE, J.B.D. 1980. Nutrient content and feeding value of common bean types grown and consumed in Kenya. East African Agricultural and Forestry Journal 45(4):284-289. En., Sum. En., 26 Ref.

Phaseolus vulgaris. Cultivars. Nutritive value. Dietary value. Protein content. Fiber content. Amino acids. Kenya.

Nutrient content and feeding value of 4 bean var. grown and consumed in Kenya (Rose Coco, Mwezi Moja, Canadian Wonder, and Mexican 142) were determined. The protein content of the 4 var. was 20 percent; that of Mwezi Moja was slightly greater than in the rest. Mexican 142 had the most fiber, 9.08 percent, and Canadian Wonder the least, 6.76 percent. GE value was 4.33-4.47 kcal/g. Beans were high in P, Mg, and Ca but low in Fe. First limiting amino acids were met. and cystine, with valine next. Essential amino acid index was from 88.7 in Canadian Wonder to 94.4 in Mexican 142. Chemical scores for Canadian Wonder, Mwezi Moja, Mexican 142, and Rose Coco were 87.1, 84.8, 81.7, and 77.9, resp. Rats given autoclaved beans lost wt. but when met. was present they gained wt. but not as much as did controls given casein. (Nutrition Abstracts and Reviews)

0324

27386 SANTOS, T.M.E. ; OLIVEIRA, J.E.D. DE 1972. Valor nutritivo de fracoes proteicas isoladas do feijao (Phaseolus vulgaris L.). (Nutritive value of protein fractions isolated from beans). Archivos Latinoamericanos de Nutrición 22(4):547-560. Pt., Sum. Pt., En., 23 Ref., Il.

Phaseolus vulgaris. Proteins. Nutritive value. Diets. Animal nutrition. Digestibility. Methionine. Brazil.

Bean proteins were extracted with 1 percent NaCl solution at pH 8. Treatment of the extract with HCl solution at pH 4 and heat yielded 3 protein fractions with different physicochemical characteristics, their protein content varying from 59.13 to 66.49 percent. The yield of 1 fraction (65 percent) was twice that of the other 2. Studies with rats of the 3 isolated protein fractions showed a lower nutritive value than that of the cooked bean when both diets were supplemented with met. On the other hand, the digestibility of the fractions was better than that of the cooked bean. Met. supplementation did not influence the digestibility of the diets. Phytohemagglutinin was not present in the isolated fractions and in the cooked beans. Blastogenic activity was observed in the isolated fractions, although to a lesser degree than in raw beans. (AS) See also 0089 0266

I00 MICROBIOLOGY

0325

27417 ZAMBOLIM, L. ; OLIVEIRA, A.A.R.; RIBEIRO, A.C. 1985. Efeito da infeccao por fungos micorrizicos do tipo vesicular-arbuscular sobre o desenvolvimento do feijoeiro (Phaseolus vulgaris L.). (Effect of infection by vesicular-arbuscular mycorrhizal fungi on the development of beans). Revista Ceres 32(181):252-258. Pt., Sum. Pt., En., 16 Ref. [Depto. de Fitopatologia, Univ. Federal de Vicosa, 36.570 Vicosa-MG, Brasil]

Phaseolus vulgaris. Mycorrhizae. Growth. Nutrient uptake. N. P. K. Ca. Mg. Brazil.

An expt. was carried out in the greenhouse to determine the effect of vesicular arbuscular mycorrhizal fungi (Glomus epigaeum, G. mosseae, G. claroideum, G. macrocarpum, G. fasciculatum, G. monosporum, and G. etunicatum) on the plant development of bean cv. Costa Rica inoculated at seeding. The lowest root infection level was obtained with G. epigaeum. All Glomus species evaluated were efficient in promoting bean growth responses and nutrient uptake. The height of mycorrhizal plants, independent of Glomus species, was greater than that of nonmycorrhizal plants. (AS) See also 0042

I01 Rhizobium spp., Nitrogen Fixation and Nodulation

0326

27077 DAKORA, F.D. 1985. Use of intrinsic antibiotic resistance for characterisation and identification of Rhizobia from nodules of Vigna unguiculata (L) Walp. and Phaseolus vulgaris (L). Acta Microbiologica Polonica 34(2):187-194. En., Sum. En., 23 Ref. [Crops Research Inst., P.O. Box 52, Nyankpala, Tamale, Ghana]

Phaseolus vulgaris. Nodulation. Rhizobium. Australia.

Intrinsic resistance to low concn. of antibiotics was used to characterize 83 isolates from nodules of cowpea and bean. Fingerprint patterns of isolates revealed considerable heterogeneity among the populations even where the location and/or host plant were common. Pure culture of slow-growing rhizobia from cowpea nodules were generally more resistant to the concn. of antibiotics used than fast-growing nodule bacteria from beans. (AS (extract)

0327

27202 HEMANTARANJAN, A. ; GARG, O.K. 1986. Introduction of nitrogen-fixing nodules through iron and zinc fertilization in the nonnodule-forming French bean (Phaseolus vulgaris L.). Journal of Plant Nutrition 9(3-7):281-288.

En., Sum. En., 19 ref. [Dept. of Plant Physiology, Inst. of Agricultural Sciences, Banaras Hindu Univ., Varanasi-221005, India]

Phaseolus vulgaris. Fe. Zn. Rhizobium. Nitrogen fixation. Nodulation. N. Growth. Snap beans. India.

Greenhouse expt. were conducted to study the effects of Fe (ferrous sulfate) and Zn (zinc sulfate) on nodulation and N2 fixation in French beans. Inorganic treatments were added to the soil but no exogenous supplement of Rhizobium was added. Fe alone at a concn. of 5 or 10 mg/kg soil or in combination with the same concn. of Zn enhanced nodulation. At 5 mg Fe and Zn/kg soil, max. nodulation and leghemoglobin were noted. Enhanced in vivo N2 fixation was also noted when either Fe or Zn (alone or in combination) were added at concn. of 5 or 10 mg/kg soil. These expt. showed that Fe could create a condition conducive to the formation of N2-fixing nodules in French bean. Synergistic effects of Zn in these processes could not be ruled out. (AS)

0328

27068 HUNGRIA, M. ; NEVES, M.C.P. 1986. Interacao entre cultivares de Phaseolus vulgaris e estirpes de Rhizobium na fixacao e transporte do nitrogenio. (Interaction between Phaseolus vulgaris cultivars and Rhizobium strains in nitrogen fixation and transport). Pesquisa Agropecuaria Brasileira 21(2):127-140. Pt., Sum. Pt., En., 46 Ref., Il. [Empresa Brasileira de Pesquisa Agropecuaria, Unidade de Apoio ao Programa Nacional de Pesquisa em Biologia do Solo, Km 47, 23.460 Seropédica-RJ, Brasil]

Phaseolus vulgaris. Rhizobium. Strains. Cultivars. N. Nutrient transport. Nitrogen fixation. Nitrogen-fixing bacteria. Brazil.

Under greenhouse conditions, 5 Phaseolus vulgaris cv. and 6 Rhizobium leguminosarum biovar phaseoli strains were used to evaluate N fixation and transport in the plants. Both cv. and strains significantly affected the dry wt. and total N of leaves, stems, and pods, nodule dry wt. and efficiency (mg N/g nodule), nitrogenase activity, H2 evolution by the nodules, relative efficiency, N concn. and rate of N translocation in the xylem sap, and percentage of the N of the xylem sap as ureides. The parameters (estimated at flowering time, 35 days after germination) that correlated best with total N of pods at 50 days were relative efficiency (0.872), rate of N translocation in the xylem sap (0.949), and percentage of N as ureides in the xylem sap (0.907). A positive correlation was found between relative efficiency and percentage of N as ureides (0.903), and this can be best explained in terms of a relationship between H2 metabolism and ureide metabolism. (AS)

0329

27262 HUNGRIA, M. ; THOMAS, R.J.; DOBEREINER, J. 1985. Efeito do sombreamento na fixacao biológica do nitrogenio em feijoeiro. (Effect of shading on biological nitrogen fixation in beans). Pesquisa Agropecuaria Brasileira 20(10):1143-1156. Pt., Sum. Pt., En., 49 Ref., Il. [Empresa Brasileira de Pesquisa Agropecuária, Unidade de Apoio ao Programa Nacional de Pesquisa em Biologia do Solo, Km 47, 23.460 Serpédica-RJ, Brasil]

Phaseolus vulgaris. Rhizobium phaseoli. Leaf area. Nodulation. N. Light. Temperature. Shading. Nitrogen fixation. Brazil.

Two expt. were performed to investigate the effect of decreasing luminosity and temp. caused by shading on biological N fixation of common beans. When the shading was at 25 percent level, there was an increase, in relation to full light, of the dry wt., nitrogenase activity, total N in xylem sap, rate of N as ureides, and total N in shoots. At this level of shading, an increase in nodular efficiency compensated for the decrease in nodule wt. The favorable effect of reducing 25 percent of the luminosity was caused by the decrease in max. diurnal temp. in the shaded pots and the decrease of

solar energy was compensated by an increase in leaf area. At 40 percent shading, there was a decrease in the rhizosphere temp. and an increase in leaf area but this was not enough to compensate for the lower photosynthetic activity. Generally, the high temp. did not affect the infection process and the growth of the nodules, but altered nodule metabolism, decreasing nitrogenase activity and total N in shoots. (AS)

0330

27067 HUNTINGTON, T.G. ; SMITH, M.S.; THOMAS, G.W.; BLEVINS, R.L.; PEREZ, A. 1986. Response of Phaseolus vulgaris to inoculation with Rhizobium phaseoli under two tillage systems in the Dominican Republic. Plant and Soil 95(1):77-85. En., Sum. En., 31 Ref. [Dept. of Agronomy, Kentucky Agricultural Experiment Station, Lexington, KY 40546-0091, USA]

Phaseolus vulgaris. Nitrogen fixation. Nodulation. Rhizobium phaseoli. N. Land preparation. Inoculation. Strains. Yields. Dominican Republic.

Field expt. were established at 3 locations in the Dominican Republic to evaluate the response of bean cv. Pompadour to inoculation with selected strains of Rhizobium phaseoli. A comparison of no-tillage and conventional tillage was included to determine whether modification of rhizosphere temp. and moisture would influence the inoculation response. Yields of inoculated treatments were not statistically different from controls and ranged from 30 to 80 percent of those obtained on N-fertilized plots. Neither tillage systems nor P fertilization influenced the response to inoculation. Serological investigations indicated that the applied rhizobial strains nodulated successfully. This host/endophyte combination appears to form an ineffective symbiotic association. Inoculation trials employing indigenous and commercial strains compared with N fertilizer in the greenhouse support the conclusion from the field studies that symbiotic N2 fixation can provide only a fraction of the plant's N requirement. (AS)

0331

23650 LOPEZ A., E. 1982. Generación de tecnología de producción y evaluación de cepas de Rhizobium phaseoli y Rhizobium japonicum por su efecto en la producción de grano y economía de nitrógeno en los cultivos de fríjol (Phaseolus vulgaris L.) y soya (Glycine max L.) Merril) en la Mixteca Poblana. (Generation of production of technology and evaluation of Rhizobium phaseoli and R. japonicum strains regarding their effect on grain production and nitrogen econonics in bean and soybean crops in Mixteca Poblana). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 305p. Es., Sum. Es., 98 Ref., Il.

Phaseolus vulgaris. Rhizobium phaseoli. Strains. Fertilizers. N. P. Yields. Protein content. Mineral content. Mexico.

Expt. were established in the Mixteca Poblana region, Mexico, with 4 Rhizobium phaseoli (CP10, CP30, CP31, and CPM) and 4 R. japonicum strains (CP6, CP35, CP36, and CPM) in beans and soybean, resp., in the 2 most important production systems of this zone: deep black soil and thin black soil. The factorial design used consisted of the 4 Rhizobium strains and 3 P levels (0, 30, and 60 kg/ha) with 6 additional fertilizer treatments without inoculation: increasing N doses (0, 20, 40, and 60 kg/ha) + 30 kg P, and increasing P doses (0, 30, and 60 kg/ha) without N. In the expt. carried out with beans in deep soil, the highest grain yield (473.25 kg/ha) was obtained by inoculating with R. phaseoli strain CP30 + 60 kg P/ha. However, according to the economic analysis, the treatment yielding highest profits was that with the strain CP30 without fertilization. In the expt. carried out in thin soil, the following treatments gave the highest grain yields/ha: treatment without inoculation + 60 kg P/ha, 606.41 kg; treatment with inoculation with strain CP30 + 60 kg P/ha, 583.60 kg; treatment without inoculation + 60 kg N + 30 P/ha, 499.16 kg. The control

treatment yielded 363.89 kg/ha. The economic analysis indicated that the highest profits with the min. investment are obtained by using 60 kg P without inoculation. (AS (extract)-CIAT)

0332

27391 RENNIE, R.J. 1986. Comparison of methods of enriching a soil with nitrogen-15 to estimate dinitrogen fixation by isotope dilution. Agronomy Journal 78(1):158-163. En., Sum. En., 37 Ref. [Agriculture Canada Research Station, Lethbridge, Alberta, Canada T1J 4B1]

Phaseolus vulgaris. Nitrogen fixation. Rhizobium phaseoli. Canada.

A 2-yr field comparison of methods of labeling the soil with (15)N was undertaken to increase the precision of estimating N2 fixation by the (15)N isotope dilution procedure. Dinitrogen fixation was estimated using Phaseolus vulgaris cv. Aurora grown on a Chin loam (Typic Haploboroll) soil under irrigation in southern Alberta, Canada. Postemergence fluid injection of ((15)NH4)2SO4 into the rooting zone of 1-wk.-old plants (with or without nitrapyrin) resulted in excellent exptl. precision and greater planning flexibility. It was superior to preemergence addition of liquid (15)N in broadcast or banded form because of the high winds often encountered in the spring. The preemergence addition of low-level (15)N-labeled legume or cereal organic residues compared favorably with mineral N addition and had the advantage that residues from previous (15)N expt. could be utilized cost-free. Isotope dilution of (15)N at levels of natural isotopic abundance resulted in similar estimates of N2 fixation with no consistent evidence of isotopic discrimination, and appears promising as an inexpensive but qualitative screening procedure for field selection of N2 fixation by legume breeders. (AS)

0333

27340 RENNIE, R.J. 1986. Selection for captan tolerance in the Rhizobium phaseoli-Phaseolus vulgaris L. N2-fixing symbiosis. Canadian Journal of Soil Science 66(1):143-150. En., Sum. En., Fr., 20 Ref. [Research Station, Agriculture Canada, Lethbridge, Alberta T1J 4B1, Canada]

Phaseolus vulgaris. Rhizobium phaseoli. Strains. Nitrogen fixation. Nodulation. Chemical control. Canada.

Application of the seed-applied fungicides captan, DL-Plus (15 percent diazinon, 25 percent lindane, and 15 percent captan), Evershield (29.5 percent captan and 0.77 percent malathion), thiram, and metalaxyl reduced nodulation in the bean cv. Lancer in the field in Vauxhall (Alberta, Canada). Captan, Evershield, B3 (11.0 percent diazinon, 16.6 percent lindane and 33.5 percent captan), and thiram also lowered the acetylene reducing activity under the same conditions. Captan, DL-Plus, and B3 resulted in significant yield reductions of bean inoculated with commercial multistrain rhizobial inoculant. Since captan or captan-containing fungicides were the most potent inhibitors of symbiotic N2 fixation in bean, spontaneous mutants of Rhizobium phaseoli strains 3644 and 8215 were selected on the basis of ability to grow in microbial medium containing 100 ppm of captan. The existence of mutants of R. phaseoli tolerant to seed-applied captan but unaltered in symbiotic properties makes the combined use of captan as a seed protectant and seed-applied rhizobial inoculation fully compatible. (AS (extract))

0334

27241 RENNIE, R.J. 1984. Comparison of N balance and (15)N isotope dilution to quantify N2 fixation in field-grown legumes. Agronomy Journal 76(5):785-790. En., Sum. En. [Research Station, Agriculture Canada, Lethbridge, Alberta, Canada T1J 4B1]

Phaseolus vulgaris. Rhizobium phaseoli. Nitrogen-fixing bacteria. Nitrogen fixation. Cultivars. Strains. N. Canada.

Two methods of estimating N fixation, (a) total N balance and (b) (15)N isotope dilution, were compared in trials with field-grown Phaseolus vulgaris and soybeans in 1980-82. Estimates given by (a) were generally lower and less precise than (b). In 70 percent of trials the 2 methods gave similar results for estimation of total N fixed but in only 60 percent of trials for estimation of percentage N fixed. Method (a) was most reliable under conditions of low soil N status when plants unable to fix N showed deficiency by anthesis. Accurate estimation by (a) was only possible when fertilizer use efficiency or N uptake was identical to that in nonfixing plants. N balance techniques were found to be unreliable for estimating N fixation in field-grown legumes. (AS (extract))

0335

27289 ROSAS, J.C. ; BLISS, F.A. 1986. Host plant traits associated with estimates of nodulation and nitrogen fixation in common bean. HortScience 21(2):287-289. En., Sum. En., 15 Ref. [Dept. of Horticulture, Univ. of Wisconsin, Madison, WI 53706, USA]

Phaseolus vulgaris. Cultivars. Rhizobium phaseoli. Nitrogen fixation. Nodulation. Dry matter. Acetylene reduction. Growth. USA.

Field and greenhouse expt. were conducted to study the relationships among plant growth traits; ratios of dry wt. among nodules (Rhizobium phaseoli), roots, and shoots; and traits associated with N2-fixation potential of common bean. The dry wt. of plant parts and the traits associated with N2-fixation differed among the 10 lines studied. A visual nodulation score used to evaluate N2-fixation potential correlated positively with nodule dry wt., acetylene reduction value, root dry wt., and shoot dry wt. for plants grown under both greenhouse and field conditions. Acetylene reduction values, nodule dry wt., and visual nodule scores of plants grown in the greenhouse correlated positively with the resp. figures obtained for field-grown plants. These methods of evaluation can be used to discriminate among lines for N2-fixation potential. (AS)

0336

26083 UNIGARRO S., A.E. 1984. Influencia de la inoculación de Rhizobium y de la fertilización en la fijación de nitrógeno y producción de fríjol arbustivo en un suelo del altiplano de Pasto, Departamento de Nariño. (Influence of Rhizobium inoculation and of fertilization on nitrogen fixation and production of bush beans on a Pasto altiplano soil, department of Nariño). Tesis Ing.Agr. Pasto, Colombia, Universidad de Nariño. 149p. Es., Sum. Es., En., 46 Ref., Il.

Phaseolus vulgaris. Inoculation. Rhizobium. Fertilizers. N. P. K. B. Mo. Nitrogen fixation. Yields. Yield components. Colombia.

A trial was carried out under greenhouse conditions with soil from the Pasto altiplano (Nariño, Colombia) to determine the influence of Rhizobium inoculation and of fertilization on N fixation and yield of bush bean var. Diacol Andino. A total of 168 pots were used, of which 84 were employed in the partial trial during flowering and the remaining 84 were carried through production, determining the no. of pods/plant, no. of grains/pod, no. of grains/plant, and yield. The following treatments were considered: normal soil and uninoculated seed, normal soil and inoculated seed, and sterile soil and inoculated seed. Subtreatments consisted of NPK, NPKB, NPKMo, Mo, B, and an unfertilized check. There were no differences in root DM, no. of grains/pod, and no. of pods/plant. When the seed was inoculated, increases were observed in the no. of buds, DM wt. of the nodules, height, and leaves/plant. NPK applications produced the lowest values for the yield parameters studied. Biomass yield was affected by B applications. (AS (extract)-CIAT) See also 0027 0046 0092 0122 0125 0156 0275 0277

0337

27007 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Evaluation and improvement of agronomic practices. Economics. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.219-229. En., Il. Also in Spanish.

Phaseolus vulgaris. Marketing. Consumption. Costs. Income. Transfer of technology. Dominican Republic. Colombia. Guatemala. Costa Rica.

Economics research at CIAT in 1985 focused on production studies, marketing studies, and training. Production studies identified farm level constraints, evaluated new technologies as solutions to these constraints, and assessed the adoption of new technologies. Since most beans in Latin America reach the consumer through the market, consumer preferences, market structure, and demand were considered critical factors. Most of the research on these issues was conducted in collaboration with national programs, and strengthening their research capacity through training and joint projects was a major objective. (CIAT)

0338

27006 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Evaluation and improvement of agronomic practices. On-farm research. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.211-217. En. Also in Spanish.

Phaseolus vulgaris. Cultivars. Technology evaluation. Adaptation. Yields. Colombia.

During 1984-85, 98 trials were planted by CIAT-Instituto Colombiano Agropecuario (ICA) in 4 areas of Colombia (eastern Antioquia and southern, central, and northern Nariño). These trials were of 5 types: var., exploratory, determination of economic levels, verification, and farmer-managed. The expansion of training in on-farm research and of participation in network activities was also important. As a direct result of recommendations derived by ICA-CIAT on-farm research, ICA released var. Frijolica 0-3.2 for cold climates and var. Frijolica LS-3.3 for moderate cool climates. (CIAT)

0339

27008 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1986. Scientific training and network activities. Training. In _____. Bean Program. Annual Report 1985. Cali, Colombia. Working Document no.14. pp.231-242. En., Il. Also in Spanish.

Phaseolus vulgaris. Transfer of technology. Technological package. Latin America. Caribbean. Burundi. Rwanda. Uganda.

The methodology and achievements of training at CIAT are described. Tables indicating the training by discipline and category, and the participants trained in 1985 are included. (CIAT)

0340

27050 WARREN, A. 1985. Malawi: beans crop evaluation. In Bean production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 1p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Production. Yields. Malawi.

Statistical data are presented of bean production, area under cultivation, and yields for the 1983-84 and 1984-85 seasons for the Karonga, Salima, Kasungu, and Lilongwe regions of Malawi. (CIAT)

0341

27049 WARREN, A. 1985. Malawi: women farmers in bean production (project of CRSP, with Bunda College, in the northern region. In Bean production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 2p. En., [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Agricultural projects. Development. Malawi

A research project to study the role of women farmers in bean production in Malawi is described. Brief information of the surveys undertaken, problems encountered, and future work is included. (CIAT)

0342

27045 WARREN, A. 1985. Tanzania: bean production statistics. In Bean production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 3p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Production. Marketing. Tanzania.

Statistical data of bean seed sales in the northern region of Tanzania are presented for the years 1976-85. Bean production estimates made by regional agricultural development offices are also included. (CIAT)

0343

27048 WARREN, A. 1985. Tanzania: food science and nutrition. In Bean production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 3p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Production. Tanzania.

Statistical data are presented of bean production, planted area, and consumption for 20 geographical regions of Tanzania during the 1982-83 and 1983-84 seasons. Future plans are briefly described. (CIAT)

0344

27046 WARREN, A. 1985. Tanzania: seed beans for export (green bean varieties for Europe). In Bean production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 2p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Snap beans. Trade. Land preparation. Insect control. Tanzania.

Production prospects and constraints of bean cultivation in Tanzania are discussed. Brief information is also presented of inputs and prices, land preparation, insects (mainly Heliothis spp.), diseases, and yields. (CIAT)

0345

27055 WARREN, A. 1985. Zambia: bean production data. In Bean production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 4p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Production. Zambia.

Statistical data on cultivated area, production, and consumption of beans during the years 1983-84 are presented for 48 Zambian districts. (CIAT)

0346

27057 WARREN, A. 1985. Zimbabwe: bean pricing. In Bean production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 1p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Prices. Zimbabwe.

The methods used by the Ministry economists to arrive at the control prices of crops in Zimbabwe are briefly described. Problems concerning bean pricing are discussed. (CIAT)

0347

27062 WARREN, A. 1985. Zimbabwe: bean production data. In Bean Production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 5p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Production. Consumption. Zimbabwe.

Statistical data on bean production in commercial farms in Zimbabwe is presented for the years 1976-83. Information includes no. of farms, area planted to beans, production, and yields. (CIAT)

0348

27056 WARREN, A. 1985. Zimbabwe: seed beans. In Bean Production in Tanzania, Malawi, Zambia and Zimbabwe. Report of a bean information survey in Africa. Cali, Colombia, Centro Internacional de Agricultura Tropical. 2p. En. [9 Hillside, Allcraft Road, Reading, England]

Phaseolus vulgaris. Trade. Production. Zimbabwe.

Bean exports in Zimbabwe in 1985 may be 800-900 t, of which half will go to Europe. Beans are planted after mid-feb.; many farmers plant the crop after tobacco, soybeans, or groundnuts. Bonus is the main var. grown because of its good yields. Major production constraints are insects (bean fly), diseases (anthracnose and Alternaria leaf spot), and threshing difficulties. (CIAT) See also 0091 0140 0154 0275 0283

L00 GRAIN STORAGE

0349

27279 ARAUJO, E.F. ; MARTINS, D. DOS S.; FERREIRA, M. DE A.L.; SILVA, R.F. DA 1985. Efeito de fumigantes e insecticida de contato na germinacao e vigor de sementes de feijao (Phaseolus vulgaris L.). (Effect of fumigants and contact insecticides on bean seed germination and vigor). Revista Ceres 32(180):110-119. Pt., Sum. Pt., En., 9 Ref. [Depto. de Fitotecnia da Univ. Federal de Vicosa, 36.750 Vicosa-MG, Brasil]

Phaseolus vulgaris. Seed. Germination. Insecticides. Seed vigor. Brazil.

Seeds of bean cv. Negrito 897, with a MC of 8.1 and 13.8 percent, were submitted to the following treatments: methyl bromide, aluminum phosphide, malathion (at recommended and 2 times recommended dosages), and as combinations of fumigants with the 2 levels of malatnion. Treated and untreated seeds were placed in Kraft paper bags of several layers and stored at room temp. Evaluations of the effects of treatments on seed germination and vigor were made shortly after treatments, and after 4 and 9 mo. of storage. Methyl bromide reduced both germination and vigor. These effects were pronounced in the tests made shortly after treatment and increased with storage time. Seeds with the higher MC were more susceptible than were those with lower moisture. Aluminum phosphide and malathion (even at the higher dosage) did not reduce seed germination or vigor neither as an immediate effect nor as a latent effect (during storage). (AS)

0350

27304 SAWAZAKI, H.E. ; TEIXEIRA, J.P.F.; MORAES, R.M. DE; BULISANI, E.A. 1985. Modificaoes bioquímicas e físicas em graos de feijao durante o armazenamento. (Biochemical and physical modifications of bean seeds during storage). Bragantia 44(1):375-390. Pt., Sum. Pt., En., 29 Ref., Il. [Secao de Fitoquímica, Inst. Agronomico, Caixa Postal 28, 13.100 Campinas-SP, Brasil]

Phaseolus vulgaris. Seed. Storage. Cultivars. Protein content. Sugar content. Water content. Fiber content. Starch content. Fat content. Brazil.

Seeds of dry bean cv. Rico 23 and Carioca were chemically and physically characterized 3 times during 11 mo. of storage. SOS-polyacrylamide gel electrophoresis of the globulin fraction showed an increase in the no. of bands at the 3rd sampling, probably due to a more efficient protein extraction. Mol. wt. of the G1 and G2 subunits, however, were constant (about 50,000-43,000 and 18,000, resp.) Total protein, soluble sugar, and water contents did not change during storage, while fiber increased and lipids decreased. Starch content also increased probably due to greater extractability. Both free fatty acids content and peroxide value increased according to the increase of the acidity value. Water absorption capacity initially increased and leveled off thereafter. The percentage of seeds with hard coat was not affected by storage. The behavior of the 2 cv. was similar. (AS) See also 0353

MOD USES, INDUSTRIALIZATION AND PROCESSING

0351

27298 COLLINS, J.L. ; MULLINS, C.A. 1984. Tennessee snap beans for canning and freezing. Tennessee Farm and Home Science no.130:11-14. En., 7 Ref. [Plateau Experiment Station, Univ. of Tennessee, Crossville, TN, USA]

Phaseolus vulgaris. Cultivars. Snap beans. Canned beans. Processing. USA.

Nineteen snap bean cv. grown at the Plateau Expt. Station (Tennessee, USA) were evaluated, 2 of which were wax-type and the rest green-type. Snipped raw pods were examined for color and sieve size measurement and graded accordingly. Some medium-size pods were canned (blanched at 76.7 degrees Celsius/3 min, filed into No. 303 cans, covered with water at 95 degrees Celsius, 1 teaspoon of salt was added to each can, cans were sealed and processed for 20 min at 115.6 degrees Celsius. Cans were stored 6 mo. at room temp. Some medium-sized pods were frozen (blanched and blast frozen for storage at -17.8 degrees Celsius for 6 mo. Processed beans were tested for color, appearance (shape, size, uniformity, defects), firmness, and amount of epidermal sloughing. Results are tabulated. By balancing several important parameters under consideration the cv. recommended are Eagle, Flo, Checkmate, Cape, and BBL GV66. BBL GV66 is an exptl. line and the others are commercial cv. (Food Science and Technology Abstracts)

0352

27079 FIGUEROLA R., F. ; ESTEVEZ A., A.M.; SEPULVEDA E., E.; VILLARROEL S., P. 1984. Almidón de tres cultivares de frejol (Phaseolus vulgaris L.). 1. Extracción y análisis de pureza. (Starch from three bean cultivars. I. Extraction and purity analysis). Alimentos 9(4):5-9. Es., Sum. Es., En., 19 Ref. [Depto. de Agroindustria, Facultad de Ciencias Agrarias, Veterinarias y Forestales, Univ. de Chile, Casilla 1004, Santiago, Chile]

Phaseolus vulgaris. Cultivars. Starch content. Bean starch. Processing. Chile.

The feasibility of obtaining bean starch was studied and the efficiency of 2 extraction methods, centrifugation and sedimentation, was determined. In addition, the yield and purity of starch obtained from bean cv. Tortola,

Arroz, and Red Kidney were evaluated. The yield obtained through sedimentation (23.7-26.4 percent) was higher than that obtained by centrifugation (20.4-21.8 percent). N content of starch did not show significant differences between extraction methods or cv. Ash content was significatively lower in sedimentation (0.11-0.23 percent) than in centrifugation (0.22-0.26 percent). Fiber content was also lower in sedimentation (0.60-0.70 percent) compared with centrifugation (0.71-0.89 percent). Cv. Arroz had the highest starch yield and purity. (CIAT)

0353

27213 GARCIA, A. ; BRESSANI, R. 1985. Efecto de la radiación solar sobre algunas características fisicoquímicas del grano de fríjol (Phaseolus vulgaris L.). Observaciones preliminares. (Effect of solar radiation on some physicochemical characteristics of bean seeds. Preliminary observations). Turrialba 35(2):155-158. Es, Sum. Es., En., 8 Ref., Il.

Phaseolus vulgaris. Solar radiation. Seed hardening. Seed. Sugar content. Guatemala.

An expt. was conducted at the Instituto de Nutrición de Centro América y Panamá to test the hypothesis that extended solar exposure increases bean hardening or resistance to a rapid cooking. A sample of recently harvested beans was exposed to solar radiation for various periods of time. The MC, water absorption index, cooking index, and total solids in the bean broth were determined. Results indicated that extended solar exposure increased cooking time and reduced MC and ammonium oxalate-soluble pectins. (AS)

0354

27069 GOMEZ-BRENES, R.A. ; BRESSANI, R. 1985. Evaluación de un aparato para medir la dureza del grano de fríjol (Phaseolus vulgaris) y su utilización para la determinación de tiempos de cocción. (Evaluation of a device to measure bean grain hardness and its utilization in the determination of cooking time). Archivos Latinoamericanos de Nutrición 35(4):654-665. Es., Sum. Es., En., 10 Ref., Il. [Inst. de Nutrición de Centro América y Panamá, División de Ciencias Agrícolas y de Alimentos, Apartado Postal 1188, Guatemala]

Phaseolus vulgaris. Cooking. Timing. Seed hardening. Guatemala.

A device (DUR-INCAP), developed by the Instituto de Nutrición de Centro América y Panamá (INCAP), to measure bean seed hardness is described. In addition, a study was conducted to determine cooking time and hardness of white-, black-, and red-seeded beans. All beans were cooked in boiling water at 95 degrees Celsius for 30, 60, 100, 140, and 180 min. At each cooking time, hardness was measured with DUR-INCAP and beans were classified into soft cooked beans (less than 100 g-force), medium (between 100-200 g-force), and hard (above 200 g-force). White and black beans reach softness at 140 min of cooking, with the exception of 1 black sample that required 180 min. Two of the 4 red beans required 180 min, and the other 2, 220 min. The effects of storage time and temp. on hardness were evident; the bean sample stored for 1 yr at 25 degrees Celsius required 140 min of cooking, while the sample stored at 5 degrees Celsius was cooked in 100 min. (AS (extract))

0355

27229 PAO, M.A. ; LEE, C.Y.; COOLEY, H.J. 1985. Loss of color and firmness during thermal processing of canned snap beans. Journal of Food Quality 8(1):39-44. En., Sum. En., 14 Ref., Il. [New York State Agricultural Experiment Station, Cornell Univ., Geneva, NY 14456, USA]

Phaseolus vulgaris. Snap beans. Canned beans. Processing. USA.

A study was undertaken to determine the kinetic parameters (D and z) for the loss of color and firmness of snap beans during thermal processing. The

D value (at 250 degrees Fahrenheit) and the z value for the loss of color were 12.6 min and 91 degrees Fahrenheit, resp. The D value (at 250 degrees Fahrenheit) and the z value for the loss of firmness were 3.4 min and 106 degrees Fahrenheit, resp. The magnitudes of the kinetic parameters are in the range of values reported in the literature. (CIAT)

0356

27081 SHEWFELT, R.L. ; PRUSSIA, S.E.; JORDAN, J.L.; HURST, W.C.; RESURRECCION, A.V.A. 1986. A systems analysis of postharvest handling of fresh snap beans. HortScience 21(3):470-472. En., Sum. En., 20 Ref. [Univ. of Georgia Agricultural Experiment Station, Dept. of Food Science, Experiment, GA 30212, USA]

Phaseolus vulgaris. Snap beans. Processing. Packaging. Seed characters. Composition. Marketing. USA.

The postharvest handling system of fresh market snap beans of cv. Sprite was analyzed to determine steps of greatest quality deterioration. A decrease in ascorbic acid concn. was the only consistent quality change noted between the arrival at the packinghouse and departure from the wholesale warehouse. Quality differences in percentage of fiber, percentage of seeds, color, hue angle, moisture, ascorbic acid, and sensory texture attributes observed in beans from different packinghouses suggest that cultural and harvesting factors are most critical. Short market shelf-life is a major limitation in marketing. (AS)

0357

27076 WULF M., H. ; CAFATI K., C.; YAÑEZ, E. 1984. Mejoramiento del valor nutritivo del pan con harina de frejol. (Improvement of the nutritive value of bread with bean flour). Simiente 54(1-2):3-5. Es., Sum. En., Es., 5 Ref. [Inst. de Investigaciones Agropecuarias, Estación Experimental La Platina; Casilla 5427, Santiago, Chile]

Phaseolus vulgaris. Bean flour. Water content. Ash content. Protein content. Carbohydrate content. Human nutrition. Chile.

To improve the nutritive value of bread 2, 4, 6, 8, and 10 percent bean flour was substituted for wheat flour. The influence of the bean flour on the farinological characteristics of the dough and on the different parameters of bread quality were analyzed. Increases in bread yield and in protein percentage were obtained with the addition of bean flour. When bea flour substituted wheat flour up to 6 percent, no important alterations of the organoleptic and physical-mechanical properties of the dough or of bread quality were observed. Future studies should examine the chemical changes in bread composition, its nutritive value in rat assays, its sensorial characteristics, and consumer acceptability. (AS)

ABBREVIATIONS AND ACRONYMS

A	Angstrom(s)
ABA	Abscisic acid
ac	Acre(s)
Afr.	Afrikaans
a.i.	Active ingredient
alt.	Altitude
AMV	Alfalfa mosaic virus
approx.	Approximate(ly)
atm.	Atmosphere
ATP	Adenosine 5'-triphosphate
av.	Average
BAP	6-Benzylaminopurine
BBMV	Broad bean mosaic virus
BCMV	Bean common mosaic virus
BGMV	Bean golden mosaic virus
BGYMV	Bean golden yellow mosaic virus
BOD	Biochemical oxigen demand
BPMV	Bean pod mottle virus
BRMV	Bean rugose mosaic virus
BSMV	Bean southern mosaic virus
BV	Biological value
BYMV	Bean yellow mosaic virus
°C	Degrees Celsius (centigrade)
ca.	About (circa)
CAMD	Cassava African mosaic disease
CMV	Cassava African mosaic virus
CBB	Cassava bacterial blight
CBSD	Cassava brown streak disease
CEC	Cation exchange capacity
CER	CO2 exchange rate
CF	Cassava flour
CGR	Crop growth rate
CLM	Cassava leaf meal
CLV	Cassava latent virus
CM	Cassava meal
cm	Centimeter(s)
COD	Chemical oxigen demand
concn.	Concentration
CP	Crude protein
CSL	Calcium stearyl lactylate
CSW	Cassava starch wastes
C.V.	Coefficient of variation
cv.	Cultivar(s)
2,4-D	2,4-dichlorophenoxyacetic acid
DM	Dry matter
DNA	Deoxyribonucleic acid
EC	Emulsifiable concentrate
EDTA	Ethylenediaminetetraacetic acid
EEC	European Economic Community
e.g.	For example
ELISA	Enzyme-linked immunosorbent assays
EMS	Ethyl methane sulfonate
Engl.	English
EP	Preliminary Trials, CIAT
expt.	Experiment(s)
exptl.	Experimental
°F	Degrees Fahrenheit
Fr.	French
ft-ca	Foot candles (10.76 lux)
FYM	Farmyard manure
g	Gram(s)
G	Giga (109)
GA	Gibberellic acid
gal	Gallon(s)
GE	Gross energy
Germ.	German
GERs	Glucose entry rates
GLC	Gas-liquid chromatography
h	Hour(s)
ha	Hectare(s)
HCN	Hydrocyanic acid
HDP	Hydroxypropyl distarch phosphate (modified cassava starch)
HI	Harvest index
hp	Horsepower
IAA	Indoleacetic acid
IBA	Indolebutyric acid
IBYAN	International Bean Yield and Adaptation Nursery, CIAT
Illus.	Illustrated
in.	Inches
Ital.	Italian
IU	International unit
J	Joule
Jap.	Japanese
kat	Katal(amount of enzymatic activity that converts 1 mole of substrate/s)
kcal	Kilocalorie(s)
kg	Kilogram(s)
kJ	Kilojoule
km	Kilometer(s)
KNap	Potassium naphthenate
kR	Kiloroentgen(s)
l	Liter(s)
LAD	Leaf area duration
LAI	Leaf area index
lat.	Latitude
lb	Pound(s)
LD50	Mean lethal dose
LER	Land efficiency ratio

LPC	Leaf protein concentrate
lx	Lux
M	Mega
M	Molar
m	Meter(s)
Mal.	Malay
max.	Maximum
MC	Moisture content
ME	Metabolizable energy
meq	Milliequivalent(s)
met.	Methionine
mg	Milligram(s)
mho	Reciprocal ohm
min.	Minimum
min	Minute(s)
ml	Milliliter(s)
mm	Millimeter(s)
mo.	Month
mol. wt.	Molecular weight
m.p.	Melting point
NAA	Alpha-naphthalene acetic acid
NAD	Nicotinamide adenine dinucleotide
NADH	Nicotinamide adenine dinucleotide, reduced form
NAR	Net assimilation rate
NCE	Net CO2 exchange
NE	Northeast
NER	Net energy ratio
nm	Nanometer(s) (10-9 m)
no.	Number(s)
NPFs	Negative production factors
NPR	Net protein ratio
NPU	Net protein utilization
NW	Northwest
OM	Organic matter
oz	Ounce(s)
p.	Page
P	Probability
Pa	Pascal(s)
PAN	Peroxyacetic nitrate
PCNB	Pentachloronitrobenzene
PDA	Potato dextrose agar
PER	Protein efficiency ratio
pH	Hydrogen ion concentration
pp.	Pages
pphm	Parts per hundred million
PPI	Pre planting incorporation
ppm	Parts per million
PSA	Potato sucrose agar
pv.	Pathovar
Ref(s).	Reference(s)
resp.	Respective(ly)
Rf	Retardation factor-chromatography
RGR	Relative growth rate
RH	Relative humidity
RNA	Ribonucleic acid
Rom.	Romanian
rpm	Revolutions per minute
Russ.	Russian
s	Second
SBM	Soybean meal
SCN	Thiocyanate
SCP	Single cell protein
SDS	Sodium dodecyl sulfate
Sk.	Slovak
sp.	Species
Span.	Spanish
spp.	Species
SSL	Sodium stearyl-2-lactylate
Sum.	Summary
t	Ton(s)
TDN	Total digestible nutrients
temp.	Temperature
TIA	Trypsin inhibitor activity
TIBA	2,3,5-Triiodobenzoic acid compound with N-methylmethanamine
TLC	Thin-layer chromatography
TMV	Tobacco mosaic virus
TSH	Thyroid-stimulating hormone
UDPG	Uridine diphosphate glucose
UMS	Unmodified cassava starch
UV	Ultraviolet
var.	Variety(ies), varietal
VEF	Bean Team Nursery, CIAT
VFA	Volatile fatty acids
vol.	Volume
VPD	Vapor pressure deficit
vpm	Volume per million
vs.	Versus
W	West, watt
wk.	Week
WP	Wettable powder
wt.	Weight
yr	Year(s)
/	Per
%	Percent(age)
>	More than, greater than
<	Less than
≤	Equal to or less than
≥	Equal to or greater than
±	Plus or minus

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BEAN PROGRAM

Aart van Schoonhoven, PhD, Entomology, Program Leader
David Allen, PhD, Plant Pathology, Regional Coordinator, Southern African Bean Project (stationed in Arusha, Tanzania)
Stephen Beebe, PhD, Plant Breeding
John Bowman, PhD, Plant Pathology, Central America Bean Project (stationed in Costa Rica)
Cesar Cardona, PhD, Entomology
Jeremy H.C. Davis, PhD, Plant Breeding
Krista C. Dessert, MS, Nutrition, Great Lakes Bean Project (stationed in Rubona, Rwanda)
Michael Dessert, PhD, Plant Breeding, Great Lakes Bean Project (stationed in Rubona, Rwanda)
Guillermo E. Gálvez, PhD, Plant Pathology, Regional Coordinator, Central America Bean Project (stationed in San José, Costa Rica)
Willi Graf, MS, Agronomy, Great Lakes Bean Project (stationed in Rubona, Rwanda)
Theodora C. van Herpen, MS, Economics
Judith Kipe-Nolt, PhD, Microbiology
Roger Kirkby, PhD, Agronomy, Regional Coordinator, East African Bean Project (stationed in Ethiopia)
Julia L. Kornegay, PhD, Plant Breeding
Francisco J. Morales, PhD, Virology
Silvio H. Orozco, MS, Agronomy, Central America Bean Project (stationed in Guatemala City, Guatemala)
Douglas Pachico, PhD, Economics
Marcial Pastor-Corrales, PhD, Plant Pathology
Veronique Schmit, MS, Associate Expert, FAO
Shree P. Singh, PhD, Plant Breeding
Barry Smithson, PhD, Plant Breeding, Southern Africa Bean Project (stationed in Arusha, Tanzania)
Michael D. Thung, PhD, Agronomy (stationed at CNPAF, Goiania, Brazil)
Joseph M. Tohme, PhD, Plant Breeding (Posdoctoral Fellow)
Peter Trutmann, PhD, Plant Pathology, Great Lakes Bean Project (stationed in Rubona, Rwanda)
Joachim Voss, PhD, Agronomy, Great Lakes Bean Project (stationed in Rubona, Rwanda)
Oswaldo Voysest, PhD, Agronomy
Jeffrey White, PhD, Plant Physiology
Jonathan Woolley, PhD, Agronomy, Cropping Systems

SPECIALIZED INFORMATION CENTERS

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

Vol. XII No. 2 August, 1987

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INTRODUCTION

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

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

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

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

COMPONENTS OF AN ABSTRACT

Accession number (for photocpy requests)

Authors

Year of publication

Sequential number in the journal (for use of indices)

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

0118

Original title

Additional notes

Author address

Source

Pages

Language of paper

Language of summary

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

Descriptors

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

Abstract

Abstractor and/or translator

HOW TO USE THE INDEXES

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

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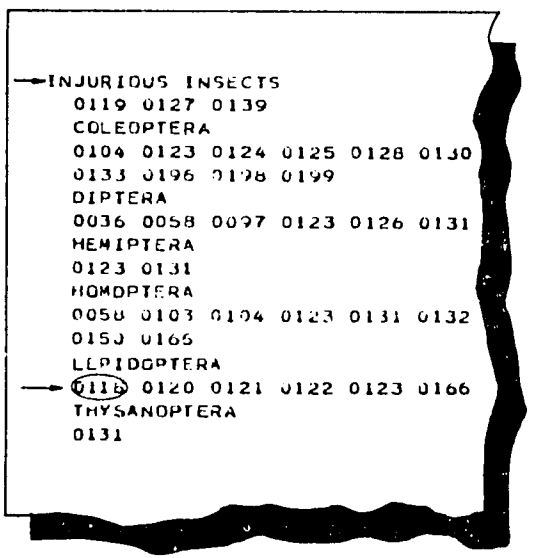
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seed approached maturity. In the cotyledons, the diameter of the storage cells and starch granules increased over time, with distinct protein bodies becoming visible only in the later stages of maturity. An extensive vascular system responsible for rapid delivery of water and nutrients to the cotyledons was observed in both immature and mature beans. (AS)

0364

28641 PESACRETA, T.C.; LUCAS, W.J. 1985. Presence of a partially-coated reticulum in angiosperms. Protoplasma 125(3):173-184. En., Sum. En., 34 Refs., Il. [The Biological Laboratories, Harvard Univ., 16 Divinity Ave., Cambridge, MA 02138, USA]

Phaseolus vulgaris. Cytology. Leaves. Roots. USA.

The form and distribution of partially-coated membrane systems and coated vesicles in the leaf glands of Phaseolus vulgaris var. Red Kidney and the root cortical cells of Zea mays were investigated. Partially-coated membranes were found to exist as a reticulum which is either sparsely branched or extensively anastomosed. Coated vesicles and coated membrane regions may occur at all points that are in the vicinity of such a reticulum. Golgi stack membranes, though associated with the partially-coated reticulum in many cases, showed no consistent orientation to it. Occasionally, the reticulum and the associated coated vesicles were located away from any Golgi stack. It is suggested that membrane flow may be occurring from the partially-coated reticulum to either the Golgi stack or to other intracellular compartments. (AS (extract))

0365

27728 TICHA, I.; CATSKY, J. 1986. Leaf architecture and net photosynthetic rate during ontogeny of primary French bean leaves. In Marcelle, R.; Clijsters, H.; Van Poucke, M., eds. Biological control of photosynthesis; proceedings of a conference, Diepenbeek, Belgium, 1985. Dordrecht, Netherlands, Martinus Nijhoff Publishers. pp.209-217. En., Sum. En., 27 Ref., Il. [Inst. of Experimental Botany, Czechoslovak Academy of Sciences, 160 00 Praha 6, Flemingovo nám. 2, Czechoslovakia]

Phaseolus vulgaris. Leaves. Plant anatomy. Leaf area. Stomata. Photosynthesis. CO2. Czechoslovakia.

Anatomical characteristics of primary bean leaves (cv. Jantar and Harzgruss) were followed during leaf ontogeny to evaluate how changes in leaf structure may limit the photosynthetic performance of the leaf. During leaf development the leaf area, mesophyll thickness, and internal leaf surface area increased to a max. size. The mean distance of chloroplasts from the cell wall surface increased to a max. on about the 5th day after leaf unfolding, followed by a slow decline. Stomata density decreased whereas stomata sizes increased during leaf ontogeny. These changes were reflected in changes in the conductances for CO2 transfer calculated from the anatomical parameters: thus, the intracellular conductance decreased shortly after leaf unfolding and increased slowly thereafter; stomatal conductance increased to a max. on about the 5th day after leaf unfolding and then slowly decreased. The comparison of the ontogenetic course of net photosynthetic rate (a rapid increase after leaf expansion to a max. followed by a slow decrease in senescent leaves) with that of the anatomical characteristics showed that the compact leaf structure (tightly packed mesophyll cells, small intercellular spaces) of the young leaf might limit the CO2 supply to photosynthetic centers. (AS)

0366

27794 YAÑEZ J., P.; PIMIENTA, E.; MARK, E.; KOHASHI, J. 1984. Comparative anatomy of flower buds with and without potential for abscission in

Phaseolus vulgaris. Turrialba 34(4):431-435. En., Sum. Es., En., 18 Ref., Il. [Centro de Botánica, Colegio de Postgraduados, 56230 Chapingo, México]

Phaseolus vulgaris. Ovules. Abscission. Mexico.

In anatomical comparisons, ovules from flower buds of beans with high potential for abscission showed a high percentage (96 percent) of anatomical abnormalities and irregularities in the development of the embryo sac. In contrast, few ovules from flowers with low potential for abscission (31 percent) were abnormal. The following anatomical abnormalities were identified: necrosis of embryo sac and nucellus, absence or delayed development of embryo sac. These and other observations suggest that abscission of the flower buds is related to previously developed abnormalities in the ovules. (AS)

C00 PLANT PHYSOLOGY

0367

27491 BEGGS, C.J.; STOLZER-JEHLE, A.; WELLMANN, E. 1985. Isoflavonoid formation as an indicator of UV stress in bean (Phaseolus vulgaris L.) leaves. Plant Physiology 79(3):630-634. En., Sum. En., 30 Ref., Il. [Biologisches Inst. II, Universitat Freiburg, Schanzlestrasse 1, D-7800 Freiburg, West Germany]

Phaseolus vulgaris. Leaves. Plant pigments. Radiation.

Induction of the isoflavonoid pigment, coumestrol, in primary leaves of bean var. Saxa by UV radiation was used as a quantifiable marker for UV damage to a plant system. Coumestrol was induced only by wavelengths below 300 nm and its formation could be reversed by treatment with white, but not red light after the UV irradition period. Formation of coumestrol by UV could also be prevented over a period of 14 h by simultaneous irradiation with blue light provided that the blue fluence rate was high enough. The results suggest that coumestrol formation is mediated via UV- induced pyrimidine dimer formation in the plant DNA and the photorepair properties of blue light are discussed with respect to possible increases in solar UV due to stratospheric O3 depletion. (AS)

0368

28036 BERG, V.S.; HSIAO, T.C. 1986. Solar tracking: light avoidance induced by water stress in leaves of kidney bean seedlings in the field. Crop Science 26(5):980-986. En., Sum. En., 22 Ref., Il. [Biology Dept., Univ. of Northern Iowa, Cedar Falls, IA 50614, USA]

Phaseolus vulgaris. Leaves. Solar radiation. Photosynthesis. Irrigation. Water stress. Light. Tropisms. USA.

Solar tracking by unifoliolate leaves of small red kidney bean seedlings was studied in the field (Davis, California, USA) in the summer, using a simple solar-foliar inclinometer to measure the angle between the leaf surface and the sun rays. Changes in leaf orientation increased light interception in the morning and late afternoon, while reducing light interception at midday. Light avoidance occurred even in well-watered plants, but was more marked for plants growing in drier soil. Light avoidance was also observed under diffused but directional light in a growth chamber, where changes in leaf angle were proportional to changes in shoot water potential factors. Temp. differences between leaves of tracking plants in well-watered soil and those in drier soil were small due to the compensating change in light interception. Holding leaves horizontal increased leaf temp. in the hottest part of the day slightly above those of tracking leaves for well-watered plants, but considerably more for plants

0358

28254 ACOSTA G., J.; GUERRERO R., E. 1979. Caracterización agronómica de especies silvestres y cultivadas de los géneros Phaseolus y Vigna en Durango. (Agronomic description of wild and cultivated species of the genera Phaseolus and Vigna in Durango). Proceedings of the Tropical Region American Society for Horticultural Science 23:224-228. Es., Sum. Es., En., 10 Ref.

Phaseolus vulgaris. Phaseolus acutifolius. Phaseolus coccineus. Germplasm. Flowering. Maturation. Yields. Yield components. Resistance. Epilachna varivestis. Mexico.

In 1977 a field survey was initiated in Durango, Mexico, with a group of wild and cultivated species of the genera Phaseolus and Vigna, collected in different parts of the country. These were grouped into annuals (P. acutifolius, V. mungo, and V. unguiculata) and perennials (P. coccineus and P. ritensis). Those of major importance belonged to the species P. acutifolius and P. coccineus and can be used as a complementary crop to P. vulgaris or as parents in a crossbreeding program. (AS (extract))

0359

28276 BEBOUCK, D.G. 1985. Recolección de germoplasma nativo de Phaseolus. (Collection of native Phaseolus germplasm). Revista Industrial y Agrícola de Tucumán 62(1):155-159. Es., Sum. En. [Estación Experimental Agro-Industrial Obispo Colombres, Casilla de Correo no.9, 4101 Las Talitas, Tucumán, Argentina]

Phaseolus vulgaris. Germplasm. Geographical distribution. Argentina.

A collection trip of native Phaseolus germplasm was carried out over a 15-day period in the provinces of Jujuy, Salta, Tucumán, and Catamarca (Argentina) within the alt. range of 700-2200 m.a.s.l. Seeds of 26 wild populations of Phaseolus vulgaris var. aborigineus and of other species were collected. P. augusti was found in Tucumán for the 1st time. P. vulgaris populations adapted to both dry and humid environments were found. Several diseases and pests were recorded on populations of this species. (CIAT)

0360

28826 DEBOUCK, D.G. 1986. Primary diversification of Phaseolus in the Americas: three centres?. Plant Genetic Resources Newsletter 67:2-8. En., Sum. Fr., Es., 31 Ref., Il.

Phaseolus vulgaris. Phaseolus lunatus. Phaseolus coccineus. Phaseolus acutifolius. Phaseolus polyanthus. Center of origin. America.

The origin of 5 Phaseolus species cultivated in America (P. vulgaris, P. lunatus, P. coccineus, P. acutifolius, and P. polyanthus) is discussed within the context of a broader theory of the origin of this genus, for which 3 centers of origin may be defined: Mesoamerica, the northern and southern Andean regions. Most of their considerations have an archaological or botanical origin, but recent genetic and biochemical research works are also mentioned. (AS-CIAT)

0361

28298 GEPTS, P.; OSBORN, T.C.; RASHKA, K.; BLISS, F.A. 1986. Phaseolin-protein variability in wild forms and landraces of the cormon bean (Phaseolus vulgaris): evidence for multiple centers of domestication.

Economic Botany 40(4):451-468. En., Sum. En., 35 Ref., Il. [Dept. of Botany & Plant Sciences, Univ. of California, Riverside, CA 92521, USA]

Phaseolus vulgaris. Germplasm. Seed. Analysis. Proteins. USA.

A sample of 106 wild forms and 99 landraces of common bean from Middle America and the Andean region of South America was screened for variability in phaseolin seed protein using 1-dimensional SDS-polyacrylamide gel electrophoresis and 2-dimensional isoelectric focusing SDS-polyacrylamide gel electrophoresis. The Middle American wild forms exhibited phaseolin patterns similar to the 'S' pattern described previously in cultivated forms, as well as a wide var. of additional banding patterns such as 'M' (Middle America) types, not encountered among common bean cv. The Andean wild forms showed only the 'T' phaseolin pattern, also described previously among cultivated forms. Landraces from Middle America showed 'S' or 'S'-like patterns except for 2 lines with 'T' phaseolin. In Andean South America, a majority of landraces had the 'T' phaseolin. Additional types represented in that region were (in decreasing order of frequency) the 'S' and 'C' types (already described among cultivated forms) as well as the 'H' (Huevo de huanchaco) and 'A' (Ayacucho) types, which are new patterns previously undescribed among wild and cultivated beans. In each region (Middle America and Andean South America) the seeds of landraces with 'T' phaseolin were significantly larger than those of landraces with 'S' phaseolin. No significant differences in seed size were observed among landraces with 'T', 'C', 'H', and 'A' phaseolin types of the Andean region. Data favor 2 primary areas of domestication, one in Middle America leading to small-seeded cv. with 'S' phaseolin patterns and the other in the Andes giving rise to large-seeded cv. with 'T' (and possibly 'C', 'H', and 'A') phaseolin patterns. (AS) See also 0630

B00 PLANT ANATOMY, MORPHOLOGY AND CYTOLOGY

0362

28648 GAPOCHKA, G.P.; CHAMARA, L.P. 1985. Sporoderm development in Phaseolus vulgaris L. and Ph. coccineus L. Moscow University Biological Sciences Bulletin 39(2):22-26. En., Sum. En., 6 Ref., Il.

Phaseolus vulgaris. Pollen. Cell structure.

The development of pollen-grain membranes in Phaseolus vulgaris and P. coccineus was found to differ from that of previously studied representatives of leguminous plants. The endexine is formed almost simultaneously with the matrix of the primexine. The sporoderm consists of an ectexine, a mesexine, an endexine, and an intine. (AS)

0363

28654 HUGHES, J.S.; SWANSON, B.G. 1985. Microstructural changes in maturing seeds of the common bean (Phaseolus vulgaris L.). Food Microstructure 4(2):183-189. En., Sum. En., 20 Ref., Il. [Dept. of Food Science & Human Nutrition, Washington State Univ. 375 Clark Hall, Pullman, WA 99164-6330, USA]

Phaseolus vulgaris. Seed coat. Cotyledons. Electron microscopy. Cell structure. USA.

Seeds of Phaseolus vulgaris beans were collected at weekly intervals throughout maturation and examined by scanning electron microscopy. No major structural changes were observed on the surface of the seed coat during the 7-wk. study period. A cross-sectional examination of the seed coat revealed a substantial increase in thickness of the parenchyma cell layer in young seeds followed by a dramatic decrease in thickness as the

with lower water potentials. When leaves were held horizontal, water potentials were lower at midday and in early afternoon than they were for tracking leaves. Photosynthesis was enhanced at midday in both wet and dry treatments for leaves held horizontal. At 1600 h horizontal leaves of plants in both treatments, and tracking leaves of plants in the dry treatment, photosynthesized at a low rate, although tracking leaves intercepted more light. Tracking leaves of plants in the wet treatment assimilated at a substantially higher rate. (AS)

0369

28517 BOLWELL, G.P.; CRAMER, C.L.; LAMB, C.J.; SCHUCH, W.; DIXON, R.A. 1986. L-phenylalanine ammonia-lyase from Phaseolus vulgaris: modulation of the levels of active enzyme by trans-cinnamic acid. Planta 169(1):97-107. En., Sum. En., 35 Ref., Il. [Dept. of Biochemistry, Royal Holloway & Bedford New College, Univ. of London, Egham Hill, Egham, Surrey TW20 0EX, England]

Phaseolus vulgaris. Enzymes. United Kingdom.

The extractable activity of L-phenylalanine ammonia-lyase in cell suspension cultures of bean is greatly induced following exposure to an elicitor preparation from the cell walls of the phytopathogenic fungus Colletotrichum lindemuthianum. Following exogenous application of trans-cinnamic acid (the product of the L-phenylalanine ammonia-lyase reaction) to elicitor-induced cells, the activity of the enzyme rapidly declines. Loss of enzyme activity is accompanied by inhibition of the rate of synthesis of L-phenylalanine subunits, as determined by ((35)S)met. pulse-labelling followed by specific immunoprecipitation; this is insufficient to account for the rapid loss of L-phenylalanine enzyme activity. Pulse-chase and immune blotting expt. indicate that cinnamic acid does not affect the rate of degradation of enzyme subunits, but rather mediate inactivation of the enzyme. A non-dialyzable factor from cinnamic acid-treated bean cells stimulates removal of L-phenylalanine activity from enzyme extracts in vitro; this effect is dependent on the presence of cinnamic acid. Such loss of enzyme activity in vitro is accompanied by an apparent loss or reduction of the dehydroalanine residue of the active site of the enzyme as detected by active site-specific tritiation, although levels of immunoprecipitable enzyme subunits do not decrease. (AS (extract))

0370

26813 CHOUDHURY, B.J.; MONTEITH, J.L. 1986. Implications of stomatal response to saturation deficit for the heat balance of vegetation. Agricultural and Forest Meteorology 36(3):215-225. En., Sum. En., 14 Ref., Il. [Hydrological Sciences Branch, NASA/Goddard Space Flight Center, Greenbelt, MD 20771, USA]

Phaseolus vulgaris. Transpiration. Stomata. USA.

The Penman-Monteith equation for transpiration from a uniform stand of vegetation was extended to include the response of stomata to the saturation deficit of air in the canopy. The implications for the relationship between transpiration rate and saturation deficit measured at some reference height above the stand, where the saturation deficit is assumed to be independent of the exchange of heat and vapor between the atmosphere and the surface, were examined. Calculations for arable crops (among them Phaseolus vulgaris) and for deciduous and coniferous forest species show the extent to which transpiration rate is overestimated when the stomatal response to saturation deficit and the vertical gradient of saturation deficit are ignored. (AS)

0371

27492 COLE, D.J.; LOUGHMAN, B.C. 1984. Transformation of phenoxyacetic acid herbicides by Phaseolus vulgaris L. callus cells. Plant Cell Reports 3(1):5-7. En., Sum. En., 11 Ref., Il. [Dept. of Agricultural & Forest Sciences, Univ. of Oxford, Parks Road, Oxford, OX1 3PF, England]

Phaseolus vulgaris. Herbicides. Metabolism. United Kingdom.

The auxin herbicide MCPA was absorbed by liquid-cultured callus cells of Phaseolus vulgaris and subsequently became hydroxylated at the methyl group. The alcohol remained largely unconjugated and was partly released to the culture medium. Several glycosides and an ether-soluble conjugate of MCPA appeared as minor metabolites. Unsubstituted phenoxyacetic acid was metabolized primarily by 4-hydroxylation and subsequent phenolic glucoside formation. Metabolites of phenoxyacetic acid were retained by the cells. In the case of both substrates, metabolism in cells correlated well with that observed in apical buds excised from etiolated seedlings. (AS)

0372

28660 DE VILLIERS, O.T.; KOCH, H.M. 1985. The effect of the herbicide chlorsulfuron on photochemical reactions in isolated chloroplasts of Phaseolus vulgaris. South African Journal of Botany 51(4):262-264. En., Sum. En., Af., 17 Ref. [Dept. of Agronomy & Pastures, Univ. of Stellenbosch, Stellenbosch, 7600 Republic of South Africa]

Phaseolus vulgaris. Chloroplasts. Carbon fixation. Herbicides. Nutrient transport. South Africa.

The effect of chlorsulfuron on different photochemical reactions was studied in isolated chloroplasts of kidney beans. Chlorsulfuron (10(-4) mol/dm(3)) inhibited both cyclic and noncyclic photophosphorylation and CO2 fixation by 15, 22, and 17 percent, resp., and stimulated electron transport by 10 percent. Although chlorsulfuron at high concn. functioned as an uncoupler of photophosphorylation in chloroplasts, it did not operate primarily as an inhibitor of photosynthesis. (AS)

0373

28065 FISCUS, E.L. 1986. Diurnal changes in volume and solute transport coefficients of Phaseolus roots. Plant Physiology 80(3):752-759. En., Sum. En., 29 Ref., Il. [United States Dept. of Agriculture, Agricultural Research Service, Crops Research Laboratory, Colorado State Univ., Fort Collins, CO 80523, USA]

Phaseolus vulgaris. Roots. Nutrient transport. USA.

Vol. and solute fluxes through Phaseolus vulgaris root systems were observed over a 24-h period. The vol. flux was varied in a pressure chamber by altering the hydrostatic pressure in 10 steps, from 0 to 0.41 MPa. All root systems showed strong diurnal peaks in vol. flux. The 5 transport coefficients were estimated from a nonlinear least squares algorithm. Analysis of the data revealed that all the coefficients exhibited a diurnal rhythm. When the total differential of the vol. flux was considered, it was possible to show that the diurnal changes in vol. flux were due to a complex interaction between the diurnally shifting coefficients with the role of each highly dependent on the level of vol. flux. (AS (extract))

0374

27797 GERRISH, C.; ROBBINS, M.P.; DIXON, R.A. 1985. Trans-cinnamic acid as a modulator of chalcone isomerase in bean cell suspension cultures. Plant Science 38(1):23-27. En., Sum. En., 17 Ref., Il. [Dept. of Biochemistry,

Royal Holloway College, Univ. of London, Egham Hill, Egham, Surrey, TW20 0EX, England]

Phaseolus vulgaris. Enzymes. Colletotrichum lindemuthianum. Cell walls. United Kingdom.

Trans-cinnamic acid, but not the biosynthetically related 4-coumaric and ferulic acids, induced an increase in the extractable activity of chalcone isomerase in cell suspension cultures of Phaseolus vulgaris. The kinetics of isomerase induction in response to 0.001 molar cinnamic acid were similar to those observed following exposure of cell cultures to a fungal elicitor preparation; however, extractable activity of L-phenylalanine ammonia-lyase was markedly decreased by cinnamic acid in contrast to its induction by elicitor. Treatment of elicited cell cultures with L-alpha-aminooxy-beta-phenylpropionic acid, a potent inhibitor of phenylalanine ammonia-lyase, and therefore cinnamic acid production in vivo, resulted in superinduction of extractable lyase activity but reduced extractable isomerase activity. Aminooxyphenylpropionic acid does not inhibit chalcone isomerase activity in vitro. The results suggest that cinnamic acid plays a role in the induction of chalcone isomerase in vivo; these findings are discussed in the context of recent evidence for the induced synthesis of both active and inactive forms of the isomerase in elicitor-treated cell cultures. (AS)

0375

27493 GORING, H.; KOSHUCHOWA, S.; MUNNICH, H.; DIETRICH, M. 1984. Stomatal opening and cell enlargement in response to light and phytohormone treatments in primary leaves of red-light-grown seedlings of Phaseolus vulgaris L. Plant and Cell Physiology 25(5):683-690. En., Sum. En., 18 Ref., Il. [Humboldt Univ., Section of Biology, Dept. of Plant Physiology, Invalidenstrasse 42, 1040 Berlin, German Democratic Republic]

Phaseolus vulgaris. Leaves. Light. Cell division. Growth. Stomata. Cytokinins. Gibberellins. German Democratic Republic.

Cell enlargement in primary leaves of bean seedlings, grown for 10 days in dim red light, in response to different light and phytohormone treatments was studied. On day 10, bean leaf discs were floated on 1 percent sucrose with, or without, phytohormones for different periods (up to 24 h) under dim red light, or discs were floated in sucrose solution and irradiated with white or blue light. Cell enlargement was enhanced by continuous white and blue light and by benzyladenine, kinetin, and GA. When seedlings were grown for 8 days under dim red light after which a 2-day dark period was interposed (for the accumulation of inactive phytochrome), cell enlargement was enhanced by a 5-min irradiation with red light. This growth induction was far-red reversible. The conditions under which cell enlargement was promoted, also induced the opening of the stomata. Red light induced a far-red reversible transient stomatal opening. Based on the kinetics of stomatal opening and cell enlargement, the hypothesis was formulated that cell enlargement in leaves in response to light and phytohormones is mediated by the stomatal response to these factors. (AS)

0376

28643 GRANGE, A.; MIEGE, M.N.; MANEN, J.F.; MIEGE, J. 1980. Vieillissement des graines de Phaseolus vulgaris (L.) var. contender. 2. Effects sur les BAPAses et les inhibiteurs de trypsine. (Senescence of seeds of Phaseolus vulgaris cv. Contender. 2. Effects of BAPAses and trypsin inhibitors). Physiologie Vegetale 18(4):587-596. Fr., Sum. Fr., En., 27 Ref., Il.

Phaseolus vulgaris. Seed. Enzymes. Inhibitors.

BAPAses (enzymes hydrolyzing alpha-N-benzoyl-DL-arginine-p nitroanilide) and trysin inhibitors were studied in kidney beans stored for 3 yr at (a) 2 degrees Celsius and 30 percent RH, (b) 22 degrees Celsius and 0-5 percent RH, or (c) 22 degrees Celsius and 60 percent RH. The 2 pH optima of the enzymes, 5.0-5.5 and 7.5-9.5, were not affected by aging. In treatment (b), loss of enzyme activity occurred in 2 distinct stages whereas in (c), activity decreased rapidly during the 1st 6 mo. and then increased markedly. Reasons for these changes are suggested. TIA also decreased in (b) and (c), but less than BAPAse activity. No changes occurred in (a). (AS)

0377

28041 GREER, D.H.; BERRY, J.A.; BJORKMAN, O. 1986. Photoinhibition of photosynthesis in intact bean leaves: role of light and temperature, and requirement for chloroplast-protein synthesis during recovery. Planta 168(2):253-260. En., Sum. En., 15 Ref., Il. [Dept. of Plant Biology, Carnegie Inst. of Washington, Stanford, CA 94305, USA]

Phaseolus vulgaris. Photosynthesis. Light. Temperature. Inhibitors. USA.

Photoinhibition of photosynthesis was induced in intact leaves of Phaseolus vulgaris grown at a photon flux density of 300 micromols/square meter/s, by exposure to a photon flux density of 1400 micromols/square/square/s. Subsequent recovery from photoinhibition was followed at temp. ranging from 5 to 35 degrees Celsius and at a photon flux density of either 20 or 140 micromols/square meter/s or in complete darkness. Photoinhibition and recovery were monitored mainly by chlorophyll fluorescence emission at 77 K but also by photosynthetic O2 evolution. The effects of the protein-synthesis inhibitors, cycloheximide and chloramphenicol, on photoinhibition and recovery were also determined. The results demostrate that recovery was temp.-dependent with rates slow below 15 degrees Celsius and optimal at 30 degrees Celsius. Light was required for max. recovery but the process was light-saturated at a photon flux density of 20 micromols/square meter/s. Chloramphenicol, but not cycloheximide, inactivated the repair process, indicating that recovery involved the synthesis of 1 or more chloroplast-encoded proteins. With chloramphenicol, it was shown that photoinhibition and recovery occurred concomitantly. The temp.-dependency of the photoinhibition process was, therefore, in part determined by the effect of temp. on the recovery process. Consequently, photoinhibition is the net difference between the rate of damage and the rate of repair. The susceptibility of chilling-sensitive plant species to photoinhibition at low temp. is proposed to result from the low rates of recovery in this temp. range. (AS)

0378

27472 HAVAUX, M.; LANNOYE, R. 1985. Effects of dehydration on the photochemical function of thylakoids in bean leaves. Photosynthetica 19(3):388-396. En., Sum. En., 36 Ref., Il. [Laboratoire de Physiologie Végétale, Université Libre de Bruxelles, 28 Avenue Paul Heger, B-1050 Bruxelles, Belgium]

Phaseolus vulgaris. Leaves. Water stress. Photosynthesis. Belgium.

Discs of bean leaves were subjected to rapid desiccation in air for 4 h and the effects of leaf dehydration on the photochemical apparatus were examined. Water-stressed leaves showed a 70 percent decrease in the quantum yield of photosynthetic O evolution. Desiccation resulted in drastic changes in the shape of the in vivo chlorophyll fluorescence induction curves. In addition to the depression of the variable fluorescence amplitude, the slow fluorescence quenching rates were spectacularly decreased after the desiccation treatment. Simultaneous measurements of

chlorophyll fluorescence at 683 nm (photosystem 2) and at 770 nm (photosystem 1) suggested that alterations in the slow fluorescence induction transients were partly due to inhibition of the state 1-state 2 transition phenomenon. Temp. vs. in vivo delayed light emission curves have indicated changes in the physical properties of thylakoid membrane lipids, which could explain this inhibition of the state 1-state 2 transitions by water stress. (AS (extract))

0379

28280 HOLMES, M.G.; KLEIN, W.H. 1986. Photocontrol of dark circadian rhythms in stomata of Phaseolus vulgaris L. Plant Physiology 82(1):28-33. En., Sum. En., 28 Ref., Il. [Botany School, Univ. of Cambridge, Downing Street, Cambridge CB2 3EA, England]

Phaseolus vulgaris. Leaves. Stomata. Photoperiod. USA.

Stomatal diffusion resistance in primary leaves of Phaseolus vulgaris that had been grown in light:dark cycles followed a marked circadian rhythm'when the plants were transferred to continuous darkness. Reentrainment of the rhythm required more that 1 inductive change in photoperiod. The phasing of the rhythm of dark stomatal opening was controlled primarily by the light-on (dawn) signal, whereas the rhythm of dark closure was related to the light-off (dusk) signal. The evidence points to a dual control of the circadian clock in which a product of photosynthesis plays a major role. No evidence for phytochrome involvement in the phasing of the rhythm was found. An influence of phytochrome on the amplitude of the stomatal rhythm was observed in which removal of phytochrome-far-red absorbing form caused rapid damping. (AS)

0380

28622 HOLMES, M.G.; SAGER, J.C.; KLEIN, W.H. 1986. Sensitivity to far-red radiation in stomata of Phaseolus vulgaris L.: rhythmic effects of conductance and photosynthesis. Planta 168(4):516-522. En., Sum. En., 20 Ref., Il. [Dept. of Botany, Univ. of Cambridge, Downing Street, Cambridge CB2 3EA, England]

Phaseolus vulgaris. Radiation. Stomata. Photosythesis. United Kingdom.

The influence of far-red (700-800 nm) radiation on steady-state stomatal conductance and net photosynthesis in Phaseolus vulgaris was studied. Whereas far-red radiation alone was relatively ineffective, addition of far-red to a background of white light (predominantly 400-700 nm) resulted in increased stomatal conductance. Stomata exhibited a marked diurnal sensitivity to far-red. The action max. for enhancing stomatal conductance was near 714 nm. A combination of far-red and infrared (over 800 nm) enhanced net photosynthesis when added to a background of white light. When infrared alone was added to white light, there was a net decrease in photosynthesis, indicating that it is the far-red waveband that is responsible for the observed photosynthetic effects. Naturally occurring levels of far-red radiation (235 micromols/square meter/s) in vegetation-canopy shade enhanced net photosynthetic CO2 gain by 28 percent when added to a background of 55 micromols/square meter/s white light. (AS)

0381

27494 HOREMANS, S.; VAN ONCKELEN, H.A.; DE GREEF, J.A. 1984. Phytochrome control mechanisms in leaf expansion of Phaseolus vulgaris cv. Limburg. Plant, Cell and Environment 7(5):309-315. En., Sum. En., 41 Ref., Il. [Dept. of Biology, Univ. of Antwerpen, UIA, Universiteitsplein 1, B-2610 Wilrijk, Belgium]

Phaseolus vulgaris. Leaves. Cell division. Growth. Light. Belgium.

The effectiveness of a red-light pulse acting through phytochrome in inducing primary leaf expansion in 9-day-old etiolated bean cv. Limburg seedlings is strongly increased by a continuous far-red light pretreatment. This increase in effectiveness of a red pulse is positively correlated with the time and the fluence rate of the continuous far-red light pretreatment. When a dark period is interposed between the end of the continuous far-red light pretreatment and the inductive red pulse, the photoreversible part of the response to this pulse is highly dependent upon the photostationary state of phytochrome at the onset of the dark period. The results give strong evidence for the synergistic activity of 2 components of phytochrome action during leaf growth induction, one of them acting via a very stable fraction of the far-red absorbing form of phytochrome. (AS)

0382

27461 HOSOKAWA, Y.; KIYOSAWA, K. 1985. Diurnal Rb(+) transport from roots to the laminar pulvinus in Phaseolus vulgaris L. Annals of Botany 55(2):195-200. En., Sum. En., 12 Ref., Il. [Dept. of Biophysical Engineering, Faculty of Engineering Science, Osaka Univ. Toyonaka, Osaka 560, Japan]

Phaseolus vulgaris. Nutrient transport. Rb. Photoperiod. Transpiration. Leaves.

The Rb(+) transport from roots to the pulvinus in kidney bean plants was studied. The primary leaves were observed to open under light and close in the dark by the deformation of the pulvinus resulting from diurnal distribution changes of K(+), Cl(-), organic acid (or H(+)) and NO3(-). When Rb(+) was added as a tracer of K(+) to the seedlings through their roots, it was transported to the pulvinus cells during the light period but not during the dark period. Transpiration occurred vigorously in the light but almost stopped in the dark. It was concluded that Rb(+) absorbed by the roots was carried to the pulvinus by the transpiration stream. (AS)

0383

28051 HUNGRIA, M.; NEVES, M.C.P. 1986. Efeito da manipulacao de fotossintatos na fixacao biológica de nitrogenio em feijoeiro. (Effect of photosynthate manipulation on biological nitrogen fixation in beans). Pesquisa Agropecuária Brasileira 21(1):9-24. Pt., Sum. Pt., En., 59 Ref., Il. [Empresa Brasileira de Pesquisa Agropecuária, Unidade de Apoio ao Programa Nacional de Pesquisa em Biologia do Solo, Caixa Postal 23460, Seropédica-RJ, Brasil]

Phaseolus vulgaris. Defoliation. Flowers. Nitrogen fixation. C. Translocation. N. Leaves. Podding. Brazil.

Two expt. were performed under greenhouse conditions to investigate the effect of the availability of C to the nodules on biological N fixation in common bean plants. Removal of flowers initially increased nitrogenase activity, relative efficiency of electrons for nitrogenase, and rate of N translocation in the xylem sap, but within 10 days all these parameters decreased due to an acceleration of nodule senescence. The removal of 50 percent of the leaves at flowering decreased nitrogenase activity, relative efficiency of electrons for nitrogenase, and N translocation in the xylem sap, but after 10 days the plants began to recover in these parameters due to the production of new leaves; this did not happen when the leaves were removed at mid-pod filling stage. The stem ringing, hampering translocation of photosynthates to the nodules, decreased nitrogenase activity, relative efficiency of electrons for nitrogenase,

and N transport in xylem sap, but the decrease in nitrogenase activity occurred 24 h after ringing, indicating that in bean roots there is a considerable quantity of stored substrates for N2 fixation. (AS)

0384

28659 KIRALY, I.; JAKUCS, E.; RACZ, I.; TAMAS, L.; LASZTITY, D. 1985. Effect of the fungicide fenitropan on the metabolism of some higher plants and Fusarium oxysporum. Pesticide Science 16(1):1-9. En., Sum. En., 19 Ref., Il. [Dept. of Microbiology, Eotvos Univ., H-1445 Budapest, P.O.B. 324, Hungary]

Phaseolus vulgaris. Fungicides. Photosynthesis. Plant respiration. RNA. Proteins. Hungary.

The effect of fenitropan ((1RS, 2RS)-2-nitro-1-phenyltrimethylene di(acetate)), a new fungicide from EGYPT Pharmacochemical Works, on the photosynthetic activity, respiration, RNA content, and protein synthesis of some higher plants, among them Phaseolus vulgaris, and Fusarium oxysporum was investigated. The effect on the aminoacylation of tRNAs suggests that fenitropan is an inhibitor of the aminoacyl tRNA ligases accepting aromatic amino acids. (AS)

0385

27750 KONDRACKA, A.; MALESZ.WSKI, S. 1986. Effect of oxygen on photosynthesis in bean (Phaseolus vulgaris L.) leaves at elevated carbon dioxide concentration. In Marcelle, R.; Clijsters, H.; Van Poucke, M., eds. Biological control of photosynthesis; proceedings of a conference, Diepenbeek, Belgium, 1985. Dordrecht, Netherlands, Martinus Nijhoff Publishers. pp.127-134. En., 36 Ref., Il.

Phaseolus vulgaris. Leaves. CO2. Photosynthesis. O. Netherlands.

The effect of O concn. on the assimilated C metabolism during photosynthesis in beans, carried out at elevated CO2 concn., was studied. Special attention was given to the changes in the intermediate metabolites of the glycolic acid pathway and in the final products of photosynthesis. Five-fold elevation of the CO2 concn. (up to 60 mmols/cubic meter) resulted in a 50 percent increase in the photosynthesis rate measured at lowered O2 concn. (0.8 mol/cubic meter). During photosynthesis in bean leaves at elevated CO2 concn. the stimulating effect of O2 on malate production was eliminated. O stimulated the assimilated C outflow from the pools of the Calvin cycle metabolites to those of soluble sugars and of glycolic acid pathway compounds. (CIAT)

0386

28275 LALORAYA, M.M.; NOZZOLILLO, C.; PUROHIT, S.; STEVENSON, L. 1986. Reversal of abscisic acid-induced stomatal closure by trans-cinnamic and p-coumaric acid. Plant Physiology 81(1):253-258. En., Sum. En., 25 Ref., Il. [Dept. of Life Sciences, Devi Anilya Vishwavidyalaya, Indore, India]

Phaseolus vulgaris. Stomata. Leaves. Plant growth substances. India.

ABA-induced increase in stomatal diffusive resistance in excised leaves of bean cv. Pencil Pod and maize is inhibited by low concn. of trans-cinnamic acid (1 micromolar) and p-coumaric acid (10 micromolar) when given together with ABA (10 micromolar) in the transpiration stream through the cut end of the petiole or leaf blade. A concn. effect is observed both in the ABA action and its reversal by phenolic acids. Leaves having attained a high diffusive resistance in ABA solution recover rapidly when transferred to water. In the presence of trans-cinnamic acid (10 micromolar) and p-coumaric acid (10 micromolar) K(+) is retained in the guard cells with open

stomata. The dark closure of stomata is also inhibited by trans-cinnamic acid and p-coumaric acid. It is suggested that these phenolic acids may inhibit the ABA effect by competing with or acting on some ABA-specific site, probably located on the plasma membrane, regulating flux of K(+) ions. (AS (extract))

0387

28067 MARKHART III, A.H. 1985. Comparative water relations of Phaseolus vulgaris L. and Phaseolus acutifolius Gray. Plant Physiology 77:113-117. En., Sum. En., 22 Ref., Il. [Dept. of Horticultural Science & Landscape Architecture, Univ. of Minnesota, St. Paul, MN 55108, USA]

Phaseolus vulgaris. Phaseolus acutifolius. Water stress. Irrigation. Leaf area. Resistance. Drought. Osmotic potential. Rooting. Stomata. Water absorption. USA.

Leaf area expansion, dry wt., and water relations of Phaseolus vulgaris and P. acutifolius were compared during a drying cycle in the greenhouse to understand the characteristics that contribute to the superior drought tolerance of P. acutifolius. Stomates of P. acutifolius closed at a much higher water potential than those of P. vulgaris, delaying dehydration of leaf tissue. P. acutifolius had a more deeply penetrating root system, which also contributes to its drought tolerance. Root:shoot ratios did not differ between the 2 species either under well-watered or water-stressed conditions. Leaf osmotic potential was also similar in the 2 species, with no apparent osmotic adjustment during water stress. These results indicate that P. acutifolius postpones dehydration and suggest that sensitive stomates and a deeply penetrating root system are characteristics which, if incorporated into cultivated beans, might increase their drought tolerance. (AS)

0388

28616 MAROWITCH, J.; RICHTER, C.; HODDINOTT, J. 1985. The influence of plant temperature on photosynthesis and translocation rates in bean and soybean. Canadian Journal of Botany 64(10):2337-2342. En., Sum. En., Fr., 23 Ref., Il. [Dept. of Botany, Univ. of Alberta, Edmonton, Alta., T6G 2E9, Canada]

Phaseolus vulgaris. Temperature. Photosynthesis. Translocation. C. Canada.

Phaseolus vulgaris cv. Black Valentine and Glycine max cv. Maple Arrow and Evans were grown at 20 degrees Celsius. They were pruned to a simple source-sink system and placed in a steady-state (14)C-labelling system, where their photosynthesis and translocation rates were determined at the growth temp. The temp. of each plant was then raised or lowered and the rates were measured again. All 3 var. showed net photosynthesis optima near the growth temp. Translocation rates increased sigmoidally from 5 to 35 degrees Celsius in P. vulgaris, giving a decreasing Q10 value. Rates were suboptimal at the highest temp. used. Plants grown at 30 degrees Celsius and exposed to higher or lower temp. responded in parallel to the plants grown at 20 degrees Celsius. When grown at 12.5 degrees Celsius and exposed to higher temp., the plants responded in parallel to the ones grown at 20 degrees Celsius. (AS (extract))

0389

28066 MAUK, C.S.; BREEN, P.J. 1986. Partitioning of (14)C-photosynthate among competing sinks during flowering and early fruiting in snap bean. Journal of the American Society for Horticultural Science 111(3):416-421. En., Sum. En., 28 Ref., Il. [Dept. of Horticulture, Oregon State Univ., Corvallis, OR 97331, USA]

Phaseolus vulgaris. Planting. Spacing. Irrigation. Flowering. Podding. Translocation. Anthesis. USA.

The influence of irrigation and plant density on distribution of (14)C photoassimilate within the major yield contributing inflorescences (nodes 2 and 6, numbered acropetally) of field-grown snap beans during flowering and pod set was studied. Although irrigation-density effects on (14)C-partitioning were slight, the percentage of (14)C-assimilate translocated from the dosed leaf to its nearby inflorescence increased sharply at each successive sampling date. Flowers and pods at distal raceme node positions received small percentages of exported (14)C and tended to abscise, while those at proximal raceme nodes sequestered a much higher fraction of (14)C and developed mature pods. Sink intensity (the percentage of (14)C/dry wt.) of flowers at a raceme node was lowest near anthesis, peaked 3-4 days after anthesis, and then declined. Max. sink intensity of basal flowers in an axillary inflorescence lower in the canopy was twice as high as in comparable flowers of the terminal raceme. The reduced accumulation of photoassimilate and declining sink intensity in organs at distal raceme nodes may contribute to their increased rate of abscission. (AS (extract))

0390

28025 MOROHASHI, Y. 1986. Examination of the possibility of the involvement of the alternative respiration in seed germination. Journal of Experimental Botany 37(175):262-269. En., Sum. En., 11 Ref., Il. [Faculty of Agriculture, Tokyo Univ. of Agriculture & Technology, Fuchu, Tokyo 183, Japan]

Phaseolus vulgaris. Plant respiration. Mitochondria. Germination. Seeds.

The possibility that the alternative respiration is involved in seed germination was followed during and after imbibition by noting the changes in the sensitivity to the respiratory inhibitors, KCN and salicylhydroxamic acid. This was carried out by measuring O uptake of mitochondrial preparations from storage cotyledons and of the whole axis in a selection of legumes (Vigna mungo, V. radiata, V. angularis, V. sinensis, Phaseolus vulgaris, Pisum sativum, and Dolichos lablab). The extent of participation of alternative respiration in the respiration of cotyledonary mitochondria was variable according to species and time after imbibition, and varied even within the same genus (Vigna). In some species, alternative respiration was not observed. As to the axis, salicylhydroxamic acid treatment by itself had little effect on the rate of respiration, but, when applied with KCN, reduced O uptake to an extent greater than KCN treatment alone. It was suggested that alternative respiration was not necessarily important for seed germination. (AS)

0391

28048 NEUMANN, P.M.; STEIN, Z. 1986. Ion supply capacity of roots in relation to rejuvenation of primary leaves in vivo. Physiologia Plantarum 67(1):97-101. En., Sum. En., 18 Ref., Il. [Plant Physiology Laboratory, Faculty of Agricultural Engineering, Technion, Israel Inst. of Technology, Haifa 32000, Israel]

Phaseolus vulgaris. Defoliation. Ca. Mg. K. Plant age. Nutrient transport. Translocation. Photosynthesis. Growth.

Removal of the shoot above the primary node (detopping) of 3-wk.-old plants of bean cv. Contender altered the metabolism and development of the remaining leaves. An increase in levels of chlorophyll, protein, stomatal opening, photosynthesis, and growth (rejuvenation of primary leaves) was established within 7 days of detopping. These levels were maintained while the primary leaves of equivalent intact plants senesced. Root output of

ions (electrical conductivity of passive xylem exudate) in detopped plants was 30 percent lower than in intact plants after 24 h and 60 percent lower after 7 days. The output of Ca(2+), Mg(2+), and K(+) were similarly reduced 7 and 14 days after detopping as were fresh and dry wt. of roots. Furthermore, neither the calculated xylem flux of ions nor directly measured levels of Ca(2+), Mg(2+), and K(+) were significantly increased in leaves of detopped plants during their rejuvenation. It was therefore concluded that root output is tightly coupled to shoot demand and that the apparent rejuvenation of primary leaves caused by detopping bean plants is not a consequence of increased xylem flux of mineral ions into the leaves. (AS (extract))

0392

27702 NISHIZAKI, Y. 1986. Rhythmic and blue light-induced turgor movements and electrical potential in the laminar pulvinus of Phaseolus vulgaris L. Plant and Cell Physiology 27(1):155-162. En., Sum. En., 22 Ref., Il. [Faculty of General Education, Kobe Gakuin Univ., Nishi-ku, Kobe 673, Japan]

Phaseolus vulgaris. Leaves. Light. Irradiation. Plant physiology. Japan.

The relationship between the small pulvinar movements in Phaseolus vulgaris leaves and the membrane potential of the motor cell was examined as well as the effect of light on them. Blue light affected both the movements and membrane potential while red and green light of the same photon flux had little effect. The difference in the membrane potential between the extensor and flexor cells was also found to be closely related to the rhythmic turgor movement of the pulvinus. Changes in the potential difference always preceded the movement. Sequential changes of the potential difference and turgor pressure in the motor cells, including the light-induced ones, are discussed in relation to the leaf movement. (AS)

0393

27701 NOLAN, M.C.; DAVIS, B.D. 1984. A starch-agar gel method for the localization of starch hydrolyzing enzymes in the cotyledons and hypocotyls of beans. American Journal of Botany 71(1):137-141. En., Sum. En., 15 Ref., Il. [Dept. of Biological Sciences, Rutgers Univ., New Brunswick, NJ 08903, USA]

Phaseolus vulgaris. Cotyledons. Hypocotyls. Enzymes. USA.

A starch-agar gel assay was developed for the localization of enzyme activity in the cotyledons and hypocotyls of beans. The 4 major starch hydrolyzing enzymes (alpha-amylase, beta-amylase, debranching enzyme, and phosphorylase) were assayed with this technique using gels containing different substrates and buffers. Hypocotyls and cotyledons were sectioned by hand and the sections were incubated on the gel for varying lengths of time. Only alpha-amylase was observed to increase significantly. While virtually absent in ungerminated axes and hypocotyls from young seedlings, it increased 1st in the basal region and subsequently in progressively higher portions of the hypocotyl. High activities were 1st observed in the pith and later in the cortex. The increased activity was most obviously associated with the degradation of the pith, suggesting a regulation relative to cellular autolysis. (AS)

0394

28287 ORTEGA, J.L.; CAMPOS, F.; SANCHEZ, F.; LARA, M. Expression of two different glutamine synthetase polypeptides during root development in Phaseolus vulgaris L. Plant Physiology 80(4):1051-1054. En., Sum. En., 20 Ref., Il. [Centro de Investigación sobre Fijación de Nitrógeno, U.N.A.M., Cuernavaca, Morelos, Apartado Postal 565-A, México]

Phaseolus vulgaris. Roots. Analysis. Enzymes. Mexico.

Immunoprecipitation and 2-dimensional gel electrophoresis of the glutamine synthetase polypeptides found during Phaseolus vulgaris root development showed that the alpha polypeptide was the main component of the enzyme in the embryo and in roots up to 5 days old. From 5 days on, the beta polypeptide became the predominant form. The alpha:beta ratio of the in vitro translocated glutamine synthetase polypeptides from the total polysomal RNA isolated at different root ages was correlated with the alpha:beta ratios of the root extracts. The results suggested that the 2 root glutamine synthetase polypeptides were coded by different mRNAs. (AS)

0395

28053 PATRICK, J.W.; JACOBS, E.; OFFLER, C.E.; CRAM, W.J. 1986. Photosynthate unloading from seed coats of Phaseolus vulgaris L. Nature and cellular location of turgor-sensitive unloading. Journal of Experimental Botany 37(180):1006-1019. En., Sum. En., 24 Ref., Il. [Dept. of Biological Sciences, Univ. of Newcastle, New South Wales, 2308, Australia]

Phaseolus vulgaris. Seed coat. Photosynthesis. Australia.

Unloading rates of (14)C-photosynthates from excised seed coat halves of Phaseolus vulgaris plants were sharply increased at cell turgor potentials in excess of 5 x 10(5) Pa. Turgor-sensitive unloading occurred in the absence of any change in the passive permeability of, and active sucrose influx across, the plasmalemma and tonoplast membranes. The proton ionophore CCCP (carbonyl cyanide m-chlorophenylhydrazone), and low temp. significantly slowed turgor-sensitive unloading while PCMBS (p-chloromercuribenzene sulphonic acid), a nonpermeating sulphydril-modifying compound was without effect. Turgor-sensitive unloading significantly depressed the (14)C-photosynthate content of the ground and branch parenchyma, but had no effect on the (14)C-photosynthate levels in the vascular tissues. Cycling of cell turgor potentials above and below 5 x 10(5) Pa elicited reproducible responses in the unloading rate of (14)C-photosynthates. Increasing turgor above 5 x 10(5) Pa resulted in a burst of (14)C-photosynthate unloading. Reversal to turgors less than 5 x 10(5) Pa caused a rapid depression in unloading rate. It is proposed that turgor-sensitive unloading is facilitated by a specific turgor-sensitive porter located on the plasmalemma of the ground and/or branch parenchyma cells of bean seed coats. (AS)

0396

28808 RACZ, I.; JAKUCS, E.; KIS-TAMAS, A.; LASZTITY, D. 1984. The effect of (plus or minus)-threo-1-phenyl-2-nitro-1,3-diacetoxy- propane on the intensity of respiration in some higher plants and Fusarium oxysporum. Acta Agronomica Academiae Scientiarum Hungaricae 33(3-4):349-352. En., Sum. En., 4 Ref., Il. [Inst. of Plant Physiology, Eotvos Lorand Univ., Budapest, Hungary]

Phaseolus vulgaris. Fungicides. Plant respiration. Hungary.

The effect of a new fungicide on the intensity of respiration in some higher plants (wheat, bean, and cucumber) and in Fusarium oxysporum was investigated. This compound, (plus or minus)-threo-1-phenyl-2-nitro-1,3-diacetoxypropane (FNDP), a member of the phenyl-nitropropane group, was developed in the Plant Protection Lab. of the EGYPT-Pharmacochemical Works (Budapest, Hungary). The compound was found to decrease the respiration of Fusarium at a concn. 2 times lower than that required for higher plants. The inhibition of respiration seems to be not a primary but a secondary effect in the case of both higher plants and Fusarium sp. (AS)

0397

28658 SALTZMAN, S.; HEUER, B. 1985. A rapid bioassay for the detection of photosynthesis inhibitors in water. Pesticide Science 16(5):457-462. En., Sum. En., 8 Ref., Il. [Inst. of Soils & Water, Agricultural Research Organisation, The Volcani Center, Bet Dagan, Israel]

Phaseolus vulgaris. Analysis. Inhibitors. Photosynthesis. Leaves. Israel.

A modified leaf disc buoyancy procedure for the detection of photosynthesis-inhibiting residues in water is described. The modifications proposed, mainly the presence of sodium hydrogen carbonate in the infiltration solution, increased the sensitivity of the method and reduced the time required. The substituted urea and 1,3,5-triazine herbicides (diuron, linuron, monuron, atrazine, ametryn, and atraton) were detected below 0.7 mg/liter using cucumber leaf discs. A concn. as low as 0.09 mg diuron/liter could be detected. Although bean cv. Bulgarian leaf tissue was less sensitive in this bioassay than cucumber, 0.3 mg diuron/liter could still be detected. The test, being very rapid (less than 30 min/determination) and relatively sensitive, could be used for the detection of photosynthesis inhibitors in recycled water used for irrigation. (AS)

0398

28038 SASAKI, K.; TAYLOR, I.E.P. 1986. myo-Inositol synthesis from (1-(3)H) glucose in Phaseolus vulgaris L. during early stages of germination. Plant Physiology 81(2):493-496. En., Sum. En., 13 Ref. [Dept. of Botany, Univ. of British Columbia, 3529-6270 Univ. Blvd., Vancouver, British Columbia, V6T 2BI, Canada]

Phaseolus vulgaris. Seed. Glucose. Hypocotyls. Roots. Cell walls. Germination. Canada.

Radiolabeled D-(1-(3)H)glucose was fed by imbibition under sterile conditions to bean seeds. After 72 and 96 h of feeding, the (3)H was located in uronic acid and pentose residues as well as hexose residues of cell wall polysaccharides in growing hypocotyl and root. Free myo-inositol present in cotyledons, hypocotyl, and root also contained (3)H, showing that de novo synthesis of myo-inositol from (1-(3)H)glucose did occur during the 1st 72 h of germination. More than 90 percent of the labeled, free myo-inositol was present in the cotyledons. The (3)H percentage in trifluoroacetic acid-soluble arabinose residues of cell wall polysaccharides from 72 h-old bean hypocotyls was only half of their mole percentage. On the other hand, (3)H percentages in hexose residues were higher than their mole percentages. The results suggest that myo-inositol is synthesized from reserve sugars during the very early stages of germination, and that the newly sythesized myo-inositol, as well as that stored in cotyledons, can be used for the construction of new hypocotyl and root cell wall polysaccharides after conversion into uronic acids and pentoses via the myo-inositol oxidation pathway. (AS)

0399

27709 SASAKI, K.; TAYLOR, I.E.P. 1984. Specific labeling of cell wall polysaccharides with myo-(2-(3)H) inositol during germination and growth of Phaseolus vulgaris L. Plant and Cell Physiology 25(6):989-997. En., Sum. En., 27 Ref., Il. [Dept. of Botany, Univ. of British Columbia, #3529-6270 Univ. Blvd., Vancouver, B.C., V6T 2B1, Canada]

Phaseolus vulgaris. Cell walls. Hypocotyl. Germination. Growth. Carbohydrate content. Roots. Canada.

myo-(2-(3)H)Inositol was fed to bean seeds by imbibition and its metabolic fate was studied during germination and seedling growth. myo-Inositol was incorporated to new cell wall polysaccharides of hypocotyl and roots, mostly as uronic acid and pentose residues. The (3)H in uronic acid and arabinose residues decreased with increasing age (0-6 cm from cotyledons) and increased in older segments (further than 6 cm from cotyledons). The results show that the myo-inositol oxidation pathway functions in growing hypocotyls and roots of bean seedlings to provide exclusively uronic acid and pentose units for cell wall synthesis. Results also show that incorporation of arabinose and uronic acids derived from myo-(2-(3)H)inositol to cell wall polysaccharides is active in 2 regions of the hypoootyl: 1st, for the construction of the primary walls in the young, growing region of the hypocotyl, and 2nd, for thickening of the walls after completion of elongation growth. (AS (extract))

0400

27706 SATO, H.; GOTOH, K. 1983. Studies on leaf orientation movements in kidney beans (Phaseolus vulgaris L.). 1. The response to light intensity and location of photo-receptor. Japanese Journal of Crop Science 52(4):515-520. En., Sum. En., Ja., 14 Ref., Il. [Sapporo College, Hokkaido Univ. of Education, Chuo-ku, Sapporo 064, Japan]

Phaseolus vulgaris. Leaves. Light. Plant physiological processes.

The relation of leaf orientation movement in kidney beans to light intensity was investigated by measuring the angles of vertical inclination of the leaflet (upward and downward movement) and of its twisting inclination (rotation on the mid-rib). Angles of the vertical inclination became larger (upwards) with the increase of the light intensity up to 10 to 40 klx and did not differ at higher light intensities. For the twisting inclination, with the increase of light intensity the adaxial surfaces of all the leaflets used turned (clockwise) larger to each central leaflet. Thus, with the increase of light intensity, the leaflet orientation was changed from more perpendicularly to the light beam to more parallelly to the beam. The difference was also recognized between cv. characterized by the 2 inclinations, regardless of light intensity. The result of an additional expt. showed that the photoreceptors were both on the pulvinule and the leaf blade. But by the photoreceptor of the leaf blade, the leaflet appeared to be moved only more perpendicularly to light beam and this response was less than that of the pulvinule. (AS)

0401

28627 SEEMANN, J.R.; SHARKEY, T.D. 1986. Salinity and nitrogen effects on photosynthesis, ribulose-1,5- bisphosphate carboxylase and metabolite pool sizes in Phaseolus vulgaris L. Plant Physiology 82(2):555-560. En., Sum. En., 23 Ref., Il. [Biological Sciences Center, Desert Research Inst., P.O. Box 60220, Reno, NV 89506, USA]

Phaseolus vulgaris. Salinity. Photosynthesis. Enzymes. USA.

Salinity (100 millimolar NaCl) was found to reduce photosynthetic capacity independent of stomatal closure in Phaseolus vulgaris. The reduction was shown to be a consequence of a reduction of the efficiency of ribulose-1,5-bisphosphate (RuBP) carboxylase (RuBPCase) rather than a reduction in the leaf content of photosynthetic machinery. In control plants, photosynthesis became RuBP-limited at approx. 1.75 moles RuBP/mole 2-carboxyarabinitol bisphosphate binding sites. Salinization caused the RuBP pool size to reach this limiting value for CO_2 fixation at much lower values of intercellular CO_2. Plants grown at low N and plus or minus NaCl became RuBP limited at similar RuBP pool size as the high N-grown plants. At limiting RuBP pool size and equal values of intercellular CO_2

photosynthetic capacity of salt-stressed plants was less than control plants. This effect of salinity on RuBPCase activity could not be explained by deactivation of the enzyme or inhibitor synthesis. Thus, salinity reduced photosynthetic capacity by reducing both the RuBP pool size by an effect on RuBP regeneration capacity and RuBPCase activity by an unknown mechanism when RuBP was limiting. (AS)

0402

28020 SHARKEY, T D. 1985. O2-Insensitive photosynthesis in C3 plants; its occurrence and a possible explanation. Plant Physiology 78(1):71-75. En., Sum. En., 32 Ref., Il. [Biological Sciences Center, Desert Research Inst., P.O. Box 60220, Reno, NV 89506, USA]

Phaseolus vulgaris. Light. Photosynthesis. CO2. O. USA.

Leaves of C3 plants that exhibit a normal O2 inhibition of CO2 fixation at less than saturating light intensity were found to exhibit O2-insensitive photosynthesis at high light. This behavior was observed in Phaseolus vulgaris, Xanthium strumarium, and Scrophularia desertorum. O2- insensitive photosynthesis has been reported in 9 other C3 species and usually occurred when the intercellular CO2 pressure was about double the normal pressure. A lack of O2 inhibition of photosynthesis was always accompanied by a failure of increased CO2 pressure to stimulate photosynthesis to the expected degree. O2-insensitive photosynthesis also occurred after plants had been water stressed. Under such conditions, however, photosynthesis became O2 and CO2 insensitive at physiological CO2 pressures. Postillumination CO2 exchange kinetics showed that O2 and CO2 insensitivity was not the result of elimination of photorespiration. It is proposed that O2 and CO2 insensitivity occurs when the concn. of phosphate in the chloroplast stroma cannot be both high enough to allow photophosphorylation and low enough to allow starch and sucrose synthesis at the rates required by the rest of the photosynthetic component processes. Under these conditions, the energy diverted to photorespiration does not adversely affect the potential for CO2 assimilation. (AS)

0403

28004 SPRUYT. E.; VERBELEN, J.P.; DE GREEF, J.A. 1984. The stem hook of etiolated Phaseolus vulgaris seedlings is implicated in hypocotyl gravitropism. Physiologie Vegetale 22(2):199-207. En., Sum. En., Fr., 43 Ref., Il. [Dept. of Biology, Univ. of Antwerpen, U.I.A., Universiteitsplein 1, B-2610 Wilrijk, Belgium]

Phaseolus vulgaris. Tropisms. Hypocotyl. Stems. Belgium.

Expt. on the role of the stem hook of etiolated Phaseolus vulgaris cv. Limburg seedlings in hypocotyl gravirespons are reported. Results indicate that the stem hook plays a role in gravireaction. Stem gravitropism was strongly reduced after removal of the hook. If agar blocks were put in contact with the cross section of isolated hooks, they subsequently modulated the gravireaction of decapitated hypocotyls. Even in these circumstances the orientation of the isolated hook determined the gravireaction of the decapitated shoot. In intact plants the gravireaction of the stem could be explained as the result of a specific action of gravity on the hook. (AS)

0404

28293 SUSS, K.H.; YORDANOV, I.T. 1986. Biosynthetic cause of in vivo acquired thermotolerance of photosynthetic light reactions and metabolic responses of chloroplasts to heat stress. Plant Physiology 81(1):192-199. En., Sum. En., 32 Ref., Il. [Central Inst. of Genetics & Crop Plant

Research, Academy of Sciences of the German Democratic Republic, 4325 Gatersleben, German Democratic Republic]

Phaseolus vulgaris. Chloroplasts. Proteins. Analysis. Temperature. Nutrient transport. Photosynthesis.

Thermotolerance of bean chloroplasts in vivo was correlated with a decrease in the ratio of monogalactosyl diacylglycerol:digalactosyl diacylglycerol and an increased incorporation into thylakoid membranes of saturated digalactosyl diacylglycerol species. Although electron transport remained virtually intact in thermotolerant chloroplasts, thylakoid protein phosphorylation was strongly inhibited. The opposite was true for thermosensitive chloroplasts in vivo. Heat stress caused reversible and irreversible inactivation of chloroplast protein synthesis in heat-adapted and nonadapted plants, resp., but did not greatly affect formation of rapidly turned-over 32 kilodalton proteins of photosystem II. The formation on cytoplasmic ribosomes and import by chloroplasts of thylakoid and stroma proteins continued, although at a reduced rate, at supraoptimal temp. Thermotolerant chloroplasts accumulated heat shock proteins in the stroma, among which 22 kilodalton polypeptides predominated. (AS (extract))

0405

27473 TURNER, J.G. 1986. Effect of phaseolotoxin on the synthesis of arginine and protein. Plant Physiology 80(3):760-765. En., Sum. En., 22 Ref., Il. [Mount Albert Research Centre, Auckland, Private Bag, New Zealand]

Phaseolus vulgaris. Leaves. Enzymes. Proteins. Arginine.

Mesophyll cells in discs cut from primary leaves of Phaseolus vulgaris were exposed to a phaseolotoxin concn. that inhibited ornithine carbamoyltransferase (OCTase) measured in an extract of the tissue. This treatment also blocked incorporation of exogenous ((14)C) ornithine into protein-arginine of the mesophyll cells. Protein synthesis in mesophyll cells was unaffected by phaseolotoxin because treated tissue continued to incorporate ((14)C)leucine into protein at the same rate as the untreated control. Phaseolotoxin also blocked OCTase but not protein synthesis in exponentially growing cell suspension cultures. Phaseolotoxin rapidly inhibited growth of Escherichia coli and this effect was rapidly reversed by arginine. Thus, the toxic effects of phaseolotoxin may be attributed to the inhibition of OCTase which, in turn, blocks arginine synthesis. (AS (extract))

0406

28697 VITALE, A.; STURM, A.; BOLLINI, R. 1986. Regulation of processing of a plant glycoprotein in the Golgi complex: a comparative study using Xenopus oocytes. Planta 169(1):108-116. En., Sum. En., 30 Ref., Il. [Istituto Biosintisi Vegetali, Consiglio Nazionale delle Ricerche, via Bassini 15, I-20133 Milano, Italy]

Phaseolus vulgaris. Phytohemagglutinins. Analysis. RNA. DNA. Italy.

The synthesis of phytohemagglutinin, the major seed lectin of Phaseolus vulgaris, was investigated in Xenopus oocytes injected with RNA isolated from developing bean cotyledons. As is the case for normal phytohemagglutinin, oocyte-synthesized phytohemagglutinin polypeptides were found to contain 2 asparagine-linked oligosaccharide chains, one of which was of the high-mannose type and the other one of the Golgi-modified type, being largely resistant to endo-beta-N-acetylglucosaminidase H digestion and containing fucose. The modified oligosaccharide chain of oocyte-synthesized phytohemagglutinin appeared to be much larger and more

heterogeneous with respect to the modified chain normally present on phytohemagglutinin. When the oocytes were injected with purified mRNA for phytohemagglutinin, isolated by hybrid-selection using a phytohemagglutinin complementary-DNA clone, the results were the same as those obtained by injecting total cotyledonary RNA. On the whole, these results indicate that plant glycoproteins are directed to the Golgi complex even when synthesized in an animal cell, and that correct sorting of the oligosaccharide chains to be processed is independent of the cell type in which protein synthesis occurs. The form of processing is, however, cell-type specific. (AS)

0407

27717 WIEST, S.C. 1986. Kinetic and proteolytic identification of heat-induced conformational changes in the urea herbicide binding site of isolated Phaseolus vulgaris chloroplast thylakoids. Physiologia Plantarum 66:527-535. En., Sum. En., 27 Ref., Il. [Dept. of Horticulture, Kansas State Univ., Manhattan, KS 66506, USA]

Phaseolus vulgaris. Chloroplasts. Enzymes. Temperature. Herbicides. Proteins. USA.

A study was undertaken to identify differential heat sensitivities of different functions within a single thylakoid-associated process (and perhaps within a single protein)--3-(3,4-dichlorophenyl)-1, 1-dimethyl urea (DCMU) inhibition of electron transport. Exposure of thylakoids to 45 degrees Celsius resulted in a gradual, continuous decrease in the apparent affinity of the thylakoid for DCMU in addition to a rapid increase in the relative rate of DCMU-insensitive electron transport. Both of these temporally distinct events are apparently due to structural alterations within the thylakoids. Hence, kinetic parameters of inhibition by DCMU describe a useful model system for investigating heat effects on membrane-associated events. (CIAT)

0408

27208 YAÑEZ J., P.; KOHASHI-SHIBATA, J.; ENGLEMAN, E.M. 1985. Callose in flower buds, flowers and young pods of high and low potential for abscission in Phaseolus vulgaris L. Bean Improvement Cooperative. Annual Report 28:86. En. [Centro de Botánica, Colegio de Postgraduados, 56230 Chapingo, México]

Phaseolus vulgaris. Abscission. Flowers. Fruits. Buds. Pods. Mexico.

A study was conducted to determine if callose occurs in reproductive organs in plants of bean cv. Canhuate-72, grown in the greenhouse, and if so, whether its occurrence is associated with potential for abscission. No difference was apparent between reproductive organs with high and low potentials for abscission. This lack of difference makes it likely that the abundance of callose in the chalazal region is not crucial in the inhibition of translocation of photosynthates to the embryo or to the embryo sac. Thus, it is inferred that callose, in the ovules, does not play an important role in the abscission of flower buds, flowers, or fruits. (CIAT) See also 0361 0365 0503

C01 Plant Nutrition

0409

27457 AITKEN, R.L.; BELL, L.C. 1985. Plant uptake and phytotoxicity of boron in Australian fly ashes. Plant and Soil 84(2):245-257. En., Sum. En., 27 Ref., Il. [Dept. of Agriculture, Univ. of Queensland, St. Lucia, Qld. 4067, Australia]

Phaseolus vulgaris. Snap beans. Toxicity. B. Nutrient uptake. Yields. Mineral content. Australia.

French bean cv. Redland Pioneer and Chloris gayana cv. Pioneer were grown in glasshouse expt. to examine the potential for phytotoxicity of B in a range of Australian fly ashes. In each expt., the ashes used were either untreated, leached, or adjusted to pH 6.5 and subsequently leached. In the 1st expt., the yield and B status of plants grown on 5 fly ashes mixed (5 and 10 percent by wt.) with an acid-washed sand were measured. In a subsequent expt., a fly ash was mixed (0, 15, 30, 70, and 100 percent by wt.) with a sandy loam, and the yield and mineral composition of plants grown on these mixtures determined. Although the available water capacity of the soil was substantially increased by fly ash addition, incorporating large proportions of untreated fly ash resulted in poor plant growth primarily due to B toxicity. In both expt., leaching the ash reduced the potential for B toxicity, whereas adjustment of the pH to 6.5 and subsequent leaching of the fly ash resulted in plants with normal levels of B. (AS (extract))

0410

28029 BIENFAIT, H.F.; VAN DEN BRIEL, W.; MESLANDMUL, N.T. 1985. Free space iron pools in roots; generation and mobilization. Plant Physiology 78(3):596-600. En., Sum. En., 32 Refs., Il. [Dept. of Plant Physiology, Univ. of Amsterdam, Kruislaan 318, 1098 SM Amsterdam, The Netherlands]

Phaseolus vulgaris. Nutrient solution. Fe. Nutrient uptake. Mineral deficiencies. Translocation. Roots. Netherlands.

A rapid and simple method for the determination of a ferric Fe pool in the free space of bean, maize, and Chlorophytum comosum roots is described. Formation of this pool depended on the source of Fe in the nutrient solution. During growth in water culture at pH 5-6 with Fe-ethylenediaminetetraacetate, a free space pool of 500-1000 nanomoles Fe/g fresh wt. was formed in the roots of bean var. Prélude, maize var. Capella, and chlorophytum. No significant pool (less than 100 nanomoles/g fresh wt.) was formed with ferrioxamine. Upon impending Fe deficiency, bean and chlorophytum were able to mobilize this pool. Fe-deficient bean plants mobilized Fe from the free space Fe pool of another plant in the same vessel. (AS)

0411

28284 GOMEZ, M.G.; MARTIN, M.S.; ABAD, J.B. 1985. Molibdeno y contenido de compuestos metabólicos (carbohidratos y proteínas) en Phaseolus vulgaris L. (Molybdenum and metabolic compound contents (carbohydrates and proteins) in Phaseolus vulgaris). Anales de Edafología y Agrobiología 44(5-6):767-785. Es., Sum. En., Es., 21 Ref., Il. [Depto. de Fisiología Vegetal, Facultad de Farmacia, Univ. Complutense, 28040, Madrid, España]

Phaseolus vulgaris. Plant nutrition. Mo. Carbohydrate content. Protein content. Leaves. Stems. Roots. Spain.

The influence of different Mo concn. (0.1, 1.0, and 5.0 ppm) on the carbohydrate and protein content of beans was studied. Although the concn. used caused no external alterations, they had a negative effect on carbohydrate synthesis in the different plant organs during the entire growth cycle. These Mo rates, especially 1 ppm, favored protein synthesis during fructification; however, the opposite effect was observed on the root system. The carbohydrate:protein ratio in the plants receiving 1 ppm Mo during fructification had similar values to the check. (AS)

0412

28044 KOHNO, Y. 1986. Vanadium induced manganese toxicity in bush bean plants grown in solution culture. Journal of Plant Nutrition 9(10):1261-1272. En., Sum. En., 14 Ref., Il. [Biology Laboratory, Central Research Inst. of Electric Power Industry, 1646 Abiko, Abiko City, Chiba 270-11, Japan]

Phaseolus vulgaris. Cultivars. Nutrient solution. Mn. Mineral content. Canopy. Roots. V. Toxicity. Fe. Plant nutrition.

Seedlings of 2 bush bean cv., Mn-sensitive Wonder Crop 2 and Mn-tolerant Green Lord, were grown for 14 days in full strength Hoagland No. 2 nutrient solution containing 0.05-2.00 mg V (ammonium vanadate)/liter. Increasing V concn. in the solution decreased total dry wt. of both cv. Plant tops were stunted and leaf color became dark green at 1.00-2.00 mg V/liter, especially in Green Lord. Veinal necrosis similar to that of Mn toxicity was observed in the primary leaves of Wonder Crop 2 at 0.20 mg V/liter or above, but not in those of Green Lord. Root V concn. increased exponentially with increasing V concn. in the solution; however, V concn. in the leaves and stems were not affected. The Mn concn. in the primary leaves increased under the higher V treatment in Wonder Crop 2, but not in Green Lord. In contrast, Fe concn. in the leaves of Wonder Crop 2 decreased markedly with increasing V concn. in the solution. Enhanced Mn uptake and greater reduction of Fe uptake by Wonder Crop 2 may explain the incidence of V-induced Mn toxicity. (AS)

0413

28271 RICKAUER, M.; TANNER, W. 1986. Effects of Ca(2+) on amino acid transport and accumulation in roots of Phaseolus vulgaris. Plant Physiology 82(1):41-46. En., Sum. En., 21 Ref., Il. [Inst. fur Botanik, Univ. Regensburg, 8400 Regensburg, Federal Republic of Germany]

Phaseolus vulgaris. Roots. Nutrient uptake. Ca. Nutrient solution. Amino acids. Nutrient transport.

Ca(2+) stimulates the uptake of alpha-aminoisobutyric acid into excised or intact Phaseolus vulgaris roots by a factor of 2. In roots depleted of Ca(2+) by preincubation with ethylenediaminetetraacetate, ethyleneglycol-bis(beta-aminoethyl ether)-N,N'-tetraacetic acid, or streptomycin, the stimulatory effect is 7- to 10-fold. In the presence of Ca(2+) roots accumulate alpha-aminoisobutyric acid more than 100-fold; Ca(2+)-depleted roots only equilibrate with alpha-aminoisobutyric acid. Radioautography shows (14C)alpha-aminoisobutyric acid to be present in all cells after 90 min. Although Ca(2+)-depleted roots lose accumulated (14C)alpha-aminoisobutyric acid about 10 times faster than roots supplied with Ca(2+), this increased efflux is not the main cause for the decrease in net uptake observed. The latter is rather due to a less negative membrane potential delta psi in Ca(2+)-depleted roots. The basic feature explaining all the results of Ca(2+) deficiency is an increase in general membrane permeability. No indication of a specific regulatory function of Ca(2+) in membrane transport of roots has been obtained. (AS)

0414

27778 SAWADA, S.; MISAWA, T.; MIYACHI, S. 1984. Effects of nutritional levels of phosphate on photosynthetic rate and hill reaction activity determined successively with the same leaf slices obtained from single rooted leaf of dwarf bean. Photosynthetica 18(4):541-548. En., Sum. En., 7 Ref., Il. [Dept. of Biology, Faculty of Science, Hirosaki Univ., Hirosaki 036, Japan]

Phaseolus vulgaris. Nutrient solution. Leaves. Rooting. Photosynthesis. Mineral deficiencies. P. Plant nutrition.

A procedure to measure net photosynthetic rate and the Hill reaction activity with the same thin leaf slices of bean was developed. Both activities were determined by measuring O evolution with a polarographic electrode. The addition of HCO3(-) (final concn., 30 millimolar) greatly enhanced the Hill activity. This method was then applied for the investigation on the effects of P deficiency on photosynthetic processes. P deficiency was induced by the removal of phosphate from the nutrient solution in which a single rooted leaf of dwarf bean (Phaseolus vulgaris var. humilis) cv. Edogawa was grown. The net photosynthetic rate in leaf slices decreased with increasing P deficiency, whereas the decrease in the Hill activity was not so pronounced. The recovery of the net photosynthetic rate, determined 10 min after a vacuum infiltration of phosphate into intercellular spaces of leaf slices, was significant, whereas the increase of the Hill activity was not so remarkable in the later period of P deficiency. (AS)

0415

27705 SAWADA, S.; IGARASHI, T.; MIYACHI, S. 1983. Effects of phosphate nutrition on photosynthesis, starch and total phosphorus levels in single rooted leaf of dwarf bean. Photosynthetica 17(4):484-490. En., Sum. En., 10 Ref., Il. [Dept. of Biology, Faculty of Science, Hirosaki Univ., Hirosaki 036, Japan]

Phaseolus vulgaris. Nutrient solution. Leaves. Rooting. Photosynthesis. Mineral deficiencies. P. Chlorophyll. Protein content. Starch content. Mineral content. Plant nutrition.

Single rooted leaves of dwarf bean (Phaseolus vulgaris var. humilis) cv. Edogawa were cultivated hydroponically in phosphate-free or normal culture medium for 14 days. Although the rate of gross photosynthesis at high irradiance was reduced to about 30 percent of the control by phosphate cutoff, rate of gross photosynthesis at low (limiting) irradiances was not affected. The diffusion resistance to water vapor was not affected, while the mesophyll resistance to CO2 was greatly increased by the phosphate cutoff. The dark reaction(s) of photosynthesis was therefore inhibited by the phosphate cutoff. In the leaves of phosphate-deficient plants, chlorophyll and protein contents did not change significantly, but starch content was greatly increased and P content greatly decreased. Four hours after the addition of phosphate to the deficient plants, leaf P content rose twice, while those of petioles and roots did not change even 24 h after phosphate addition. Hence, the lowering of rate of gross photosynthesis induced by keeping the plants in phosphate-deficient medium for more than 10 days was directly due to the lack of phosphate compounds in the photosynthetic machinery. The transfer of the plants into phosphate medium for 1 h increased leaf phosphate content and hence enhanced rate of gross photosynthesis. (AS) See also 0452 0453 0473 0478 0479 0497 0509 0585 0652 0663

CO2 Plant Development

0416

27490 BORREBAECK, C.A.K.; LINSEFORS, L. 1985. Hormonal regulation of the lectin biosynthesis in callus culture of the Phaseolus vulgaris plant. Plant Physiology 79(3):659-662. En., Sum. En., 18 Ref., Il. [Dept. of Biotecnology, Univ. of Lund, P.O. Box 124, S-221 00 Lund, Sweden]

Phaseolus vulgaris. Tissue culture. Lectins. Cytokinins. Auxins. Sweden.

Callus cultures established from Phaseolus vulgaris seedlings were used to investigate hormonal influence on lectin biosynthesis. The plant tissue cultures were initiated using defined levels of both a cytokinin (kinetin) and an auxin (2,4-D) and were then transferred to media containing different amounts of these hormones. The lectin content of each callus culture was determined using an enzyme immunoassay specific for the seed lectin of the P. vulgaris plant. The lectin biosynthesis was directly affected by the levels of auxin and cytokinin in the culture media and no lectin was detected in hormone-free medium. This enabled a culture media yielding a maximal or minimal lectin content of the callus cultures to be composed, illustrating the ability to induce an enhancement or suppression of the in vitro lectin biosynthesis. The lectin level of callus tissue during the growth cycle of a culture was, furthermore, related to the cellular growth rate which might indicate an involvement of the lectin in cellular events during rapid cell division. (AS)

0417

28094 CASTRO, P.R.C.; ARCHILA, A.; AGUIAR, I.F.A.; ALMEIDA, M. DE 1983 Efeito da temperatura na germinacao de sementes de vigna, feijoeiro e soja. (Effect of temperature on the germination of Vigna, bean, and soybean seeds). Anais da Escola Superior de Agricultura Luiz de Queiroz 40(1):575-583. Pt., Sum. Pt., En., 5 Ref. [Depto. de Botânica, Escuela Superior de Agricultura Luiz de Queiroz, Univ. de Sao Paulo, Piracicaba-SP, Brasil]

Phaseolus vulgaris. Seeds. Germination. Temperature. Brazil.

An expt. was carried out to study the effects of temp. (14, 21, and 28 degrees Celsius) on the germination of 3 cv. each of Vigna unguiculata, Phaseolus vulgaris, and Glycine max. Seeds were germinated on Petri dishes containing cotton and filter paper and maintained at high humidity levels. Greater germination was observed at 21 degrees Celsius compared with 14 and 28 degrees Celsius for all 3 species. Best germination was showed by bean cv. Carioca and Goiano Precoce, followed by bean cv. Rosinha, Vigna cv. EPACE 1, and soybean cv. Davis at 21 degrees Celsius. Vigna cv. adapted to high temp. had germination problems at 14 degrees Celsius. Normally, the rate of hypocotyl emergence was lower than the rate of radicle emergence. (AS)

0418

28814 D'ANTUONO, L.F.; LOVATO, A.; BONI, A. 1984. Confronto tra alcuni metodi di laboratorio per la valutazione del vigore del seme di fagiolino nano (Phaseolus vulgaris L.). (Comparison of some laboratory methods to evaluate bush bean seed vigor). Rivista della Ortoflorofrutticoltura Italiana 68(6):501-517. It., Sum. It., En., 19 Ref.

Phaseolus vulgaris. Seeds. Germination. Seed vigor. Emergence. Analysis. Italy.

Thirty seed samples were analyzed in both lab. and field trials to determine the most suitable method to evaluate bush bean seed vigor. Germination, mean germination time, and 1000-seed wt. were determined in the lab. Electrical conductivity tests were also carried out using P 310 and ASA 610 instruments. Field emergence trials were conducted on 2 sowing dates (early and standard). Climatic conditions during emergence were favorable, even for the 1st sowing. In these conditions, the germination test provided the best correlation with field emergence for all 30 samples on both sowing dates. On the other hand, a combination of germination with ASA 610 readings provided the best estimation of field emergence for the 22 out of 30 commercial samples (germination equal to or greater than 75 percent). Exptl. results showed that vigor tests can play an imporatant

role, especially for high germination seed samples, and demonstrated that seed vigor has a greater influence on field emergence in unfavorable climatic conditions. It is suggested that the prediction for high germination of bush bean seed in the field can be made by combining germination tests with ASA 610 readings. (AS)

0419

28093 FERNANDEZ DE C., F.; GEPTS, P.; LOPEZ, M. 1986. Etapas de desarrollo de la planta de fríjol común (Phaseolus vulgaris L.). (Developmental stages of the common bean plant). Cali, Colombia, Centro Internacional de Agriculture Tropical. 38p. Es., 7 Ref., Il. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Germination. Emergence. Flowering. Seedling. Podding. Maturation. Colombia.

A development scale of the common bean plant, designed by CIAT, is presented in order to provide bean researchers and technicians with a standard and stable pattern to which observations and practices can be referred to. The scale is numeric and is based on the morphological characteristics that the plant exhibits according to a given physiological stage. Color photos of the plant in the different developmental stages are provided. (CIAT)

0420

27762 ITO, O.; OKANO, K.; KUROIWA, M.; TOTSUKA, T. 1985. Effects of NO2 and O3 alone or in combination on kidney bean plants (Phaseolus vulgaris L.): growth, partitioning of assimilates and root activities. Journal of Experimental Botany 36(165):652-662. En., Sum. En., 28 Ref., Il. [Division of Environmental Biology, The National Inst. for Environmental Studies, Yatabe, Itaraki, 305 Japan]

Phaseolus vulgaris. NO2. Ozone. Air pollution. Growth. Nutrient uptake. N. Sugar content. Dry matter. Roots.

Ten-day-old kidney bean plants of cv. Shin-edogawa were exposed to 2.0 and 4.0 parts 10(-6) NO2, and 0.1, 0.2, and 0.4 parts 10(-6) O3, alone or in combination, for 2, 4, and 7 days. The effects of these air pollutants were examined with respect to the growth, partitioning of assimilates, N uptake, soluble sugar content, and root respiration. Decreased DM production was significant with all treatments, except 2.0 parts 10(-6) NO2 and 0.1 parts 10(-6) O3. Exposure to mixtures of the gases produced more severe suppression of growth than exposure to the single gases. Root:shoot ratio was significantly lowered at 7 days by the gas treatments other than 2.0 parts 10(-6) NO2 and 0.1 parts 10(-6) O3. The total N content of plants was increased by all treatments; the higher percent of N found with O3 exposure will result from the growth retardation, which increases the N concn. in the plants because root N absorption was unaffected. The combination of O3 with NO2 significantly decreased plant assimilation of NO2. The soluble sugar concn. in roots was decreased by the gas treatments. There was a strong positive correlation between soluble sugar content and dry wt. of the roots harvested at 7 days. Root respiration was relatively unchanged until 5 days and then decreased significantly at 7 days by 2.0 parts 10(-6) NO2 and 0.2 parts 10(-6) O3. Retarded growth of the roots and the decreased root respiration may be due to diminished translocation of sugars from leaves to roots caused by exposure to air pollutants. The uptake of soil N was not closely related with root respiration in the case of O3 exposure. (AS)

0421

27796 LEE, E.H.; BYUN, J.K.; WILDING, S.J. 1985. A new gibberellin biosynthesis inhibitor, paclobutrazol (PP333), confers increased SO2 tolerance on snap bean plants. Environmental and Experimental Botany 25(3):265-275. En., Sum. En., 33 Ref., Il. [Plant Stress Laboratory, Plant Physiology Inst., U.S. Dept. of Agriculture, Beltsville, MD 20705, USA]

Phaseolus vulgaris. Snap beans. Plant growth substances. Resistance. SO2. Growth. Chlorophyll. Leaf area. USA.

A SO2-sensitive snap bean cv., Bush Blue Lake 290, was treated with a new exptl. plant growth regulator, paclobutrazol, a gibberellin biosynthesis inhibitor that has been found to be a highly potent protectant against SO2-induced injury to plants. The SO2 tolerance induced by paclobutrazol was reversed by subsequent applications of GA. The degree of reversibility was related to the duration of treatment and the concn. of the resp. GA and paclobutrazol. The data show that the susceptibility or tolerance of sensitive plants to SO2 stress can be manipulated by treatment with this growth regulator and the plant hormone GA. (AS)

0422

28285 LOAIZA, C.; ALARCON, F.; LATORRE, F. 1985. Respuesta del frejol variedad Algarrobo a la aplicación de Ergostim en tres diferentes fases vegetales Cumbaya - Pichincha. (Response of bean variety Algarrobo to applications of Ergostim at three different vegetative phases in Cumbaya - Pichincha). Rumipamba 2(2):1-12. Es., Sum. Es., En., 7 Ref.

Phaseolus vulgaris. Plant growth substances. Emergence. Flowering. Podding. Yields. Yield components. Ecuador.

A trial was carried out in Cumbaya (Pichincha, Ecuador) at 2510 m.a.s.l. using seed of bean var. Algarrobo to determine which of the developmental stages (emergence, flowering, and pod formation) best responds to the application of the biostimulant Ergostim. The different growth stages and yield components of beans were assessed. Ergostim produced a positive response for the following variables: plant height, no. of plants/plot, no. of pods/plant, no. of grains/plant, and yield. Generally, the best av. of each one of the variables were obtained in those treatments with the highest application rates of the product. The treatment of 600 cc at emergence + 600 cc at flowering + 600 cc at pod formation gave the best response, with an av. yield of 2746.16 kg/ha. Economic aspects are considered. (AS-CIAT)

0423

28614 MIKKONEN, A. 1986. Activities of some peptidases and proteinases in germinating kidney bean, Phaseolus vulgaris. Physiologia Plantarum 68(2):282-286. En., Sum. En., 25 Ref., Il. [Dept. of Biology, Univ. of Jyvaskyla, Vapaudenkatu 4, SF-40100 Jyvaskyla, Finland]

Phaseolus vulgaris. Seeds. Cotyledons. Germination. Enzymes.

The activities of aminopeptidase, dipeptidase, carboxypeptidase, naphthylamidase, and proteinases were assayed in extracts from the cotyledons and the axial tissues of resting and germinating kidney bean cv. Processor. The activities of the alkaline peptidases and naphthylamidases were high in the cotyledons of resting seeds, but decreased during germination. This decrease was faster than the loss of the total N. On the contrary, the activities of carboxypeptidase and proteinases were low in the resting seeds, but increased during germination reaching their max. values when the mobilization of N was highest. It has been suggested that the breakdown of storage proteins is initiated inside the protein bodies by

acid proteinases and carboxypeptidases. Although the activities of the alkaline peptidases and naphthylamidases decreased during germination, these were still relatively high and enough for the completion of the proteolytic breakdown. Thus, it is suggested that, as a final step in a chain of events, the main role for the alkaline peptidases in the cotyledons of germinating seeds is to provide amino acids for the growth of the seedlings. (AS)

0424

28628 MORRIS, D.A.; ARTHUR, E.D. 1986. Stimulation of acid invertase activity by indol-3yl-acetic acid in tissues undergoing cell expansion. Plant Growth Regulation 4(3):259-271. En., Sum. En., 24 Ref., Il. [Dept. of Biology, Building 44, The Univ., Southampton, SO9 5NH, England]

Phaseolus vulgaris. Stems. Enzymes. Indoleacetic acid. Growth. Inhibitors. United Kingdom.

The soluble acid invertase activity of young, excised Phaseolus vulgaris internodal segments decreased when they were incubated in water, and their elongation ceased within 6-7 h. IAA (10 micromolar) promoted segment elongation and stimulated an increase in the specific activity of acid invertase to a level greater than that originally present. The rate of segment elongation in the presence of IAA was closely and positively correlated with the specific activity of the enzyme. Optimum concn. of IAA for both elongation and stimulation of invertase activity was 10 micromolar. Concurrent protein synthesis was necessary for these responses to IAA. Segments cut from mature, fully elongated internodes did not respond to IAA. Inclusion of Ca(2+), vanadate, or mannitol in the incubation medium eliminated IAA-induced segment elongation but did not inhibit the stimulation of acid invertase activity by IAA. Auxin-induced elongation and acid invertase activity were both substantially increased in the presence of up to 25 millimolar D-glucose or up to 50 millimolar sucrose. Inclusion of either sugar in the medium considerably increased tissue hexose concn. Under some circumstances cell growth and invertase synthesis may compete for available hexose substrate. It is concluded that IAA-induced promotion of acid invertase in P. vulgaris internodal segments is not simply an indirect consequence or removal of end product (hexose) during IAA-induced cell growth and that a more direct action of IAA on enzyme turnover is involved. (AS)

0425

28040 PECHAN, P.M.; WEBSTER, B.D. 1986. Flower and pod set of Phaseolus vulgaris under controlled environment conditions. HortScience 21(4):989-991. En., Sum. En., 12 Ref., Il. [Dept. of Agronomy & Range Science, Univ. of California, Davis, CA 95616, USA]

Phaseolus vulgaris. Flowering. Anthesis. Podding. Flowers. Pods. Abscission. USA.

Plants of Phaseolus vulgaris Light Red Kidney grown under controlled conditions flowered over a 20-day period. The 1st flower to open was on the terminal (uppermost) raceme. Pods retained to maturity originated from flowers that opened within 5 days of anthesis and were located at the basal positions on a raceme. Flowers that opened 4-5 days after anthesis had a much higher proportion of aborted pods than those that opened at anthesis or 1 day thereafter. (AS)

0426

28021 RAFIQUE-UDDIN, M. 1984. Effects of Cycocel on yield and yield contributing characters of Phaseolus vulgaris (kidney beans). Legume

Research 7(1):43-47. En., Sum. En., 17 Ref. [Dept. of Botany, Univ. of the West Indies, M a, Kingston-7, Jamaica]

Phaseolus vulgaris. Plant growth substances. Yields. Yield components. Jamaica.

The response of 2 kidney bean cv., Ms. Kelly and DOR 164, to foliar spraying of chlormequate-chloride (CCC) at concn. of 0, 200, 400, 800, and 1000 ppm, twice or 4 times during the growth cycle, was studied. Plant height was significantly reduced and grain yield was increased by 15 percent in both cv. by CCC treatment. The yield increase in the larger-seeded cv. resulted from the higher no. of seeds/pod, while in the smaller-seeded cv. it was due to an increase in the no. of pods/plant. A foliar spray of 400 ppm CCC resulted in the largest yield increase. (AS)

0427

27476 SCHWARZ, M.; GALE, J. 1984. Growth response to salinity at high levels of carbon dioxide. Journal of Experimental Botany 35(151):193-196. En., Sum. En., 15 Ref. [Dept. of Botany, Hebrew Univ. of Jerusalem, Israel]

Phaseolus vulgaris. Salinity. CO2. Growth. Resistance.

Plants of the C3 species Phaseolus vulgaris and Xanthium strumarium and of the C4 salt-sensitive Zea mays and the C4 halophyte Atriplex halimus were grown with and without NaCl salt stress at normal (approx. 340 microliters/liter) and at high (approx. 2500 microliters/liter) ambient (CO2). In all 4 species growth (dry wt. increment) was enhanced by CO2 supplementation. The relative response was greater in the salinized than in the control plants. Plant tops responded more to CO2 than the roots. CO2 supplementation appears to increase plant tolerance of low levels of salinity. (AS)

0428

28049 TAYO, T.O. 1986. Flower and pod production at various nodes of Phaseolus vulgaris L. Journal of Agricultural Science (Australia) 107(1):29-36. En., Sum. En., 7 Ref., Il. [Dept. of Agricultural Biology, Univ. of Ibadan, Ibadan, Nigeria]

Phaseolus vulgaris. Flowering. Flowers. Podding. Abscission. Growth. Yield components. United Kingdom.

In a glasshouse study, the pattern of flower and pod production at the various flowering nodes of Phaseolus vulgaris cv. 344 was mapped out. Soft X-radiation techniques were also used to study the development of retained and abscissed pods at the various nodes while varying levels of flower or pod removal were used to study the modification to pod development at each flowering node following organ removal. The terminal inflorescence produced most of the flowers on the plant (25 percent), but nodes 2 and 3 developed the bulk (50 percent) of the pods retained. Only 30 percent of the open flowers on the plant formed pods that were retained to maturity. Pod elongation was initially very rapid in the pods to be retained, following successful fertilization, with the latter period of pod growth devoted almost entirely to seed fill. A slow growth rate characterized the development of abscission in Phaseolus pods, and the no. of seeds/pod was determined later in pod growth. Flower or pod removal prolonged flowering and led to longer leaf retention and more branches on the main stem. The no. of mature pods was lower on the treated plants, and the more severe the removal the larger were these treatment effects. (AS (extract))

0429

27714 VAN STADEN, J.; FORSYTH, C. 1985. Cytokinin biosynthesis in Phaseolus vulgaris leaf explants. Journal of Plant Physiology 119(1):159-168. En., Sum. En., 33 Ref., Il. [Plant Development Research Unit, Dept. of Botany, Univ. of Natal, Pietermaritzburg 3200, South Africa]

Phaseolus vulgaris. Leaves. Auxins. Nutrient solution. Rooting. Cytokinins. South Africa.

Bean leaf explants, treated with auxin to encourage rooting, were incubated in Hoagland's nutrient solution to which had been added (U(-14)C)adenosine. After 3, 5, and 7 days the explants and the resp. nutrient media were analyzed separately for the presence of labelled compounds. Total radioactivity recovered from the media and the ethanolic extracts of the explants decreased with time. Adenosine appeared to be taken up by the petioles relatively rapidly since after 5 days there was no detectable (14)C-adenosine in the media. (14)C-Adenosine levels detected in both the laminae and in the petioles plus roots also decreased during the exptl. period and appeared to be metabolized to adenine and 3 more polar compounds. These polar compounds did not respond to either alkaline phosphatase or beta-glucosidase treatments and their identity is, as yet, unknown. Labelled free cytokinins were not detected in any extract. Aspects of this metabolism and the possible effects of auxin on the system are discussed. (AS)

0430

28661 YOUSSEF, S.A.M.; EL-SHEREF, E.M.; SHALABY, T.M.; EL-KEREDY, M.S. 1978. Response of bean plants to foliar applications of CCC (2-chloro-ethyl- trimethyl ammonium chloride). Journal of the National Agricultural Society f Ceylon 15:57-62. En., Sum. En., 12 Ref.

Phaseolus vulgaris. Cultivars. Plant growth substances. Growth. Leaf area. Yield components. Yields. Egypt.

Two field expt. were conducted at Kafr El-Sheikh exptl. farm of Tanta U. (Egypt) during 1974 and 1975 to study the effect of 2-chloro-ethyl-trimethyl ammonium chloride CCC at 0, 125, 250, 500, 1000, and 2000 ppm on the growth and productivity of 4 bean cv. (Giza 1, Family 209, Rebaya 40, and Hybrid 6I/356/66). Leaf area, LAI, dry wt./plant, and plant height were low during the early stages of growth and increased as development proceeded. All CCC treatments significantly affected leaf area, dry wt./plant, and plant height, but LAI was only slightly affected. The reduction in plant height was due to the reduction in length and no. of the main stem internodes. The length of primary and secondary branches/plant were reduced but their no. were not significantly altered by CCC. None of the CCC treatments affected the no. of pods/plant, no. of seeds/pod, and seed yield/plant compared with the control. Based on seed yield/plant, the 4 cv. ranked, in descending order, Giza 1--1st Rebaya 40 and Hybrid 6I/356/66--intermediate, and Family 209 last. (AS) See also 0433 0448 0462 0467 0469 0480 0481 0482 0491 0493 0499 0588 0596 0613 0685

C03 Chemical Composition, Methodology and Analyses

0431

27458 AKIL, B.A.; OSLUND, C.R. 1980. Electrophoretic protein profiles of mature and developing snapbean (Phaseolus vulgaris L.) seeds. Revista Brasileira de Biologia 40(2):277-282. En., Sum. En., Pt., 9 Ref., Il.

Phaseolus vulgaris. Snap beans. Proteins. Seed. Cotyledons. Analysis. USA.

Protein extracts from cotyledons of 15 snap bean cv. were resolved by

acrylamide gel electrophoresis. There were some major and consistent protein bands present in all the cv., and minor and variable bands in some cv. This procedure was not considered practical for identifying cv. When the electrophoretic gels were scanned with UV light at 280 nm 2 major protein peaks were conspicuous. These could be used in grouping or separating bean cv. Protein patterns of developing snap bean seeds indicated fewer light protein bands with immature seeds compared with many discrete bands in mature seeds. Presumably functional proteins of younger seeds appeared to be different from reserve proteins of mature seeds. Kjeldahl N (dry wt. basis) and extractable proteins decreased with increasing seed maturity. High and low mol. wt. proteins were about equally distributed in different developmental stages. (AS)

0432

28245 BULISANI, E.A. 1985. O cultivar de feijao Carioca 80. (Bean cultivar Carioca 80). O Agronomico 37(3):165-166. Pt., 2 Ref. [Secao de Leguminosas, Inst. Agronomico, Caixa Postal 28, 13.100 Campinas-SP, Brasil]

Phaseolus vulgaris. Seed. Amino acids. Proteins. Digestibility. Nutritive value. Brazil.

Bean cv. Carioca 80 resulted from the cross between cv. Carioca and an American line, Cornell 49242. It was selected for its resistance to anthracnose, rust, and BCMV. Carioca 80 plants have a more erect architecture than Carioca plants. The evaluation of the nutritional value of Carioca 80 seeds revealed a BV of above 80, and a protein digestibility of 72 percent. Large-scale cultivation of this cv. is recommended for the state of Sao Paulo, Brazil. (CIAT)

0433

28813 D'ANTUONO, L.F. 1985. La stima rapida della vitalita e del vigore dei semi di fagiolino nano (Phaseolus vulgaris L.) con l'analizzatore automatico dei semi "ASA-610". (The rapid estimation of bush bean seed viability and vigor using the automatic seed analyzer "ASA-610"). Rivista di Agronomia 19(1):56-65. It., Sum. It., En., 14 Ref., Il.

Phaseolus vulgaris. Seeds. Germination. Emergence. Seed vigor. Analysis. Italy.

Exptl. trials were carried out to calibrate the ASA-610 instrument for the rapid analysis of bush bean seed. Thirty seed samples with a wide germination range were analyzed. Standard lab. germination and field emergence on 2 sowing dates (early and standard) were also measured for the samples. The partition into frequency classes/sample on ASA-610 current printouts was made according to both the partition method and the histogram segment method. For each method, the class (current level) that allowed the best estimation of germination and field emergence, through direct instrument readings or through a regression equation, was determined. For this purpose germination and emergence estimations obtained by each method and each current level were compared with exptl. standard germination and field emergence data. The results of each of the methods tested are discussed. The best estimation method was the partition method, based on instrument readings, coupled with the regression equation. The resulting regression equations are also reported. (AS)

0434

28618 DE TAPIA, M.; BERGMANN, P.; AWADE, A.; BURKARD, G. 1986. Analysis of acid extractable bean leaf proteins induced by mercuric chloride treatment and alfalfa mosaic virus infection. Partial purification and characterization. Plant Science 45(3):167-177. En., Sum. En., 40 Ref., Il.

[Inst. de Biologie Moléculaire et Cellulaire, Univ. Louis Pasteur, 15, Rue Descartes, 67084 Strasbourg Cedex, France]

Phaseolus vulgaris. Leaves. Proteins. Analysis. Alfalfa mosaic virus. France.

Mercuric chloride treatment of leaves of Phaseolus vulgaris var. Saxa induces the synthesis of 4 new soluble proteins extractable at pH 2.8. The mol. wt. of these proteins were found to be 17,000 for pathogenesis related (PR) 1 and PR 2 proteins, 28,000 for PR 3 protein, and 32,000 for PR 4 protein, when determined by SDS polyacrylamide gel electrophoresis. In alfalfa mosaic virus-infected bean leaves only 3 new soluble proteins were found, corresponding to the mercuric chloride-induced PR 1, PR 3, and PR 4 proteins. The 4 mercuric chloride-induced proteins were purified by a technique including an ammonium sulfate fractionation and a preparative polyacrylamide gel electrophoresis. Some biochemical and serological properties of these proteins have been studied. (AS)

0435

27400 DESHPANDE, S.S. 1985. Investigations on dry beans (Phaseolus vulgaris L.): microstructure, processing, and antinutrients. Ph.D. Thesis. Urbana, University of Illinois at Urbana-Champaign. 277p. En., Sum. En., 236 Ref., Il.

Phaseolus vulgaris. Cultivars. Protein content. Fat content. Water content. Ash content. Carbohydrate content. Seed characters. Cooking. Phytic acid content. Tannin content. Phytohemagglutinins. Processing. USA.

The role of microstructure in processing and effects of several processing methods on antinutrients of dry beans were investigated. Proximate composition of whole beans showed minor differences among the 10 var. investigated. Dry beans had a well-organized ultrastructure with all the characteristic features of a typical legume. Initial water uptake rates during soaking were characteristic of each var. The seed coat played a dominant role only after its initial resistance to water uptake was overcome. Water uptake during early stages of cooking was also characteristic of the var. All var. absorbed nearly 1.5 times their wt. of water and attained a MC of about 65 percent (wet basis) when cooked for their optimal times. Excepting tannins, dehulling significantly increased phytic acid and enzyme inhibitory activity. Soaking in sodium bicarbonate or mixed salt solutions was more effective in removing these antinutrients than soaking in water. Cooking and germination followed by cooking were the most effective methods in the elimination of dry bean antinutrients. No single method, however, could effectively remove or eliminate all the undesirable components of dry beans. Since protein-bound tannins are usually not detected by the procedures routinely employed for their analyses, several parameters that might influence the commonly used vanillin, Folin-Ciocalteu, and Prussian blue assays for tannins of dry beans were investigated. Both phytate and tannins were potent inhibitors of digestive enzymes. The enzyme inhibitory fractions of legume tannins could be selectively removed by adsorption on starch. Such tannin starch association, however, decreased the in vitro digestibility of several starches investigated. Considering their heat-stable nature and interactions with proteins and carbohydrates, the residual phytate and tannins in processed beans may lower the overall nutritional quality of legumes. (AS (extract))

0436

28278 FAYE, L.; JOHNSON, K.D.; CHRISPEELS, M.J. 1986. Oligosaccharide side chains of glycoproteins that remain in the high-mannose form are not accessible to glycosidases. Plant Physiology 81(1):206-211. En., Sum. En.,

26 Ref., Il. [Dept. of Biology C-016, Univ. of California, San Diego, La Jolla, CA 92093, USA]

Phaseolus vulgaris. Proteins. Analysis. Cotyledons. USA.

Glycoproteins present in the soluble and organelle fractions of developing bean cotyledons were analyzed. Bean cotyledons contained a large no. of glycoproteins which bound to concanavalin A by means of high mannose oligosaccharide side chains. The cotyledons also contained a large var. of fucosylated glycoproteins, which, because fucose-containing oligosaccharide side chains do not bind to concanavalin A, must have both high mannose and modified oligosaccharides. Treatment of the native proteins with alpha-mannosidase removed only 1 of 2 mannose residues from the high mannose oligosaccharides, whereas treatment of SDS-denatured or pronase-digested glycoproteins removed all alpha-mannose residues. It was thought that many glycoproteins passed through the Golgi apparatus without having their high mannose side chains modified because of the inaccessibility of these side chains to the Golgi alpha-mannosidase and other processing enzymes. (AS (extract))

0437

28299 GEPTS, P.; BLISS, F.A. 1986. Phaseolin variability among wild and cultivated common beans (Phaseolus vulgaris) from Colombia. Economic Botany 40(4):469-478. En., Sum. En., 17 Ref., Il. [Dept. of Botany & Plant Sciences, Univ. of California, Riverside, CA 92521, USA]

Phaseolus vulgaris. Phaseollin. Analysis. Germplasm. Colombia.

Phaseolin seed protein variability in a group of 8 wild and 77 cultivated common bean accessions was determined by using 1-dimensional SDS/polyacrylamide gel electrophoresis. Wild common bean accessions exhibited the 'CH' and 'B' patterns, previously undescribed among either wild or cultivated common beans. The cultivated genotypes showed (in decreasing frequency) the previously described 'S', 'T', and 'C' phaseolin patterns as well as the new 'B' pattern similar to the pattern identified in a Colombian wild common bean accession. In the NE part of the Colombian bean-growing region, the cv. exhibited almost exclusively an 'S' phaseolin type, while in the SW part, the 'T' and 'C' phaseolin cv. were more frequent. Seed size analysis indicated that 'T' and 'C' phaseolin cv. had larger seeds than 'S' and 'B' phaseolin. Results suggest that Colombia is a meeting place for Andean and Middle American common bean germplasms, as well as a domestication center for the common bean. (AS)

0438

28282 GUYE, M.G.; VIGH, L.; WILSON, J.M. 1986. Polyamine titre in relation to chill-sensitivity in Phaseolus sp. Journal of Experimental Botany 37(180):1036-1043. En., Sum. En., 37 Ref. [School of Plant Biology, Univ. College of North Wales, Bangor, Gwynedd LL57 2UW, Wales, England]

Phaseolus vulgaris. Cultivars. Leaves. Temperature. Resistance. Composition. United Kingdom.

Endogenous levels of the polyamines putrescine, spermidine, and spermine were quantified in the primary leaves of 3 bean cv. (194, Seafarer, and Tendergreen), 1 runner bean cv., and 1 mung bean cv., differing in their wilting response to a chilling exposure of 5 degrees Celsius for 24 h. Levels of polyamines prior to chilling treatment did not appear to be correlated with chill tolerance as levels in the nonchilled controls were highest in cv. of medium chill sensitivity. Plants grown under a vapor saturation deficit of 8.4 g/cubic meter (day)/6.1 g/cubic meter (night) exhibited a mild hardening as compared with plants grown under a vapor

saturation deficit of 5.7 g/cubic meter (day)/4.1 g/cubic meter (night), as the former showed less wilting on chilling. Hardening at high vapor saturation deficit had the effect of slightly lowering the putrescine content of nonchilled tissue but total polyamine content remained unchanged; however, on chilling, the largest relative increase in polyamine levels, in particular that of putrescine, occurred in hardened plants. There was also a significant relative increase in putrescine titre in response to chilling in nonhardened genotypes of high chill tolerance, whereas more chill-sensitive genotypes remained unchanged or slightly declined in putrescine content on chilling. Relative changes in putrescine content rather than absolute levels appears to be correlated with chill tolerance. These results are discussed in view of present knowledge on the adaptive significance of stress-induced changes in polyamines, especially with regard to membrane stability. (AS)

0439

21525 HUTTON, M.J.; VAN STADEN, J. 1981. Endogenous cytokinins in germinating seeds of Phaseolus vulgaris L. (Abstract). South African Journal of Science 77(7):326. En.

Phaseolus vulgaris. Seeds. Cotyledons. Cytokinins. Analysis. Germination. South Africa.

Ethanolic extracts from the cotyledons of mature dry Phaseolus vulgaris seed yielded cytokinin-like activity which co-chromatographed with zeatin and ribosylzeatin. Under conditions which stimulated germination and cotyledon expansion, the level of these cytokinins decreased rapidly in both intact embryos and excised cotyledons. In the excised cotyledons the decrease was continuous and resulted in very low levels of cytokinin being detected after 4 days of incubation. With the embryonic axis present, the initial decrease was arrested and reversed after 3 days. This suggests that the cotyledons do not synthesize cytokinins but that these hormones are imported from the embryonic axis, particularly once radicle growth is well underway. (Full text)

0440

28064 MANEN, J.F.; COMTE, M. 1986. Each Phaseolus vulgaris isolectin exists in five electrophoretic forms related to the number of metal ions bound per molecule. Plant Science 43(1):51-56. En., Sum. En., 21 Ref., Il. [Inst. de Botanique, Univ. de Geneve, 1 Chemin de l'Imperatrice, 1292 Chambésy/Geneve, Switzerland]

Phaseolus vulgaris. Lectins. Analysis. Switzerland.

Analysis of the pH 8.3 electrophoresis of the Phaseolus vulgaris seed lectins suggests that each of the 5 isolectins exists in 5 different forms. Incubations of the lectins in the presence of EDTA or of metal ions such as Mn(2+), Mg(2+), CO(2+), and Ni(2+) show that their different electrophoretic behaviors are related to the binding of metal ions to the molecules. Determinations of the isolectin metal content by atomic absorption measurements demonstrate that at pH 8.3 their 5 electrophoretic forms are related to the no. of subunits (0, 1, 2, 3, or 4) that contain metal ions in the tetrameric molecules. (AS)

0441

28644 MIYOSHI, M.; HAMAGUCHI, Y.; MATSUMOTO, K.; MIZUNO, I. 1978. The isolation and characterization of a trypsin inhibitor from Kintoki bean (Phaseolus vulgaris). Journal of Nutritional Science and Vitaminology 24(2):195-204. En., Sum. En., 8 Ref., Il.

Phaseolus vulgaris. Inhibitor. Trypsin. Analysis. Amino acids. Japan.

A trypsin inhibitor was isolated from Phaseolus vulgaris cv. Kintoki, and the specific activity increased 200 times that of the crude extract. It was homogeneous on several electrophoreses and the mol. wt. was about 13,000. The amino acid composition was characterized by high ratios of cystine, aspartic acid, and serine. It inhibited trypsin and alpha-chymotrypsin in molar ratios of 1:1 and 2:1, resp., but did not inhibit pepsin or pronase. It was relatively stable to heat treatment in the acidic medium, but not in the alkaline medium. Neither pepsin nor pronase destroyed the inhibitory function. (AS)

0442

27405 ORTEGA D., M.L.; MORALES H., C.L. 1985. Comparison of tryptophan content in recently harvested and stored common bean seeds (Phaseolus vulgaris L.). Bean Improvement Cooperative. Annual Report 28:131-132. En., 3 Ref. [Colegio de Postgraduados, Chapingo 56230, México]

Phaseolus vulgaris. Seeds. Tryptophane. Composition. Storage. Cultivars. Mexico.

Tryptophan content of seeds of 8 bean genotypes belonging to the Canario and Negro Arribeño groups was analyzed, and it was compared with that obtained previously from seeds of the same genotypes stored for more than 10 yr. In both groups there were consistently higher values for the recently harvested seeds than the stored ones. In the Canario group the tryptophan increases fluctuated between 9-33 percent, with an av. of 23 percent. In the Negro Arribeño genotypes av. increments of 34 percent were obtained with values between 26-55 percent. (CIAT)

0443

28023 PEÑA V., C.B.; ORTEGA D., M.L. 1986. Partial chemical composition, free soluble sugars and unavailable carbohydrates in the embryonic axis and seed coat of Phaseolus vulgaris L. (Canario group). Qualitas Plantarum Plant Foods for Human Nutrition 36(1):27-34. En., Sum. En., 32 Ref. [Laboratorio de Bioquímica, Centro de Botánica, Colegio de Postgraduados, Chapingo, México 56230, México]

Phaseolus vulgaris. Cultivars. Protein content. Seed coat. Ash content. Fiber content. Starch content. Cellulose. Sugar content. Enzymes. Bean flour. Mexico.

Four common bean var. (Gto. 113-A, Zac. 40, Chis. 34, and Chis 141-A, all belonging to the Canario group) were examined, but there were no significant differences among them. CP content (46.7 and 49.0 percent) was the main constituent in embryonic axes. The av. values of ash, crude fiber, and ether extract were 4.2, 3.7, and 3.0 percent, resp. Starch was approx. 3 times more abundant (7.5 percent) than cellulose (2.7 percent). Hemicellulose B values were lower (5.5 percent) than those of hemicellulose A (9.2 percent). The mean value of the pectic substances in embryonic axes was 12.3 percent. The free ethanol-soluble sugars ranged from 2.9 to 4.9 percent. Verbascose, stachyose, raffinose, sucrose, and galactose were identified and quantified in embryonic axes. Seed coat flour contained cellulose (30.6 percent), ether extract (0.4 percent), ash (2.8 percent), and protein (5.4 percent). Free ribose, mannose, arabinose, and galactose were present in seed coats in amounts ranging from 0.009 to 0.031 percent. (AS)

0444

28290 STURM, A.; CHRISPEELS, M.J. 1986. The high mannose oligosaccharide of phytohemagglutinin is attached to asparagine 12 and the modified oligosaccharide to asparagine 60. Plant Physiology 81(1):320-322. En., Sum.

En., 10 Refs., Il. [Dept. of Biology C-016, Univ. of California, San Diego, La Jolla, CA 92093, USA]

Phaseolus vulgaris. Phytohemagglutinins. Analysis. Proteins. Amino acids. USA.

The glycosylation sites of the high mannose and the modified (fucosylated) oligosaccharide on each polypeptide of phytohemagglutinin, the lectin of Phaseolus vulgaris, were identified. Fractionation by high performance liquid chromatography of tryptic digests of (3H)fucose or (3H)glucosamine labelled phytohemagglutinin, followed by amino acid sequencing of the isolated glycopeptides, showed that the high mannose oligosaccharide side chain was attached to asparagine 12 and the fucosylated oligosaccharide to asparagine 60 of the protein. (AS (extract)

0445

28656 SULLIVAN, J.G.; FREYTAG, G. 1986. Predicting interspecific compatibilities in beans (Phaseolus) by seed protein electrophoresis. Euphytica 35(1):201-209. En., Sum. En., 22 Ref., Il. [101A Horticulture Field Lab., 1707 S. Orchard St., Univ. of Illinois, Urbana, IL 61801, USA]

Phaseolus vulgaris. Phaseolus polystachyus. Phaseolus metacalfei. Hybridizing. Analysis. Proteins. Seed. Puerto Rico.

Seed proteins of 17 wild species of Phaseolus were separated by electrophoresis on SDS-polyacrylamide gels. There was very little variation of the protein pattern within most species, while considerable variation among species was evident. Relative interspecific similarities of protein patterns were estimated using Jaccard's similarity index, and a cluster analysis was performed on these values. The resultant dendrogram generally agreed with previous research on interspecific relationships in Phaseolus based on morphological characteristics, and also generally agrees with current information on interspecific similarities based on hybridization studies. Suggestions are made regarding interspecific hybridizations among Phaseolus species which have not been attempted, but which may be possible based on cluster analysis. These hybrids include P. vulgaris x P. polystachyus, P. vulgaris x (P. polystachyus x P. metcalfei), and P. anisotrichos x P. angustissimus. (AS)

0446

28252 TAKAHASHI, M.; KAMIYA, Y.; TAKAHASHI, N.; GRAFBE, J.E. 1986. Metabolism of gibberellins in a cell-free system from immature seeds of Phaseolus vulgaris L. Planta 168(2):190-199. En., Sum. En., 23 Ref., Il. [Inst. of Physical & Chemical Research, Wako-shi, Saitama 351-01, Japan]

Phaseolus vulgaris. Gibberellins. Analysis. Seed.

The biosynthetic steps from gibberellin A12-aldehyde (GA12-aldehyde) to C19-GAs were studied by means of a cell-free system from the embryos of immature Phaseolus vulgaris seeds. Stable-isotope-labeled GAs were used as substrates and the products were identified by gas chromatography-mass spectrometry. Gibberellin A12-aldehyde was converted to GA4 via non-hydroxylated intermediates and to GA1 via 13-hydroxylated intermediates. 13-Hydroxylation took place at the beginning of the pathway by the conversion of GA12-aldehyde to GA53-aldehyde. The conversion of GA20 to GA5 and GA6 was also shown but no 2beta-hydroxylating activity was found. Endogenous GAs from embryos and testas of 17-day-old seeds were reexamined by gas chromatography-selected ion monitoring using stable-isotope-labeled GAs as internal standards. Gibberellins A9, A12, A15, A19, A23, A24, and A53 were identified for the 1st time in P. vulgaris, in addition to GA1, GA4, GA5, GA6, GA8, GA17, GA20, GA29, GA37, GA38, and GA44, which were

previously known to occur in this species. The levels of all GAs, except the 2beta-hydroxylated ones, were greater in the embryos than in the testas. Conversely, the contents of GA8 and GA29, both 2beta-hydroxylated, were much higher in the testas than in the embryos. (AS)

0447

27713 VAN DER MARK, F.; VAN DEN BRIEL, W. 1985. Purification and partial characterization of ferritin from normal and iron-loaded leaves of Phaseolus vulgaris. Plant Science 39(1):55-60. En., Sum. En., 24 Ref., Il. [Dept. of Genetics, Free Univ. De Boelelaan 1087, NL-1081 HV Amsterdam, The Netherlands]

Phaseolus vulgaris. Leaves. Proteins. Composition. Fe. Mineral content. Netherlands.

The isolation and partial characterization of ferritin from normal and Fe-loaded bean leaves are reported. A procedure involving immunoaffinity chromatography is described. The presence of tissue-specific isoferritins was demonstrated. Ferritin from bean seeds contained 1 type of subunit with an Mr of 26 000; however, ferritin from leaves was found to be composed of different subunits. The model that explains the heterogeneity of ferritins in animal cells therefore seems also applicable to ferritins of plants. (AS) See also 0411 0415 0420 0460 0468 0474 0476 0481 0598 0626 0669 0672 0674 0709 0710

D00 AGRONOMY

D01 Soil, Water, Climate and Fertilization

0448

27783 BARRETO S., M.; SANCHEZ L., E.; FLOR I., J. 1983. Efecto de la fertilización con nitrógeno, fósforo y la aplicación del bioestimulante Ergostim en frejol (Phaseolus vulgaris L.), Tumbaco, Pichincha. (Effect of nitrogen and phosphorus fertilization and the application of the biostimulant Ergostim in beans, Tumbaco, Pichincha). Rumipamba 1(1):25-34. Es., Sum. Es., En., 11 Ref.

Phaseolus vulgaris. Fertilizers. N. P. Plant growth substances. Yields. Yield components. Income. Ecuador.

The effect of N (0, 60, and 120 kg/ha), P (0, 60, and 120 kg/ha), and the biostimulant Ergostim (0, 220, 400, and 600 cc/ha), applied alone and in combination, on yield and yield components of beans was evaluated at La Tola Exptl. Center of the U. Central in Pichincha, Ecuador. A preliminary economic study was also conducted. N fertilization and Ergostim application produced positive responses in yield, no. of pods/plant and grains/pod. The highest yields were obtained with 120 kg N and 600 cc Ergostim/ha. The levels of 200 and 600 cc Ergostim/ha were economically profitable, giving high income return rates (94.20 and 157.96 percent, resp.). (CIAT)

0449

28050 CABALLERO, S.S.U.; LIBARDI, P.L.; REICHARDT, K.; MORAES, S.O.; VICTORIA, R.L. 1986. Lixiviacao do nitrogenio proveniente do solo e do fertilizante ((15)NH4) 2SO4 durante o ciclo de uma cultura de feijao. (Leaching of nitrogen derived from the soil and from the fertilizer ((15)NH4).2SO4 during the growth cycle of bean). Pesquisa Agropecuária Brasileira 21(1):25-31. Pt., Sum. Pt., En., 21 Ref., Il. [Empresa Brasileira de Pesquisa Agropecuária, Unidade de Apoio ao Programa Nacional de Pesquisa em Biologia do Solo, Caixa Postal 23851, Seropédica-RJ, Brasil]

Phaseolus vulgaris. Fertilizers. Ammonium sulphate. N. Soil analysis. Brazil.

In an Oxic Paleudalf (Terra Roxa Estruturada) soil in Piracicaba (Sao Paulo, Brazil), the dynamics of total soil N and fertilizer-derived N (ammonium sulfate-(15)N) in soil solution was studied during the growth cycle of bean cv. Carioca in April-July. N losses due to leaching beyond 120 cm of depth were estimated. The crop was fertilized with 42 kg N/ha using ammonium sulfate highly enriched with (15)N. During the crop cycle the av. total N concn. and fertilizer-derived N decreased markedly with soil depth, being very small at 105 and 135 cm of depth (15 and 0.048 ppm, resp.). During crop development under min. drainage conditions only 3 g total N/ha and 3.04 mg fertilizer-derived N/ha were leached beyond 120 cm of depth. (AS (extract))

0450

28052 CADIMA Z., A.; SILVA, L.F. DA; LOBAO, D.E.P. 1985. Efeitos da queima e adubacao em solos de tabuleiro (Haplorthox) sob consorciado milho-feijao. (Effects of burning and fertilization in Haplorthox soils sown to beans and maize in association). Revista Theobroma 15(3):101-112. Pt., Sum. Pt., En., 19 Ref., Il. [Divisao de Geociências, Centro de Pesquisas do Cacau, 45.600 Itabuna-BA, Brasil]

Phaseolus vulgaris. Intercropping. Zea mays. Fertilizers. N. P. K. Agricultural lime. Biomass production. Brazil.

The effects of burning and fertilization on the chemical characteristics of Haplortox (tabuleiro) soils under a continuous mixed cropping of maize and beans were measured near Santa Cruz Cabrália (Bahia, Brazil). The soils were sampled and analyzed to evaluate the fertility at depths of 0-5, 5-15, 15-30, and 30-50 cm, prior to burning and after every 2 mo. The biomass production and development in depth of the maize root system were determined. Burning had a positive effect on the neutralization of soil acidity, increasing the pH from 5.5 to 6.0 and from 5.0 to 5.5 with and without the application of fertilizers (NPK) and dolomitic lime, resp. The effects of burning were less consistent for K and P; however, significant increases were observed with P fertilization in the 0-5 cm layer, levels varying from 20 to 50 micrograms/g. Fertilization and fertilization plus mulch treatments determined the development of the maize root system in depth and length, as well as the biomass production. (AS (extract))

0451

27799 DELLA LUCIA, T.M.C.; CHANDLER, L.; CASALI, V.W.D.; GALVAO, J.D.; FREIRE, J.A.H.; COSTA, L.M. DA. 1984. Aplicacao da tabela de vida das culturas as pragas de Phaseolus vulgaris L. em quatro níveis de adubacao. 1. Em áreas de alta fertilidade. (Application of the crop table for pests of Phaseolus vulgaris grown at 4 levels of fertilization. 1. In areas of high fertility). Revista Ceres 31(175):189-214. Pt., Sum. Pt., En., 27 Ref., Il. [Depto. de Fitotecnica da Univ. Federal de Vicosa, 36.570 Vicosa-MG, Brasil]

Phaseolus vulgaris. Fertilizers. N. P. K. Spodoptera frugiperda. Elasmopalpus lignosellus. Agrotis ipsilon. Yield components. Brazil.

Two plantings of bean cv. Ricobaio were made during the 1979-80 agricultural year, one during the rainy season and one during the dry season, in the high fertility exptl. area of the U. Federal de Vicosa (Minas Gerais, Brazil) to evaluate the relationships between fertility levels and insect pest damage. Four levels of NPK application were used, with the standard recommendation of fertilizer requirement, as based on soil analysis, taken as level 1. The other levels were 0, 0.5, and 2.0

times the standard. The fertilizer was applied in the row at planting. These levels represent the practical applications commonly observed in local bean production (no fertilizer, insufficient, correct, and excessive). The bean crop life table method was utilized to record the sequential plant mortality from planting to harvest. Data were taken at 3-day intervals and grouped as 3 bean development stages (germination-emergence, vegetative, reproductive-maturation). The reproductive sequence (flower-pod-ovule-grain-seed) life table was elaborated on the basis of samples of 10 plants from each plot just prior to harvest. Plant mortality (total and that caused by pests) was greatest in the germination-emergence and vegetative stages in both periods, decreased with increased levels of fertilizer, and was more than 6 times greater during the rainy season than during the dry season. Pests, however, were not a significant factor in effective stand reduction. Spodoptera frugiperda, Agrotis ipsilon, and Elasmopalpus lignosellus were the species responsible for the plant mortality observed. Grain and seed losses caused principally by Etielia zinckenella ranged from 4 to 7 percent during the rainy season and were less than 1 percent during the dry season. Field infestations of Acanthoscelides obtectus attained levels of 10-12 percent during the rainy season but no infestations occurred during the dry season. Thus, pests were responsible for approx. 15 percent of the production loss of seeds during the rainy season but were not a loss factor during the dry season. Production (kg/ha) increased linearly with fertility levels with differences in plant response related to time of planting, a greater production being obtained during the dry season. (AS)

0452

27455 ERIKSEN, F.I.; WHITNEY, A.S. 1984. Effects of solar radiation regimes on growth and N2 fixation of soybean, cowpea, and bushbean. Agronomy Journal 76(4):529-535. En., Sum. En., 34 Ref., Il. [Malling Agricultural College, 8340 Malling, Denmark]

Phaseolus vulgaris. Growth. Nitrogen fixation. Solar radiation. Shading. Yields. USA.

The growth and N2 fixation of soybean, cowpea, and bush bean cv. Burpee Tenderpod, common to the tropics in Hawaii-USA, are examined. Also, the effect of various radiation regimes on the performance of these crops with respect to growth patterns was studied to determine the relationship between yield and N2 fixation under shaded conditions. Bush beans were least affected by shading, max. yields being obtained at 70 percent sunlight. At full sun, their leaves were yellow and seed wt. was low. N fertilization, however, could correct this problem. (CIAT)

0453

28409 FAUCONNIER, D. 1980. Potassium requirements of grain legumes. In Potassium requirements of crops. Switzerland, International Potash Institute. IPI Research Topics no.7. pp.39-46. En., 26 Ref., Il. [Société Commerciale des Potasses et de l'Azote, 62, rue Jeanne d'Arc, F-75646 Paris-Cédex 13, France]

Phaseolus vulgaris. Fertilizers. K. Nutrient uptake. Yields. France.

A bibliographical review on the K requirements of soybean, bean, pea, groundnut, and cowpea (the more important grain legumes) is given. Aspects dealt with are the response to K fertilizer and K requirements during crop growth (production and K uptake, daily absorption rates, amount and distribution of K uptake, and comparison with other crops). The response of grain legumes to K fertilizer depends on potential production of the crop (availability of water, levels of other nutrients, species and var., and cultural methods) and on K availability in the soil. The rate of K

supply is critical at periods of peak growth. Beans can be affected by the anion accompanying the K, particularly when KCl is placed near the seed. (CIAT)

0454

27489 FONDO NACIONAL DE INVESTIGACIONES AGROPECUARIAS. VENEZUELA. 1984. Caraota. (Common bean). In _____. Informe anual 1984. Bramón, Estación Experimental Táchira. pp.40-43. Es.

Phaseolus vulgaris. Fertilizers. N. P. K. Yields. Venezuela.

Based on results of trials to determine the best fertilizer levels for beans in the agroecological conditions of Táchira, Venezuela, the following are the recommended NPK doses, depending on land use: intensive, 150-150-75 kg/ha; moderate, 30-61-30 kg/ha; and sporadic, 75-150-0 kg/ha. (CIAT)

0455

28243 GNIFFKE, P.A. 1985. Studies of phenological variation in the common bean (Phaseolus vulgaris L.) as modulated by mean temperature and photoperiod. Ph.D. Thesis. Ithaca, New York, Cornell University. 198p. En., Sum. En., 88 Ref., Il.

Phaseolus vulgaris. Cultivars. Photoperiod. Flowering. Temperature. Crossbreeding. Resistance. Adaptation. Plant habit. Genes. USA.

A total of 68 diverse bean cv. were grown under 12.3 and 18.0 h photoperiods at 3 sites (1000, 1850, and 2710 m.a.s.l.) in Colombia. Cv. were compared to each other by cluster analysis of 5 regression coefficients which involved time to flowering, mean temp., and photoperiod. The resulting response pattern classes reflected major genotypic differences for growth habit, photoperiod sensitivity, and mean temp. adaptation. Genotypes originating from the same regions showed similar environmental responses. A cross between 2 climbing bean lines, one sensitive and the other insensitive to photoperiod, showed that sensitivity was controlled by 2 genes with recessive epistasis. A cross between a photoperiod-sensitive, indeterminate line and an insensitive, determinate line showed that 1 of the genes controlling photoperiod responsiveness was linked to the locus controlling determinate growth habit, with a recombination frequency of 15 percent. (AS (extract))

0456

27759 GUIMARAES, C.M. 1986. Drought resistance in bean (Phaseolus vulgaris L.). Bean Improvement Cooperative. Annual Report 29:130-131. En., Il. [Centro Nacional de Pesquisa, Arroz e Feijao, Caixa Postal 179, 74.000 Goiania-GO, Brasil]

Phaseolus vulgaris. Cultivars. Resistance. Drought. Adaptation. Soil moisture. Brazil.

A field study was conducted to examine the possible mechanisms for drought adaptation of 2 drought-resistant (BAT 477 and Carioca) and 1 susceptible (CNF 0010) bean lines. Plants received optimum irrigation from planting until 2 wk. after emergence and then 3 soil moisture treatments were applied: low (3 mm of water), moderate (188 mm), and optimum (316 mm). Root density (from surface to 80 cm depth and at 20-cm intervals), leaf water potential, and leaf diffusive resistance were studied at low and optimum soil moisture treatments. Drought-resistant lines had lower root density in the 0-20 cm soil layer than the susceptible one, under optimum soil moisture. They had, however, higher root density in the 20-60 cm soil layer as well as higher leaf water potential than the susceptible one under

drought stress. This indicates that the drought resistance of these lines is due to the avoidance mechanisms of deeper roots and water retention in the plant. (CIAT)

0457

28224 HOLLANDS, J.M.J. 1986. Hen manure as a fertilizer for common beans (Phaseolus vulgaris L.). Its costs and efficiency compared with those of a chemical fertilizer and a comparison of two common methods of applying hen manure & seeding bean seeds. Cali, Colombia, Centro Internacional de Agricultura Tropical. 42p. En., Sum. En., 27 Ref., Il. Paper presented at The Agricultural University, Tropical Crop Science Section, Wageningen, The Netherlands.

Phaseolus vulgaris. Dung. Fertilizers. N. P. K. Planting. Spacing. Yields. Yield components. Colombia.

The price and efficiency of chicken manure, when used as a fertilizer for common beans, were compared with those of a chemical fertilizer. Two commonly used methods of chicken manure application and seeding were also assessed. Chicken manure was found to be an efficient but very expensive fertilizer. Similar bean yields could be achieved in a cheaper way by using NPK (10:13:8). The amount of chicken manure applied per hectare by the farmer was too large to obtain optimum profits; half the amount normally used gave the best profits. The efficiencies of the 2 methods of applying chicken manure and seeding were quite different: seeding 1 bean every 10 cm and incorporating the chicken manure gave significantly higher yields than when the manure was applied superficially and 3 seeds were sown every 30 cm. Chicken manure seemed to enrich poor soils more than the chemical fertilizer; thus, it could be useful in the long term. When applied in large quantities, however, chicken manure could possibly lead to excess Fe in the soil. Although the quality of chicken manure differed broadly, N, P, and K were always present in substantial amounts. (AS)

0458

27485 LAORECA, L. 1986. Phaseolus vulgaris (poroto común): sus características y toxicidad. (Phaseolus vulgaris: its characteristics and toxicity). Gaceta Agronómica 6(29):44-49. Es., Sum. Es., En. [Facultad de Ciencias Veterinarias, Univ. Nacional de La Plata, Argentina]

Phaseolus vulgaris. Cultivation. Yields. Intercropping. Nutritive value. Argentina.

The following aspects of bean cultivation in Argentina are briefly described: identification and geographical location, climatic requirements, av. yields, intercropping systems, nutritive value, toxicity, and trials with animals. (CIAT)

0459

28819 LIMA, C.A. DE S.; FERREIRA, P.A.; CAIXETA, T.J.; LOUREIRO, B.T. 1986. Efeito de seis profundidades do lencol freático sobre o comportamento da cultura do feijao (Phaseolus vulgaris L.). (The effects of six water table depths on bean performance). Revista Ceres 33(186):99-107. Pt., Sum. Pt., En., 21 Ref., Il. [Empresa de Pesquisa Agropecuaria do Estado de Minas Gerais, Caixa Postal 12, 39.440 Janaúba-MG, Brasil]

Phaseolus vulgaris. Soil moisture. Yields. Yield components. Brazil.

Water tables at depths of 55-60, 61-66, 67-72, 73-78, 79-84, and 85-90 cm were studied in a clay-like lowland soil to identify the effects of depth on bean performance. The depths of the water tables were obtained by the continuous application of water to the soil, accomplished by placing an

irrigation canal between lateral drains. Seed production, no. of pods/plant, no. of seeds/pod, and plant sensitivity were evaluated. There was no statistical difference between the water table levels at 55 and 84 cm in terms of seed production, no. of pods/plant, or no. of seeds/pod. When the water table was at 55-60 cm, the 2nd production was 98 percent superior to that obtained with the water table at 85-90 cm. There was less vegetative development of the plants when the water table was at a depth greater than 84 cm. (AS)

0460

27500 LLUCH, C.; CAMPOS, J.A.; LIGERO, F. 1983. Effect of nitrogen and sulphur fertilizers and seed inoculation with Rhizobium phaseoli on the nitrogen-sulphur relationships of bean (Phaseolus vulgaris L.). Journal of Plant Nutrition 6(12):1033-1042. En., Sum. En., 28 Ref. [Dept. of Plant Physiology, Univ. of Granada, Granada, Spain]

Phaseolus vulgaris. Fertilizers. N. S. Inoculation. Rhizobium phaseoli. Yields. Leaf area. Mineral content. Shoots. Roo'ɔ. Pods. Spain.

The effect of N and S application and seed inoculation on the yield, leaf area, distribution of different N and S fractions, and N:S ratio in shoot, fruit, and root of bean plants was determined under greenhouse conditions. Inoculation of plants, together with N and S application, produced an increase in total N conen. and a decrease in the accumulation of nitrate-N and sulphate-S in shoot, fruit, and root. Leaf area increased more with N than with S application while the highest amounts of fruit DM were obtained with S application. N:S ratios obtained were different depending on the part of the plant tested. S fertilization decreased the N:S ratios in shoot, fruit, and root. The data obtained indicate that an adequate N:S ratio can insure max. yield production. (AS)

0461

28613 MARRERO, V. 1985. Consideraciones generales de la nutrición nitrogenada del fríjol (Phaseolus vulgaris). (General considerations on nitrogen nutrition in beans). Boletín de Reseñas. Suelos y Agroquímica no.12:1-48. Es., Sum. Es., En., 125 Ref. [Inst. de Investigaciones de Agroquímica y Mejoramiento de Suelos, Calle 150 No. 2123 e/21-A y 25, Siboney, Playa, Ciudad de La Habana, Cuba]

Phaseolus vulgaris. Nutritional requirements. Fertilizers. N. Symbiosis. Rhizobium. Nodulation. Nitrogen fixation. Cuba.

A literature review covering the period 1934-83 is given on aspects related to the origin and importance of beans, its general characteristics as a legume plant, nutritional requirements, and basically, the effect of N fertilization. The importance of the Rhizobium-legume symbiosis is highlighted. Factors affecting the nodulation and the biological N fixation are mentioned and briefly explained, and several examples of the benefits obtained through the Rhizobium inoculation in beans are included. It is concluded that the N levels recommended for this crop fluctuate between 80-150 kg/ha, in the absence of effective Rhizobium strains; furthermore, it is indicated that the use of Rhizobium strains guarantees the substitution of approx. 2/3 of mineral N that has to be employed, as it is only necessary to apply amounts that vary between 20-40 kg/ha to satisfy the initial plant needs till the symbiosis becomes effective. (CIAT)

0462

28229 NUÑEZ B., A. 1986. Estudio de raíz y potenciales hídricos del fríjol bajo sequía. (Study of root and water potentials of bean under drought conditions). In Taller sobre Sequía, Pabellón, Aguascalientes, México,

1984. Memoria. Aguascalientes, México, Instituto Nacional de Investigaciones Agrícolas. Publicación Especial no.8. pp.38-56. Es., 13 Ref., Il.

Phaseolus vulgaris. Cultivars. Genotypes. Rooting. Growth. Temperature. Water requirements. Mexico.

In 1984, an expt. was carried out with beans at the Francisco I. Madero expt. station, Mexico, to quantify the differences of root and water potentials, and their relationship with yield in the environmental conditions of the zone. Bean var. used were of growth habits I (Bayomex), II (C101 x DGO 105), III (PI 319551, II 90M7-M-M, 1213-2, MSU-800122, CHIS-7), and IIIb (DGO-222). Water potential, apparent density, dry wt. at different stages of the growth cycle, and root growth were calculated for the studied genotypes. Bean var. DGO-222 had the greatest root vol. at the beginning and in the middle of vegetative growth. There were no significative differences in leaf water potentials. Bean var. DGO-222 showed greater vegetative development and MSU-800122 showed the lowest DM accumulation. The pattern of DM accumulation in the aerial part was highly correlated with root growth. The correlation coefficient between total DM wt. and root vol. was 0.91. Leaf dry wt. was highly correlated with leaf area (R2 = 0.98). Rapid establishment of bean var. DGO-222 is closely related to seed size (47.3 g/100 seeds). Bean var. DGO-222 showed the highest grain yield (872 kg/ha). It is concluded that there were no severe moisture deficits throughout the growth cycle. Low temp. resulted in a slower growth. Soil moisture differences did not affect water potential of the aerial part of the plant. The greater initial development of the crop in its aerial part was highly correlated with root growth. The rapid root growth may be a good parameter for screening genotypes more resistant to drought. (CIAT)

0463

28019 OLIVEIRA, A.A.R.; ZAMBOLIM, L. 1986. Interacao entre o fungo endomicorrizico Glomus etunicatum e o nematoide das galhas Meloidogyne javanica sob diferentes níveis de fósforo em feijao (Phaseolus vulgaris). (Interaction of the endomycorrhizal fungus Glomus etunicatum and the root knot nematode Meloidogyne javanica under different levels of phosphorus in bean). Fitopatologia Brasileira 11(1):217-226. Pt., Sum. Pt., En., 28 Ref. [Empresa Brasileira de Pesquisa Agropecuária, Centro Nacional de Pesquisa de Mandioca e Fruticultura, 44.380 Cruz das Almas-BA, Brasil]

Phaseolus vulgaris. Inoculation. Mycorrhizae. Meloidogyne javanica. Fertilizers. P. Yield components. Dry matter. Nutrient uptake. Mineral content. Ca. K. Mg. Canopy. Roots. Brazil.

Under greenhouse conditions bean plants of cv. Costa Rica were inoculated at planting with vesicular-arbuscular mycorrhizal fungi: Glomus etunicatum (1000 chlamydospores/plant, percentage of germination 75 plus or minus 10 percent) and/or Meloidogyne javanica (5000 eggs/plant). A sandy loam soil was used to which P was added at levels of 7, 50, 100, and 200 ppm. After 60 days plants inoculated with both organisms showed significantly higher dry wt. of the aerial part, no. of pods/plant, nutrient uptake, and a smaller no. of nematode eggs/g of roots than plants inoculated only with M. javanica. Chlamydospore production and percentage of mycorrhizal infection were not significantly reduced in the presence or absence of the nematode. Plant growth responses and nutrient uptake increased with levels of added P. The best crop growth responses and the highest reduction in the nematode levels of parasitism were obtained with 50 ppm P. P at levels over 100 ppm inhibited both M. javanica and G. etunicatum development. (AS)

0464

28262 PADILLA, J.E. 1986. Investigación: cómo obtener mejores cosechas de frejol (fríjol, poroto, judía) Phaseolus vulgaris L. variedad Uribe. (Research: how to obtain better yields of bean variety Uribe). Revista Técnico-Científica Agropecuaria no.1:11-13. Es., Il.

Phaseolus vulgaris. Fertilzers. N. P. K. Yields. Ecuador.

Chemical fertilizer application, accompanied with conservational labors, was evaluated in Cantón Mira, province of Carchi, Ecuador, to obtain higher bean crop yields. The exptl. design was performed on 4 plots, each of 180 square meters, with a decreasing order of fertilizer percentage (100, 75, 50, 0). The compound fertilizer 18-46-00 (diammonium phosphate) was used, plus 46-00-00 (urea). Results indicated that 130 kg of the former and 57 kg/ha of the latter should be applied. Yields obtained were 3.76, 2.70, 2.17, and 1.19 t/ha when fertilizer application was 100, 75, 50, and 0 percent, resp. (CIAT)

0465

28629 PAPADOPOULOS, I. 1986. Nitrogen fertigation of greenhouse-grown French bean. Communications in Soil Science and Plant Analysis 17(9):893-903. En., Sum. En., 21 Ref., Il.

Phaseolus vulgaris. Fertilizers. N. Irrigation. Salinity. Yields. Snap beans.

Water containing 3.6, 7.2, or 10.8 mmol N/liter and uniformly supplied with 2.0 and 5.0 mmol P and K/liter, resp., was used for irrigating greenhouse-grown French bean cv. Blue Lake. The fertilizers were applied with every irrigation via the irrigation stream. The plants were grown in pots, each filled with 12 kg of soil. In all treatments a 0.3 leaching fraction was allowed. The total amounts of N applied in a total amount of 180 liters water/pot were 9, 18, and 27 g/pot for the 3 N levels, resp. The N level induced considerable differences in soil salinity among treatments. In the root vol. of the treatment fed with the lowest N level the residual NO3-N concn. in the soil solution was negligible, whereas with the highest N level it ranged throughout the growing period between 15-20 mmol/liter. With the N-treatment 7.2 mmol/liter, which gave as high yield (1.8 kg/pot) as the highest N level, NO3-N was mostly around 3 mmol/liter. It was concluded that 7.2 mmol N/liter applied with every irrigation via the irrigation stream is adequate for high yield without unduly increasing soil salinity or wasting N. (AS)

0466

28073 PARSONS, L.R.; HOWE, T.K. 1984. Effects of water stress on the water relations of Phaseolus vulgaris and the drought resistant Phaseolus acutifolius. Physiology Plantarum 60(2):197-202. En., Sum. En., 28 Ref., Il. [Univ. of Florida, Inst. of Food & Agricultural Sciences, Agricultural Research & Education Center, 700 Experiment Station Rd., Lake Alfred, FL 33850, USA]

Phaseolus vulgaris. Water stress. Cultivars. Phaseolus acutifolius. Resistance. Drought. Osmotic potential. USA.

Phaseolus acutifolius, a drought resistant species, was compared under water stress conditions with the more drought-susceptible P. vulgaris (cv. Pinto and White Half Runner). Plants were prestressed by withholding irrigation water. The relationships among leaf water potential, osmotic potential, turgor potential, and relative water content were determined. (Current Annotated Bibliography of Irrigation)

0467

27703 PECK, N.H.; MacDONALD, G.E. 1984. Snap bean plant responses to nitrogen fertilization. Agronomy Journal 76(2):247-253. En., Sum. En., 21 Ref., Il.

Phaseolus vulgaris. Snap beans. Fertilizers. N. Growth. Mineral content. Yields. Dry matter. Seedling. Flowering. Podding. Nodulation. USA.

A study was conducted to determine the effect of N fertilization on vegetative growth, N partitioning in the plants, and pod production in snap bean plants. Plants of cv. Bush Blue Lake-47 were grown under field conditions (Geneva, New York, USA) with N from ammonium nitrate at rates of 0, 4, 8, and 12 g/square meter placed in a band 5 cm to the side and 5 cm below the depth of the seeds at planting time (10 June 1981) in a Lima silt loam (fine-loamy, mixed, mesic Glossoboric Hapludalf), a productive soil derived from calcareous glacial till. Rows were 50 cm apart with 22 productive plants/meter of row (44 plants/square meter). The fresh wt., dry wt., total N, and nitrate N were determined in different parts of the plants at the seedling, bloom, and pod stages. Yield and quality determinations were made on the pods at 10 and 13 Aug. harvests. Fertilizer N decreased growth of the plants in the seedling stage but not in the pod stage Fertilizer N reduced the no. of Rhizobium nodules on the roots. At the pod stage, total N was 15.7 g/square meter in plants grown with residual available soil N but without fertilizer N, while total N was 19.5 g/square meter in plants grown with residual soil N + fertilizer N at 12 g/square meter. Fertilizer N at 4-8 g/square meter produced the optimum quality and yield of snap bean pods for processing. (AS)

0468

28294 POMBO, G.I.; SMITH, C.B. 1986. Growth and nutrient interrelationships of three vegetable crops with different sensitivities to soil pH as affected by lime and fertilizer treatments. Communications in Soil Science and Plant Analysis 17(3):353-368. En., Sum. En., 19 Ref. [Dept. of Horticulture, The Pennsylvania State Univ., Univ. Park, PA 16802, USA]

Phaseolus vulgaris. Snap beans. Fertilizers. N. P. K. Ca. Mg. Mineral content. Leaves. Zn. Mn. Cu. B. Yields. USA.

The role of lime and fertilizers in sensitivity to low soil pH of snap beans, tomatoes, and red beets was studied. Treatments of no lime, calcitic and dolomitic lime resulted in soil pH levels of 5.5, 6.9, and 6.7, resp., at the time of planting. A var. of banded fertilizer treatments was applied to each plot. Leaf samples were analyzed for 11 elements. Growth responses of the 3 crops were related to the plant sensitivity to acid soils. When grown on soil with pH 5.5, snap bean vine wt. and pod yields were not affected. Leaf Mn levels increased with the greater sensitivity to acid soils. Both calcitic and dolomitic limes had little effect on snap bean yields. Lime types affected primarily leaf Ca and Mg. The NPK fertilizer treatment increased only vine wt. of snap beans. Leaf Mn was increased substantially in the NPK treatment. When gypsum or Epsom salts was added, yields were not affected. (AS (extract))

0469

28801 RONZELLI JUNIOR, P.; VIEIRA, C.; BRAGA, J.M.; SEDIYAMA, C.S. 1985. Resposta de cultivares de feijao (Phaseolus vulgaris L.) a calagem e adubacao fosfatada. (Response of bean cultivars to liming and phosphate fertilization). Revista Ceres 32(184):500-524. Pt., Sum. Pt., En., 13 Ref., Il. [Depto. de Fitotecnia, Univ. Federal do Paraná, Caixa Postal 672, 80.000 Curitiba-PR, Brasil]

Phaseolus vulgaris. Cultivars. Fertilizers. P. Agricultural lime. Toxicity. Al. Yields. Brazil.

In Piraquara (Paraná, Brazil) the response of 17 bean cv. to liming and P fertilization was studied in a soil with pH 4.9. Combinations of 3 levels of liming (0, 4.84, and 9.68 t dolomitic limestone/ha) with 3 levels of P (0, 60, and 120 kg/ha) were applied. All treatments received 150 kg ammonium sulfate and 60 kg potassium chloride/ha plus 150 kg ammonium sulfate/ha as side dressing, 22 days after bean emergence. Initial stand was lower in the absence of limestone, but the final stand was negatively affected by the absence of limestone as well as by that of phosphate. Limestone and/or phosphate increased plant height. This characteristic, however, was not useful to evaluate the tolerance of bean cv. to Al toxicity and low P availability. Bean cv. Rio Ivaí, Carioca 80, BAT 67, Aysó, Ricopardo 896, and ICTA Tamazulapa were the most responsive to the treatments and were considered as the most sensitive to Al toxicity and low P availability. Cv. Carioca, Vagem Roxa 1805, Aroana 80, and Rio Iguacu were tolerant since they were the less responsive to the treatments. Rio Tibagi, Rio Negro, Rio Vermelho, Aeté 3, Negrito 897, Rico 23, and Rico 1735 occupied an intermediate position. (AS)

0470

27727 RONZELLI JUNIOR, P.; FEITOSA, C.T.; ALMEIDA, L. D'A. DE 1984. Formulacoes comerciais e PK na presenca de nitrogenio em cobertura e/ou adubacao foliar para feijoeiro. (Commercial formulas and PK in the presence of nitrogen applied as top dressing and/or foliar fertilizer on beans). Campinas-SP, Brasil, Instituto Agronômico. Boletim Técnico no.90. 13p. Pt., Sum. Pt., En., 4 Ref.

Phaseolus vulgaris. Fertilizers. N. P. K. Leaves. Dry matter. Yields. Brazil.

The effects of commercial NPK formulations (4-14-8, 4-16-8, 4-30-10, and 2-20-10) were tested against a mixture of P and K, top dressing with N, and foliar fertilizer applications in an expt. with dry bean at the Centro Exptl. de Campinas (Sao Paulo, Brazil) on a Red Latosol soil. DM at flowering and grain yield showed that PK and commercial formulations were equally efficient if complemented with N applied as top dressing. Among the commercial formulations best results were obtained with 400 kg 4-14-8/ha plus the addition of 24 kg N/ha. Foliar fertilization, applied twice at 3.6 kg/ha each time, was not effective in increasing yield. (AS)

0471

28605 SAMPER, C. 1984. Effects of water stress imposed at mid-pod filling upon yield and dry matter partitioning in dry beans (Phaseolus vulgaris L.). Mag.Sc. Thesis. East Lansing, Michigan State University. 139p. En., Sum. En., 60 Ref., Il.

Phaseolus vulgaris. Water stress. Cultivars. Podding. Yields. Translocation. Selection. Resistance. Mexico.

Two expt. were conducted to study the genetic potential for differential storage and remobilization of nonstructural carbohydrates and its relation to yield performance of bean cv. grown under drought conditions imposed in the mid-pod filling stage and low soil N. A close relationship between grain yield and the change in stem and leaf dry wt. from anthesis to maturity implicates assimilate remobilization as an important contributor to seed yield under late season water stress. The daily assimilate partitioning to the fruit was found to be determined by genotype and influenced by water treatment. The top yielding cv. were those that had a long vegetative phase and a high fruit growth rate accompanied by a seed

filling period that did not differ in length between the water treatments. The geometric mean as opposed to other criteria for selecting drought-tolerant cv. proved to be very advantageous. It is suggested that an understanding of the type of water limitation and a quantification of the drought environment are necessary for designing an ideotype to be used in developing drought-tolerant cv. intended for a particular production system. (AS)

0472

27707 SCHUSTER, M.L.; SMITH, C.C.; SALAC, S.S. 1985. Effect of photoperiodism on common blight reactions of Phaseolus genotypes. Fitopatologia Brasileira 10(1):461-466. En., Sum. En., Pt., 3 Ref. [Dept. of Horticulture, Univ. of Nebraska, Lincoln, NB 68583, USA]

Phaseolus vulgaris. Genotypes. Photoperiod. Maturation. Resistance. Xanthomonas campestris pv. phaseoli. USA.

Comparisons were made on the effect of 12 and 16 h day lengths on maturity and common blight reactions of 2 Phaseolus lines adapted to the temperate zone and 4 developed for the tropics. The 6 lines flowered earlier under the short day length. The temperate zone lines were not more susceptible under the 12 h day length. Two tropical lines increased in susceptibility while the other 2 tropical lines were not so affected. In other words, an interaction for day length x Phaseolus lines was found for leaf infections to Xanthomonas phaseoli. Short day length did not affect pod reactions of Tepary # 10 to common blight, but a decrease in susceptibility was observed for Great Northern U.I. 59 and the tropical Phaseolus lines. Significant differences were obtained for pod reactions among most of the different Phaseolus lines. (AS)

0473

27486 SINGH, J.P.; KARAMANOS, R.E.; LEWIS, N.G.; STEWART, J.W.B. 1986. Effectiveness of zinc fertilizer sources on nutrition of beans. Canadian Journal of Soil Science 66(1):183-187. En., Sum. En., Fr., 9 Ref. [Dept. of Soil Science, Univ. of Saskatchewan, Saskatoon, Sask, S7N 0W0, Canada]

Phaseolus vulgaris. Growth chamber experiments. Zn. Mineral deficiencies. Mineral content. Yields. Dry matter. Nutrient uptake. Canada.

The relative effectiveness of Zn-sulfate, Zn-EDTA, low-yield ammonium-based lignosulphonate (ZnLY) and high-yield Na-based lignosulphonate (ZnHY) for bean production was tested in growth chamber and incubation expt. Zn-sulfate and ZnLY were more effective than Zn-EDTA and ZnHY in correcting Zn deficiency of bean plants. While biomass production was best with Zn-sulfate, ZnLY was more effective in increasing Zn content in the foliage and in the formation of strong chelates in the soil. (AS)

0474

28626 SMITH, C.B.; DEMCHAK, K.T.; FERRETTI, P.A. 1986. Effects of lime type on yields and leaf concentrations of several vegetable crops as related to soil test levels. Journal of the American Society for Horticultural Science 111(6):837-840. En, Sum. En., 14 Ref. [Dept. of Horticulture, The Pennsylvania State Univ., Univ. Park, PA 16802, USA]

Phaseolus vulgaris. Agricultural lime. Fertilizers. Mg. Nutrient uptake. Mineral content. Leaves. Zn. B. Yields. Snap beans. USA.

The effects of liming with and without fertilizer on tomatoes, sweet corn, snap beans, and cabbage were evaluated in expt. in 11 production areas of Pennsylvania, USA, in 1981-83. Calcitic, calcitic with 3 percent Mg, and dolomitic lime types (fineness-95 percent through a 100-mesh sieve) at

rates of 4.5-15.7 t/ha were compared with unlimed checks. High lime rates increased yields and had no deleterious effects. Substantial changes in soil pH and Ca and Mg saturation took place within a year of application. Leaf Mn concn. and, to a lesser extent, leaf Zn and B were decreased by liming. Calcitic lime increased leaf Ca but depressed leaf Mg, resp., at rates of 13.4-15.7 t/ha. Comparable dolomitic lime treatments enhanced leaf Mg substantially but did not increase leaf Ca. Within 2-3 mo. of lime application, leaf analyses showed that the calcitic type usually supplied reasonable amounts of Ca, the dolomitic type consistently supplied substantial quantities of Mg, and both types reduced leaf Mn. (AS)

0475

28015 SRINIVAS, K.; RAO, J.V. 1984. Response of French bean to nitrogen and phosphorus. Indian Journal of Agronomy 29(2):146-149. En., Sum. En., 5 Ref. [Indian Council of Agricultural Research, Krishi Bhawan, New Delhi 110001, India]

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

The response of French beans to N (0, 30, 60, and 90 kg/ha) and P (0, 50, 100, and 150 kg/ha) was studied at the Indian Institute of Horticultural Research in Hessaraghatta (Bangalore, India) during the Kharif seasons of 1978 and 1979. Significant yield responses were obtained with the application of N and P. Pod yields were highest with 90 kg N and 150 kg P/ha; however, the optimum levels were found to be 80 kg N and 123 kg P/ha. (AS)

0476

27800 SSALI, H.; KEYA, S.O. 1986. The effects of phosphorus and nitrogen fertilizer level on nodulation, growth and dinitrogen fixation of three bean cultivars. Tropical Agriculture (Trinidad) 63(2):105-109. En., Sum. En., 10 Ref., Il. [Dept. of Soil Science, Univ. of Nairobi, P.O. Box 30197, Nairobi, Kenya]

Phaseolus vulgaris. Fertilizers. N. P. Nodulation. Dry matter. Nitrogen fixation. Mineral content. Yields. Cultivars. Kenya.

P and N fertilizer level effects on nodulation, DM yield, dinitrogen fixation (as measured by the (15)N technique), N and P tissue content, and seed yield of 3 common dry bean cv. were investigated in a field expt. in Kabete, Kenya. The 2 levels of P were 0 and 150 kg/ha and the 2 N fertilizer levels were 10 and 100 kg/ha. Application of P increased nodulation, DM matter yield, P uptake, tissue N yield, dinitrogen fixation, and seed yield of the 3 bean cv. at both N levels. A high dose of N severely reduced nodulation only where P was not applied but severely reduced dinitrogen fixation at both P levels. Where P was applied cv. fixed comparable quantities of dinitrogen. At the low level of N where no P was applied, however, 1 cv. (Rose Coco) nodulated well early in the growth stages and fixed substantial dinitrogen. (AS)

0477

28645 TABBADA, R.A.; FLORES, M.A.A. 1982. Effects of water stress on the microbial populations in the rhizosphere of Phaseolus vulgaris L. Natural and Applied Science Bulletin 34(1):89-95. En., Sum. En., 14 Ref.

Phaseolus vulgaris. Soil moisture. Mycoses. Rhizosphere. Water stress. Philippines.

The effect of different soil water levels (14.5, 20.1, 26.7, 38.1, and 48.8 percent) on the population densities of fungi, Actinomycetes, and

Azotobacter in the rhizosphere of Phaseolus vulgaris cv. White Baguio was investigated. Water stress suppressed the growth of fungal populations which included 2 Ascomycetes, 8 fungi imperfecti or Deuteromycetes, and 1 mycelia sterilia. High soil moisture regimes favored Azotobacter growth while water stress stimulated the growth of Actinomycetes. (AS)

0478

27710 THOMAS, R.J.; SPRENT, J.I. 1984. The effects of temperature on vegetative and early reproductive growth of a cold-tolerant and a cold-sensitive line of Phaseolus vulgaris L. 1. Nodulation, growth and partitioning of dry matter, carbon and nitrogen. Annals of Botany 53(4):579-588. En., Sum. En., 18 Ref., Il. [Hill Farming Research Organization, Bush Estate, Penicuik, Midlothian, Scotland]

Phaseolus vulgaris. Cultivars. Resistance. Temperature. Dry matter. Mineral content. C. N. Nodulation. Nitrogen fixation. Leaf area. Growth. United Kingdom.

Nodulated plants of a cold-sensitive bean line (Seafarer) and a cold-tolerant line (accession 194) were grown under 3 temp. regimes (15/10, 20/15, and 25/15 degrees Celsius, light/dark). DM, total C and N were measured in plant parts at 3 harvests. Both lines produced functional nodules at a mean growth temp. as low as 12.9 degrees Celsius (15/10) but 194 produced more and larger nodules, which fixed more N (total plant N), than Seafarer. At the lowest temp. during early vegetative growth, 194 accumulated greater amounts of dry wt. than Seafarer but had similar RGR and NAR. Relative leaf growth rate and RGR, expressed in terms of N, were markedly greater in 194 than Seafarer. Accession 194 partitioned more dry wt. and N into shoots vs. roots and had a lower leaf:stem dry wt. ratio than Seafarer. Both lines showed similar increases in leaf area, LAR, and RGR with increasing temp. The results suggest that the ability to nodulate well, increase nodule size in response to temp. stress, and achieve max. leaf expansion are important factors for the superior growth of 194 over Seafarer. (AS)

0479

27711 THOMAS R.J.; SPRENT, J.I. 1984. The effects of temperature on vegetative and early reproductive growth of a cold-tolerant and a cold-sensitive line of Phaseolus vulgaris L. 2. Nodular uricase, allantoinase, xylem transport of N and assimilation in shoot tissues. Annals of Botany 53(4):589-597. En., Sum. En., 23 Ref., Il. [Hill Farming Research Organization, Bush Estate, Penicuik, Midlothian, Scotland]

Phaseolus vulgaris. Cultivars. Resistance. Temperature. Enzymes. Translocation. Mineral content. N. Sap. Nutrient transport. Nodulation. Plant assimilation. United Kingdom.

The activities of nodular uricase and allantoinase, the composition of bleeding sap N, estimated rates of xylem N translocation, and ureide assimilation in shoot tissues were compared in a cold-tolerant (194) and a cold-sensitive (Seafarer) nodulated Phaseolus vulgaris lines grown under 3 different temp. regimes. Uricase activity increased with increasing growth temp. and was generally greater in nodules of 194 than in Seafarer at any temp. Extractable allantoinase activity, on the other hand, was highest in nodules from plants grown at the coolest temp. (15/10 degrees Celsius, day/night) and there was little or no difference in activity between the lines. There was little difference in sap composition between lines or among temp. treatments. Ureides contributed between 80-91 percent of the total sap N in both lines grown at 25/15 or 20/15 degrees Celsius with a slightly lower percentage (65-84) when grown at 15/10 degrees Celsius. Estimated rates of N translocation were higher in 194 than Seafarer at the

coolest growth temp. Increases in rates of N translocation between successive harvests of either line were often correlated with increases in total N accumulation and also an accumulation of ureides in stems + petioles but not leaves. Generally, leaves assimilated all of the ureides into other compounds at all growth temp. Nodules and shoots of either line did not accumulate ureides at 15/10 degrees Celsius. Line 194 accumulated greater amounts of ureides in stems and petioles than Seafarer when grown at the 2 warmer temp. The results are discussed in relation to the ability of 194 to fix greater amounts of N than Seafarer at suboptimal growth temp. (AS)

0480

27459 TROIANO, J.; JACOBSON, J.S.; HELLER, L. 1984. Effects of simulated acidic rain applied alone and in combination with ambient rain on growth and yield of field-grown snap bean. Agriculture, Ecosystems and Environment 11(2):161-172. En., Sum. En., 20 Ref. [Boyce Thompson Inst., Cornell Univ., Tower Road, Ithaca, NY 14853, USA]

Phaseolus vulgaris. Snap beans. Rainfall. pH. Growth. Yields. Yield components. USA.

Field-grown snap bean cv. Provider plants were treated with simulated acidic rain applied either alone or in combination with ambient rain, and the effects on growth and yield were determined. In plots where ambient rain was excluded. a retractable canopy was activated to shield the crop. Four levels of acidity at pH values of 5.0, 4.2, 3.4, and 2.6 were applied in 4 replicate treatments and the expt. was conducted in 2 successive years (1981 and 1982). In plots that received only simulated rain, yield was not adversely affected by acidic rain; in 1981, a positive linear relationship was present between acidity of simulated rain and yield, but in 1982, no effect was found. In contrast, in plots that received both simulated and ambient rain, a negative linear relationship between acidity in simulated rain and yield was observed in both years. Vegetative mass and size of pods were unaffected by acidity in simulated rain in either exptl. condition. (AS)

0481

28815 VIEIRA, R.F. 1986. Influencia de teores de fósforo no solo sobre a composicao química, qualidade fisiológica e desempenho no campo de sementes de feijao (Phaseolus vulgaris L.). (The influence of soil phosphorus levels on bean seed chemical composition, physiological quality, and field performance). Revista Ceres 33(186):173-188. Pt., Sum. Pt., En., 27 Ref., Il. [Depto. de Fitotecnia da Univ. Federal de Vicosa, 36.570 Vicosa-MG, Brasil]

Phaseolus vulgaris. Cultivars. Seeds. Fertilizers. P. Germination. Seed vigor. Rainfall. Mineral content. N. K. Ca. Mg. Zn. Yields. Yield components. Brazil.

Seeds from 2 bean cv., produced in soils with 2, 15, and 36 ppm P (seeds P1, P2, and P3, resp.), were submitted to germination and vigor tests and chemically analyzed for N, P, K, Ca, Mg, and Zn. They were also included in 2 yield trials in the field (Goiania, Brazil) during the rainy and dry seasons. In these trials the treatments included 2 bean cv. (IPA 7419 and Rio Tibagi), 3 seed origins (P1, P2, and P3), and 2 fertilization levels (0-30-0 and 30-100-60 kg NPK/ha). Seed origins did not affect their germination; however, seeds from soil with a larger amount of P yielded more vigorous and heavier seeds. Increasing amounts of P in the soil increased the P, Mg, and Zn levels and decreased the percentage of N in the seed. In the dry season trial, the stand was lower with P1 seeds, but the plants produced more pods/plant and seeds/pod, so that the final yield was

not affected. In the rainy season trial with the higher level of fertilization, seeds P2 and P3 of cv. IPA 7419 yielded more than seeds P1. (AS)

0482

28096 WALLACE, D.H. 1980. Effects of day length and temperature on early and late maturing beans. Michigan Dry Bean Digest 4(4):11,25. En.

Phaseolus vulgaris. Cultivars. Growth chamber experiments. Photoperiod. Temperature. Flowering. Maturation. USA.

Bean var. Redkloud (early maturing) and Redkote (late maturing) were both grown in controlled environment growth chambers to study their behavior under long daylengths and relatively cool temp. (temperate locations) compared with short daylengths and either higher or lower temp. (tropical countries). Four daylengths (9, 12, 14, and 16 h) and 4 night temp. (18, 21, 24, and 27 degrees Celsius) were studied. At daylengths of 9 and 12 h, days to 1st flower varied between 37n-42. As the night temp. was raised from 18 to 21 to 24 degrees Celsius, the days to 1st flower decreased. Daylength had no direct effect on days to 1st flower, and day temp. caused little change. Redkloud can be classified as largely photoperiod-temp. insensitive, whereas Redkote is very sensitive. The results presented indicate that beans have genes which control early vs. late maturity as well as the plant's response to daylength and temp. (CIAT) See also 0368 0378 0387 0388 0389 0417 0425 0438 0490 0493 0497 0500 0508 0519 0571 0638 0650 0651 0663 0674 0679

D02 Cultivation Practices: Planting, Weed Cotrol and Harvesting

0483

27464 AGUILAR F., E.; DIAZ M., F.; LAING, D.R. 1984. Efecto de la densidad de siembra sobre algunas características morfológicas y el rendimiento en fríjol común (Phaseolus vulgaris L.). (Effect of planting density on some morphological characteristics and yield of beans). Turrialba 34(1):55-61. Es., Sum. En., Es., 11 Ref., Il. [Univ. Tecnológica de Pereira, Pereira, Colombia]

Phaseolus vulgaris. Cultivars. Spacing. Planting. Yields. Colombia.

During the 2nd semester of 1976, 4 common bean var. (Ica Pijao, Porrillo Sintético, Puebla 152, and P 006) of indeterminate growth habit were sown at 4 densities (60,000, 120,000, 240,000, and 480,000 plants/ha) at CIAT-Palmira. The var. that most responded to plant density was Puebla 152 with a mean yield of 3.12 t/ha. P 006 gave the lowest yield with a mean of 2.70 t/ha. Var. Porrillo Sintético responded positively up to a density of 24 plants/square meter, after which yield began to decrease. (AS (extract))

0484

28255 AL-SOBOH, G.; SRIVASTAVA, A.K.; BURKHARDT, T.H.; KELLY, J.D. 1986. A mixed-integer linear programming (MILP) machinery selection model for navybean production systems. Transactions of the American Society of Agricultural Engineers 29(1):81-84,89. En., Sum. En., 18 Ref. [Crop & Soil Science Dept., Michigan State Univ., East Lansing, MI, USA]

Phaseolus vulgaris. Mathematical model. Cultivation systems. Harvesting. Mechanization. Agricultural equipment. USA.

A new upright navy bean var. (Swan Valley) was developed at Michigan State U. (USA), which is suitable for direct harvesting. A mixed integer-linear programming model was developed to select the optimum harvesting method and machinery system. The effect of having 2 mixed cropping systems (navy bean-

maize and navy bean-sugar beet) is also considered. The results indicate that the upright navy bean var. planted in 70-cm row spacing and harvested directly was more profitable than any alternative navy bean production system. Navy beans were more profitable than maize in the mixed cropping system, while sugar beet was the most profitable crop. (AS)

0485

28269 BEHRENS, R.; HARDMAN, L.L. 1985. Weed control in dry beans. Minneapolis, University of Minnesota. Agricultural Extension Service. AGFS-0921. 2p. En., Sum. En.

Phaseolus vulgaris. Weeding. USA.

Parameters to be considered in a weed control program in beans are dicussed, namely the kind of beans, the weed species in the field, the soil type, the type of tillage, and irrigation (if applied). Herbicide costs and expected bean yields should also be considered. If perennial or other weeds that cannot be controlled by tillage or a labelled herbicide are present, a more competitive crop than beans should be planted. Total weed control is neither probable nor necessary; however, adequate weed control, especially for the 1st 3-4 wk., is required for profitable dry bean production. (AS)

0486

28235 DIAS, M.C.; GOMES, R.A.R. 1986. Debulhadeira manual de feijao caupi alternativa para o pequeno agricultor. (Hand bean thresher, an alternative for small producers). Manaus-AM, Empresa Brasileira de Pesquisa Agropecuaria. Unidade de Execucao de Pesquisa de Ambito Estadual de Manaus. Circular Técnica no. 14. 28p. Pt., Il. [EMBRAPA, Unidade de Execucao de Pesquisa de Ambito Estadual de Manaus, Caixa Postal 455, 69.000 Manaus-AM, Brasil]

Phaseolus vulgaris. Threshing. Agricultural equipment. Brazil.

A hand bean thresher, developed by the Unidade de Execucao de Pesquisa de Ambito Estadual de Manaus (Brazil), is described. This machine will benefit farmers with scarce resources that do not have electricity on their farms. The mechanical parts are described and procedures for its use are given. The way in which farmers can construct the machine is illustrated. (CIAT)

0487

27757 ESCALANTE E., J.A.S.; KOHASHI-SHIBATA, J. 1986. Influence of age at transplanting on seed yield of a pole bean (Phaseolus vulgaris L.). Annual Report 29:78-79. En. [Centro de Botánica, Colegio de Postgraduados, 56230, Chapingo, México]

Phaseolus vulgaris. Cultivars. Plant age. Transplanting. Yields. Mexico.

During 1981-83 the influence of transplanting at 15, 30, and 45 days of age on the yield and yield components of bean cv. Flor de Mayo X-16441 and Negro 150 was studied. Only the plants transplanted at 45 days of age showed delay in days to flowering and physiological maturity. For Flor de Mayo X-16441 yield reductions up to 8 percent were not significantly different. Negro 150 showed yield reductions up to 46 percent. The best correlations with yield were obtained for no. of seeds of pods/square meter. (CIAT)

0488

27718 GRAFSTROM JUNIOR, L.D. 1985. Foxtail in navy beans and wheat. Ph.D. Thesis. Fargo, North Dakota State University. 105p. En., Sum. En., 90 Ref., Il.

Phaseolus vulgaris. Weeding. Herbicides. Yields. Yield components. Weeds. USA.

Expt. were conducted in the field, greenhouse, lab., and growth chamber to determine (1) weed control and wheat response to propanil and MCPA; (2) foxtail (Setaria viridis) density and duration of competition in navy beans seeded at 2 row widths, with and without cultivation; and (3) uptake and translocation of (14)C-fluazifop in foxtail as influenced by environment. Season-long competition from foxtail at 6, 21, 64, 189, and 240 plants/m of row decreased navy bean yield 19, 26, 44, 65, and 76 percent when cultivated in rows spaced 76 cm apart. Foxtail at 1200 plants/square meter decreased yield of uncultivated navy bean by 31, 51, 74, and 81 percent when sethoxydim was applied 3, 4, 5, and 6 wk. after navy bean emergence. Sethoxydim applied for foxtail control 4 wk. after navy bean emergence caused a 59 percent yield decrease compared with 29 percent when foxtail was removed by hand 4 wk. after navy bean emergence. Foxtail competition reduced navy bean pods/plant more than any other yield component. (AS (extract))

0489

27482 JUNQUEIRA NETTO, A.; REZENDE, P.M. DE; ALCANTARA, E.N. DE 1983. Influencia de herbicidas na producao de graos e no controle de plantas daninhas em cultura do feijao (Phaseolus vulgaris L.). (Influence of herbicides on weed control and grain yield of dry beans). Ciencia e Prática 7(1):23-37. Pt., Sum. Pt., En., 22 Ref.

Phaseolus vulgaris. Herbicides. Weeding. Yields. Brazil.

In 1980-81 2 expt. were carried out to study the influence of herbicides, applied alone and in combination, on weed control and grain yields of bean cv. Carioca in Lavras and Alfenas (Minas Gerais, Brazil) on a dystrophic ferruginous Latosol and a dark red Latosol, resp. The most common weeds in the area were Brachiaria plantaginea, Portulaca oleracea, Amaranthus spp., and Sida spp. Pendimethalin alone and in combination with linuron showed over 80 percent weed control. Chloramben alone and in mixture with linuron and pendimethalin + EPTC also showed good weed control in the Lavras expt. With chloramben + linuron, pendimethalin + linuron, and chloramben treatments, grain yield was 94, 93, and 90 percent, resp., compared with the hand-weeded check in the Lavras expt. The initial and final stands and phytotoxicity were not affected by the treatments, except EPTC which showed some phytotoxicity in Lavras. (AS)

0490

28043 KNAVEL, D.E.; HERRON, J.W. 1986. Response of vegetable crops to nitrogen rates in tillage systems with and without vetch and ryegrass. Journal of the American Society for Horticultural Science 111(4):502-507. En., Sum. En., 14 Ref. [Dept. of Horticulture & Landscape Architecture & Agronomy, Univ. of Kentucky, Lexington, KY 40546, USA]

Phaseolus vulagris. Tillage. Cover crops. Fertilizers. N. Yields. Weeding. USA.

Direct-seeded bush beans, sweet corn, summer squash, and transplanted tomato and cabbage were grown under varying tillage and cropping systems near Lexington (Kentucky, USA) in 1982 and 1983. Cultural treatments were conventional tillage (CT), no-tillage without cover crop (NT - CC), and no-tillage with a cover crop (NT + CC) of Vicia villosa in 1982 and Lolium multiflorum in 1983. Split applications of N were 56 and 112 kg/ha in CT plots and 0, 56, and 112 kg/ha in NT plots. Plant stand and yields of bush beans and sweet corn were highest in CT plots in both years. Sidedressing bush bean, sweet corn, cabbage, and summer squash plants with N in NT - CC

plots increased yields linearly in 1982. Of the crops grown by NT + CC, only yields of bush bean and cabbage in 1982 and green fruit of tomato in 1982 showed a linear increase by sidedressing with N. Sidedressing with N increased N contents of all crops linearly in 1982, but not in 1983. Weed control was excellent in CT sweet corn and satisfactory in CT and NT - CC plots of the other crops. For the other crops in NT + CC plots, most of the weed and/or cover crop growth was the regrowth of V. villosa in 1982 and L. multiflorum in 1983 after weed control chemicals were applied. (AS (extract))

0491

28624 LYON, D.J.; WILSON, R.G. 1986. Sensitivity of fieldbeans (Phaseolus vulgaris) to reduced rates of 2,4-D and dicamba. Weed Science 34(6):953-956. En., Sum. En., 12 Ref. [Dept. of Agronomy, Univ. of Nebraska, Scottsbluff, NE 69361, USA]

Phaseolus vulgaris. Herbicides. Emergence. Seedling. Flowering. Podding. Yields. Seeds. Germination. USA.

The effects of the dimethylamine salt of dicamba and the dimethylamine salt of 2,4-D on Great Northern Valley beans were studied to assess the potential hazards of using these herbicides in areas adjoining bean production. Dicamba and 2,4-D were applied to beans at 3 different rates (1.1, 11.2, and 112.5 g a.i./ha) and 4 different growth stages (preemergence, 2nd trifoliolate leaf, early bloom, and early pod). Application of 2,4-D preemergence or in the 2nd trifoliolate leaf stage of growth did not reduce seed yield, delay maturity, or reduce germination of seed obtained from treated plants. Dicamba or 2,4-D applied at 112.5 g/ha to beans in the early bloom or early pod stages of growth consistently reduced seed yield, delayed maturity, and reduced germination percentage. Beans exhibited a greater overall sensitivity to dicamba than to 2,4-D. (AS)

0492

28615 MASCIANICA, M.P.; WILSON, H.P.; WALDEN, R.F.; HINES, T.E.; BELLINDER, R.R. 1986. No-tillage snap bean growth in wheat stubble of varied height. Journal of the American Society for Horticultural Science 111(6):853-857. En., Sum. En., 18 Ref., Il. [BASF Corporation, Chemical Division, Parsippany, NJ 07054, USA]

Phaseolus vulgaris. Snap beans. Tillage. Mulching. Harvesting. Mechanization. USA.

Bush-type snap beans were seeded by a no-tillage method into standing wheat stubble of 8, 15, 23, 30, and 38 cm in height to evaluate the effects of stubble height on pod mechanical harvest efficiency, plant morphology, and shoot component yield. Basal internode elongation, stem plus leaf yields, pod yields, efficiency of mechanical pod harvest, and height of basal pod set were related in a positive linear or curvilinear fashion to wheat stubble height. Quantity of pods missed during mechanical pod harvest was related negatively to height of basal pod set. Harvest efficiency was maximized with stubble heights of 15-30 cm, and these no-tillage systems yielded mechanically harvested pods levels that equaled or exceeded those of a conventional tillage (plow, disk 2 times) system. Superior mechanical pod harvest efficiency was attributed to increased basal internode length and mechanical support of the shoots by the wheat stubble. (AS)

0493

28990 MBUGUA, G.W. 1986. Effects of plant density and phosphate levels on growth, yield and yield components of field beans Phaseolus vulgaris L.

Phaseolus Beans Newsletter for Eastern Africa no.5:15-16. En. [National Horticultural Research Station, Thika, Kenya]

Phaseolus vulgaris. Spacing. Planting. Fertilizers. P. Leaf area. Growth. Nodulation. Yield components. Yields. Kenya.

The effect of population density and phosphate fertilizer on beans was studied in 2 expt. conducted in Kabete, Kenya, during 1979 and 1980. Four plant densities (160,000, 250,000, 444,444, and 1,000,000 plants/ha) and 4 rates of triple superphosphate (0, 50, 100, and 150 kg/ha) were used. Phosphate fertilizer increased LAI, plant growth rate, rate of plant senescence, and no. and wt. of nodules. In 1980 pod no./plant, seeds/pod, and 100-seed wt. were also higher in the fertilized than in the control plants. There was a 13 and 9 percent increase in seed yield over the control in 1979 and 1980, resp., with 150 kg P/ha. Yield differences resulting from the different rates were not significant; consequently, the application of 50 kg P/ha appeared to be the best. With increased plant population, the growth rate, DM yield, rate of senescence, and no. of pods/ha increased; however, no yield benefit was obtained by increasing plant population beyond 160,000 plants/ha. Population density x fertilizer interactions were largely insignificant. (CIAT)

0494

27790 MOLINA C., A. 1986. Efecto de la distancia entre surco sobre el rendimiento en grano y otros parámetros fisiológicos de cuatro cultivares de fríjol precoz (Phaseolus vulgaris L.). (Effect of interfurrow spacing on grain yield and other physiological parameters of four early-maturing bean cultivars). Tesis Ing.Agr. Palmira, Universidad Nacional de Colombia. 98p. Es., Sum. Es., En., 63 Ref., Il.

Phaseolus vulgaris. Cultivars. Spacing. Planting. Yields. Yield components. Dry matter. Foliage. Colombia.

In the 1st semester of 1985 an expt. was conducted at CIAT-Palmira, to determine the effect of interfurrow spacing on yield and yield components and DM production in the early maturing bean cv. BAT 41, XAN 145, 00 3807, and RAB 60. Spacings used were 60, 45, 30, and 20 cm, maintaining a constant density of 24 plants/square meter; an additional exploratory treatment of 30 plants/square meter with a 30 cm interfurrow spacing was also included. Yield increased by 9.5 percent when the spacing between furrows was reduced from 60 to 20 cm (2082 vs. 2300 kg/ha); however, this increase was less than that found for DM production at 50 days (18.2 percent) and at harvest (14.0 percent). Foliage cover was nearly 100 percent in all treatments at 44 days, but foliage cover tended to increase with narrower spacings and higher plant densities. The no. of pods/square meter and pods/plant increased with decreasing interfurrow spacing, but other yield components remained relatively constant. LAI at 50 days and HI were not affected by the distance or density treatments. GO 3807 showed by far the highest seed and pod abortion rates, this also being associated with a low HI. (AS)

0495

28816 TRIPATHI, S.S.; SINGH, P.P. 1986. The association of planting density and plant type in French bean (Phaseolus vulgaris). Experimental Agriculture 22(4):427-429. En., Sum. En., Es., 4 Ref. [Dept. of Agronomy, G.B. Pant Univ. of Agriculture & Technology, Pantnagar, 263 145, UP, India]

Phaseolus vulgaris. Snap beans. Spacing. Planting. Plant habit. Yields. Yield components. India.

The interaction between planting densities (10, 20, 30, 40, and 50 plants/square meter) and type of plant in 5 French bean var. of contrasting growth habits was studied in expt. conducted in Pantnagar, India, during the winter seasons of 1980-81. French bean var. Rufus (semi-spreading) outyielded the other genotypes at all the densities in both years, followed by var. Contender (bush). The better performance of Rufus resulted from its greater no. of pods/plant and wt. of seeds/pod. Most var. yielded best at 30 plants/square meter; however, var. Contender yielded best at 50 plants/square meter. (CIAT)

0496

28247 VALDES V., J.; VALDES S., M.A.; GARCIA, M.J. 1985. Influencia de la densidad de población sobre los rendimientos y sus principales componentes en el cultivo del fríjol negro (variedad ICA-Pijao línea 32). (The influence of population density on the yield and yield components in a bean crop (variety ICA-Pijao line 32)). Centro Agrícola 12(1):117-126. Es., Sum. Es., En., 17 Ref. [Depto. Producción Vegetal, Facultad de Agronomía, Centro Universitario de Pinar del Rio, Cuba]

Phaseolus vulgaris. Planting. Spacing. Yields. Yield components. Cuba.

To determine the optimum population density of beans, 7 treatments (100,000, 150,000, 200,000, 250,000, 300,000, 350,000, and 400,000 plants/ha) were evaluated during 3 periods from Dec. 1981 to March 1983, on sandy loam soil in the municipality of Pinar del Río (Cuba). The black bean var. ICA Pijao line 32, with type II growth habit, was used. Significative differences in yield, no. of pods/plant, wt. of grains/pod, and wt. of 1000 seeds were found. The highest yields were obtained with densities of 200,000 and 250,000 plants/ha. (AS (extract))

0497

28261 VANEGAS C., J.A. 1986. Plant density, row spacing and fertilizer effects in weeded and unweeded stands of common beans, Phaseolus vulgaris L. Uppsala, Swedish University of Agricultural Sciences. Department of Plant Husbandry. Report 160. 47p. En., Sum. En., 26 Ref., Il.

Phaseolus vulgaris. Planting. Spacing. Fertilizers. P. N. Growth. Weeding. Yields. Nicaragua.

In 1983-85, 3 multifactorial expt. in common beans were carried out to investigate the effects of crop plant density (50,000, 100,000, 200,000, 300,000, and 400,000 plants/ha), row spacing (25, 50, and 75 cm), and fertilizer application (0, 46, 92, and 184 kg P/ha, and 70 kg N/ha) on bean growth and yield, weed growth, and yield reduction caused by an ordinary weed population in Carazo, Nicaragua. The seed yield of beans in unweeded stands was usually reduced to levels between 15-45 percent of that in weeded stands. There were great variations between years. The yield reduction decreased significantly with increasing crop plant density whereas the influences of row spacing and fertilizer level on the yield-reducing effect of the weeds were not clear in these expt. The influence of the crop plant density on the yield varied with the other exptl. treatments and with the year/season conditions; however, the types of interactions are not fully clear from these expt. On av., the gross seed yield increased with increasing density up to the highest density level tested, both in weeded and unweeded stands. Application of P in combination with N usually caused an increase both in bean yield and in weed wt. On av., the bean seed yield in weeded stands and the weed wt. in unweeded stands increased up the highest P level used. The no. of seeds/pod, the mean wt. of seeds, and the HI showed comparatively small variations. The clearest differences were between weeded and unweeded bean stands. (AS (extract))

0498

28061 WAHAB, M.N.J.; DABBS, D.H.; BAKER, R.J. 1986. Effects of planting density and design on pod yield of bush snap bean (Phaseolus vulgaris L.). Canadian Journal of Plant Science 66(3):669-675. En., Sum. En., Fr., 14 Ref. [Regional Agricultural Research Center, Bandarawela, Sri Lanka]

Phaseolus vulgaris. Planting. Spacing. Experiment design. Yields. Snap beans. Canada.

Because of interest in maximizing production/unit area in regions where the land base is limited, the effects of planting density (16-116 plants/square meter) and planting design on pod yield of bush snap bean were measured in replicated field trials at the U. of Saskatchewan (Canada) with cv. Harvester in 1980 and 1981. Three planting designs were used: (a) conventional row designs with interplant spacing of 5 cm and interrow spacings of 20, 45, 80, and 125 cm; (b) square designs with interplant and interrow spacings both at 10, 15, 20, and 25 cm; and (c) triangle designs (honeycomb) with plants arranged at equal distances of 10, 15, 20, and 25 cm from each of their 6 nearest neighbors. In all 3 planting designs, higher planting densities (up to 116 plants/square meter) gave higher pod yields/unit area. Except for the lower response in the square design in 1981, increases in yield with increasing density were similar for all designs in both years. Pod yields did not differ from one design to the other in 1980. In 1981, the triangle design gave the highest av. yield and the row design gave the lowest av. yield. The results confirm observations of yield advantages in planting designs that use equal spacing in all directions. (AS)

0499

27791 WESTON, L.A.; PUTNAM, A.R. 1985. Inhibition of growth, nodulation, and nitrogen fixation of legumes by quackgrass. Crop Science 25(3):561-565. En., Sum. En., 25 Ref. [Dept. of Horticulture, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Weeds. Nodulation. Growth. Nitrogen fixation. Snap beans. Herbicides. USA.

The possibility of inhibition of nodulation, N2 fixation, and legume growth in the presence of living or herbicidally treated Agrophyron repens was determined. Soybeans, navy beans, and snap beans were grown both in greenhouse and field expt. in living or killed A. repens. Inoculated legumes were seeded in the following regimes: (1) living A. repens sod, which was regularly mowed; (2) glyphosate-treated A. repens sod; (3) soil from A. repens sod from which plant material was removed by sieving or raking; (4) a control soil of similar type and physical structure free from A. repens infestation. Legumes grown in treatment 1 in the greenhouse and in the field exhibited decreased nodule no., nodule fresh wt., and N2 fixation when compared with legumes grown under similar conditions in treatments 3 and 4. Shoot and root wt. were also significantly decreased in field and greenhouse expt. when legumes were grown in treatment 1. In many cases, legume nodulation and growth were decreased in treatment 2 as compared with treatments 3 or 4. Decreases in legume growth and nodulation in the presence of A. repens may be attributed to allelochemical effects. (AS (extract)) See also 0389 0457 0458 0501 0502 0504 0507 0508 0510 0511 0512 0513 0521 0527 0529 0558 0571 0698

D03 Cultivation Systems: Intercropping, Rotational Crops

0500

28238 BARRETO, A.C.; SERPA, J.E.S. 1986. Comportamento das culturas de milho e feijao (Phaseolus vulagris L.) nos sistemas de cultivo isolado e

consorciado, sob o efeito da adubacao fosfatada. (Performance of maize and bean crops in sole cropping and intercropping systems and effects of phosphate fertilization). Aracaju-SE, Brasil, Empresa Brasileira de Pesquisa Agropecuária, Centro Nacional de Pesquisa de Coco. Comunicado Técnico no.20. 9p. Pt., Il. [Centro Nacional de Pesquisa de Coco, Caixa Postal 44, 49.000 Aracaju-SE, Brasil]

Phaseolus vulgaris. Intercropping. Zea mays. Fertilizers. P. Yields. Yield components. Brazil.

Three expt. were carried out in an Eutrophic Cambisol in Poco Verde (Sergipe, Brazil) to compare, at the same time, the performance of bean cv. IPA 74/19 and maize in sole cropping and intercropping systems and to determine the suitable dose of P fertilizer. A randomized block exptl. design was used with 3 replications, and 0, 100, 200, and 300 kg P/ha were broadcasted or applied to the furrow. Both systems (sole cropping and intercropping) were compared by the LER. Bean yields in the intercropping system were lower than expected; this was associated with the lower production of pods/plant. Intercropped beans had 29-47 percent the LER presented by the sole cropped beans at the different P levels. The competitive ability of beans and maize is the same for both cropping systems. The possible use of a unique dose that satisfies both crops is suggested. (CIAT)

0501

28637 DAVIS, J.H.C.; WOOLLEY, J.N.; MORENO, R.A. 1986. Multiple cropping with legumes and starchy roots. In Francis, C.A., ed. Multiple cropping systems. New York, MacMillan Publishing. pp.133-160. En., 102 Ref., Il.

Phaseolus vulgaris. Intercropping. Zea mays. Manihot esculenta. Ipomoea batatas. Indeterminate cultivars. Climbing beans. Planting. Spacing. Fertilizers. Timing. Weeding. Colombia.

Different aspects of the most important crop associations are given, with emphasis on multiple cropping of legumes with cereals (the most common being beans/maize): plant characteristics, maturity differences, plant architecture, management of pests and diseases, management of density and spatial arrangement, fertilization, relative planting dates, and weed control. Regarding multiple cropping of root crops with cereals, observations are made on cassava/beans and sweet potato/beans. Practical examples and results of multiple cropping research and on-farm research are mentioned. It is concluded that breeding for selection can be efficiently carried out not only in sole cropping but in multiple cropping systems and that the greater the diversity of multiple cropping, the less likely that crop loss will occur. Finally, future advances are expected to be achieved by an increasing involvement with farmers to develop and adapt new technologies. (CIAT)

0502

28268 DAVIS, J.H.C. 1983. Metodología de la investigación aplicada a la asociación fríjol-maíz. (Research methodology applied to bean-maize association). Cali, Colombia, Centro Internacional de Agricultura Tropical. 12p. Es., 4 Ref., Il. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Climbing beans. Cultivars. Spacing. Planting. Intercropping. Zea mays. Experiment design. Yields. Colombia.

Three trials were carried out at CIAT-Palmira to quantify the effect of plot edges and useful plot size in beans. In the 1st trial (sown in Oct. 1977), the competition effect of 36 climbing bean var. associated with maize ICA H-210 in adjacent plots and the effect of the alleys on plot

edges were studied. The harvested plot area was directly proportional to the F test value for var. effect, and inversely proportional to C.V. The effect of lateral edges was not significant. The effect of headland edges for 2 and 4 seed beds was influenced by the var. Light utilization was different in all the var. Yields of most productive bean var. were less overstimated when headland edges were included. The 2nd trial was sown with 3 replications, using climbing bean var. P589 and maize ICA H-207. The 3rd trial had 4 replications with the same bean var. associated with maize ICA H-210. Results of the 2nd trial show a min. effect of 2-m edges, with a greater effect for the association than for the monocrops. Beans in association acted as an anchorage to maize, thus reducing lodging. It is concluded that there was no need to leave lateral edges between plots, since there was not a significant competition effect between adjacent plots. A marked effect of headland edges was observed, not uniform for all the var. An useful plot of 11 square meters is required for climbing bean associated with maize, to detect a significant 24 percent difference over the mean, with 4 replications. Various quantification methods of the association system as a whole and regarding each component in monoculture are described and compared. Tables and figures illustrating exptl. results are included. (CIAT)

0503

27479 EDJE, O.T. 1983. Effects of tassel removal and defoliation of maize on yield of maize and bean grown on monoculture and in association. Research Bulletin of Bunda College of Agriculture 12:69-85. En., Sum. En., 10 Ref.

Phaseolus vulgaris. Intercropping. Zea mays. Defoliation. Yields. Malawi.

Maize var. M#12 and bean var. 499/5 were grown either in monoculture or in association at Bunda College of Agriculture (Malawi) during the 1982-83 cropping season. The maize in monoculture or in association was subjected to detasseling and defoliation treatments. The treatments were (1) control, (2) detassel only, (3) detassel and removal of 2 leaves, and (4) detassel and removal of 4 leaves. The leaf areas defoliated, averaged over cropping systems, for treatments 3 and 4 were 6663 and 22,400 square centimeters, resp. The total DM of treatments 2, 3, and 4 was calculated and found to be sufficient to feed 1 livestock unit weighing 454 kg for 27.6, 36.1, and 71.8 days, resp. Detasseling increased seed yield of maize in monoculture by 13.7 percent over control. Treatments 3 and 4 had no significant effect on maize in monoculture. The relative photosynthetic potentials of treatments 3 and 4 were 100.8 and 86.8, resp. (AS (extract))

0504

27429 FLOREZ O., G.; MUÑOZ A., R.; ARIAS F., J. 1984. Evaluación del sistema de yuca (Manihot esculenta Crantz) intercalada con maíz (Zea maiz L.) y fríjol (Phaseolus vulgaris L.) en clima medio. (Evaluation of cassava intercropped with maize and beans in intermediate climates). Revista ICA 19(3):301-306. Es., Sum. Es., En., 11 Ref., Il. [Inst. Colombiano Agropecuario, Apartado Aéreo 51764, Medellín, Colombia]

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

The performance of 6 different intercropping systems of cassava, maize, bush and climbing beans was evaluated at the Tulio Ospina exptl. research station (Medellin, Colombia). The intercropping systems were: (1) cassava/maize (1 row), 21,000 plants/ha; (2) cassava/bush beans (2 rows), 70,000 plants/ha; (3) cassava/maize (1 row) plus bush beans (2 rows), 21,000 and 70,000 plants/ha, resp.; (4) cassava/maize (1 row) plus 14,000 climbing bean plants/ha associated with maize; (5) system 2 planted twice

during the cassava growing season, and (6) systems 4 and 2 combined. The av. cassava yield of the 6 intercropping systems (33.3 t/ha) compared favorably with that of monocropped cassava (30.6 t/ha); this difference was not statistically significant. Maize, when intercropped with cassava, reduced its yield by 36 percent and, similarly, that of bush beans was reduced by 30 percent. The LER of 2.10 (av. of the 6 intercropping systems) and the net income were similar or higher than those obtained for monocropped cassava. Results indicated that bush beans and maize at the populations and in systems used are good associations to improve cassava productivity within the intermediate climate zone of Colombia (1200-1800 m.a.s.l.). (AS (extract)-CIAT)

0505

28267 GARCIA, S.; DAVIS, J.H.C. 1983. Principios básicos de la asociación de cultivos. (Basic principles of intercropping). Cali, Colombia, Centro Internacional de Agricultura Tropical. 9p. Es., 9 Ref.

Phaseolus vulgaris. Intercropping. Zea mays. Relay crops. Dwarf beans. Climbing beans. Colombia.

The importance of traditional intercropping in the tropics is analyzed, mentioning statistics that emphasize the worldwide importance of this cropping system. Terms that describe multiple cropping systems are defined: sequential cropping (double, triple, and quadruple cropping, and ratooning), associated cropping (mixed, intercropping, strip, and relay cropping), sole cropping (monoculture), rotation, cropping pattern, and cropping system. Examples are given of associations with beans in Latin America and basic physiological, agronomic, genetic, pathological, entomological, economic, nutritive, and cultural factors are briefly analyzed. It is concluded that it is necessary to collect all the available information before establishing priorities; the research program should keep a permanent and close communication with the farmers to ensure a practical focusing of research and to assess the new technology to determine its effectivity. (CIAT)

0506

28281 HOLGUIN A., G.; LOPEZ G., D.L.; DAVIS, J.H.C. 1985. Selección simultánea para rendimientos en maíz (Zea mays) y fríjol (Phaseolus vulgaris) en generaciones segregantes F5. (Simultaneous selection for yield in maize and beans in F5 segregating generations). Acta Agronómica 35(2):7-19. Es., Sum. Es., En., 5 Ref.

Phaseolus vulgaris. Intercropping. Zea mays. Yield. Yield components. Selection. Genotypes. Plant habit. Colombia.

Bean genotypes, differing in yield and grain color and size and belonging to 3 growth habits, were assessed at CIAT in monoculture and in association with 3 maize var. to select those materials giving higher yields in this type of association. The variables no. of nodes on the main stem, no. of pods/plant, 100-seed wt., and yield were measured for beans. Bean planting systems affected yield, no. of pods, no. of seeds/pod, and 100-seed wt. For the growth habits there is a highly significative correlation between yield components between one generation and another. (CIAT)

0507

28607 KOPPER C., N.; ARAYA V., R.; GONZALEZ M., W. 1986. Poblaciones y sistemas de siembra de fríjol común (Phaseolus vulgaris L.) asociado con maíz (Zea mays L.). (Populations and planting systems of common bean associated with maize). Boletín Técnico de la Estación Experimental Fabio Baudrit 19(2):18-27. Es., Sum. En., Es., 21 Ref., Il.

Phaseolus vulgaris. Intercropping. Zea mays. Planting. Spacing. Cultivars. Costs. Yields. Costa Rica.

Three bean populations (100,000, 200,000, and 300,000 plants/ha) and 2 planting systems in association with maize (one row of beans between 2 rows of maize; beans in the same maize row) were evaluated in Grecia (Alajuela, Costa Rica). Bean cv. Brunca and Huetar, and maize cv. Tuxpeño were used; the latter was planted at 1 m between rows and 2 plants/hill 50 cm apart. Both species were planted simultaneously. The 2 bean cv. in the 2 planting systems and at the 3 plant densities did not affect maize yield. Maize plant height was affected by the planting system. Bean cv. Brunca outyielded cv. Huetar. Production costs were higher with beans planted between the maize rows, and the largest gross return was obtained when cv. Brunca was planted at 200,000 plants/ha in the same maize row. (AS)

0508

27792 TECLEZIO, M.F.; LEA, J.D.; MOBERLY, P.K. 1984. Intercropping of beans (Phaseolus vulgaris L.) and sugar-cane: the effect of inter-specific competition on the growth of plant cane. South African Journal of Plant and Soil 2(2):59-66. En., Sum. En., Af., 24 Ref., Il. [South African Sugar Association Experiment Station, Mount Edgecombe 4300, Republic of South Africa]

Phaseolus vulgaris. Intercropping. Saccharum officinarum. Rainfall. Water requirements. Yields. Spacing. Planting. South Africa.

The competitive effects of intercropped beans on the growth, tiller development, and yield of sugarcane in the subhumid coast-hinterland of Natal (Republic of South Africa) were investigated over 2 seasons. In the 1st season rainfall was exceptionally low and intercropping reduced tiller emergence, leaf area, and DM production in the sugarcane. Lower soil and leaf water potentials were measured in the intercropped treatments. Beans appeared to be the stronger competitor and produced yields of up to 940 kg/ha. Second season rainfall was favorable and tiller emergence was more prolific in the intercropping treatments. This, combined with a higher degree of tiller mortality in the monoculture in the preceding autumn and winter, compensated for reduced DM production in the intercropped treatments in the 1st summer. Availability of soil moisture was the major factor affecting plant response to intercropping. (AS)

0509

28059 LEGGETT, G.E.; WESTERMANN, D.T. 1986. Effect of corn, sugarbeets, and fallow on zinc availability to subsequent crops. Soil Science Society of America Journal 50(4):963-968. En., Sum. En., 17 Ref., Il. [Snake River Conservation Research Center, United States Dept. of Agriculture, Agricultural Research Service, Kimberly, ID 83341, USA]

Phaseolus vulgaris. Rotational crops. Mineral deficiencies. Zn. Nutrient uptake. Mineral content. USA.

The effects of fallow, sugar beets, and maize on Zn availability to subsequent crops grown on a Portneuf silt loam near Kimberly (Idaho, USA) were determined. All bean plants were Zn deficient when grown after fallow or sugar beets but not after maize or where Zn was applied. The av. Zn concn. in beans (vegetative development stage, V3) following maize was 20.5 mg/kg compared with 12.5 mg/kg following fallow or sugar beets without Zn fertilization. The av. Zn uptake by beans (V3) following maize was 1.3 g/ha compared with 0.6 g/ha after fallow or sugar beets without Zn fertilization. The Zn uptake after maize was even greater than where 11.2 kg Zn/ha was applied to fallow or sugar beets (1.3 vs. 0.9 g Zn/ha). Enhanced Zn availability following maize persisted throughout the growing

season and into a 2nd bean crop, although at a decreased level. Similar trends occurred with potatoes and sweet corn. Soil diethylenetriamine pentaacetic acid-extractable Zn was not significantly different after fallow, sugar beets, or maize. These results indicate that Zn deficiency in sensitive crops may be alleviated or prevented depending upon the preceding crop grown, and that factors not measured by diethylenetriamine pentaacetic acid can significantly influence Zn availability. (AS (extract))

0510

28240 MBUYA, O.S. 1986. Effective number of bean (Phaseolus vulgaris L.) plants per hill in association with maize. Moshi, Tanzania Agricultural Research Organization. Lyamungu Research Institute. 6p. En., 6 Ref. Paper presented at the Bean Research Workshop in Tanzania at Sokoine University of Agriculture, 5th., Morogoro, Tanzania, 1986. [Tanzania Agricultural Research Organization, Lyamungu Research Institute, P.O. Box 3004, Moshi, Tanzania]

Phaseolus vulgaris. Intercropping. Zea mays. Cultivars. Planting. Spacing. Yields. Yield components. Tanzania.

A field trial was carried out in Lambo, Tanzania, in 1986 during the long rains to determine the effective no. of bean seeds/hill to be grown in association with maize, without reducing the yields of the 2 crops. Two bean cv. (Lyamungu 85 and Masai Red) were evaluated in pure stand and in association with maize cv. H 632 using a split plot design with 4 blocks. Sole crop beans were sown at a spacing of 50 x 20 cm, 2 seeds/hill, and beans in association with maize at 75 x 7 cm, 75 x 14 cm, and 75 x 21 cm using 1, 2, and 3 seeds/hill, resp. Bean yields were superior when sown in pure stand than in association with maize; however, there were no significant (P = 0.05) yield differences among the different no. of plants/hill within a cv. in associated culture. Considering the yield components, sole crop bean yields were superior to any of the intercrops only due to the significantly (P = 0.05) higher no. of pods/plant in the former. (CIAT)

0511

28012 PULIDO T., J.I.; MORENO M., J.D. 1986. La asociación maíz por fríjol en clima frío. (Maize and bean intercropping in cold areas). ICA Informa 20(1):24-28. Es., 4 Ref., Il.

Phaseolus vulgaris. Intercropping. Zea mays. Planting. Timing. Cultivars. Spacing. Weeding. Yields. Colombia.

Results from different trials carried out at exptl. centers of the Instituto Colombiano Agropecuario and on farms in the dept. of Cundinamarca and Boyacá (Colombia), during 1981-84, are given. The aim is to develop a suitable technology for the management of the maize/bean associated cropping system, giving an alternative for improving yields and for increasing land use efficiency. Aspects on sowing time, var., plant densities, weed management (critical time of competition and manual weed control), fertilization, and economics are indicated. (CIAT)

0512

28092 RAMALHO, M.A.P.; TEIXEIRA, A.L.S. 1983. Mecanizacao do milho e feijao consorciados. (Mechanization of maize-bean intercropping). In Empresa Brasileira de Pesquisa Agropecuária. Centro Nacional de Pesquisa de Milho e Sorgo. Mecanizacao na Cultura do milho utilizando a tracao animal. Sete Lagoas-MG, Brasil. Circular técnica no.09. pp.87-103. Pt., 9 Ref., Il. [Empresa Brasileira de Pesquisa Agropecuária, Centro Nacional de Pesquisa de Milho e Sorgo, Caixa Postal 151, 35.700 Sete Lagoas-MG, Brasil]

Phaseolus vulgaris. Intercropping. Zea mays. Mechanization. Cultivation. Brazil.

Some aspects of the mechanization of maize-bean intercropping in the state of Minas Gerais, Brazil, are analyzed. Emphasis was placed on the utilization of animal traction on small farms where this cropping system predominates. (CIAT)

0513

28606 RAMIREZ Q., I.M.; ARAYA V., R. 1986. Evaluación de cultivares y densidades de siembra en fríjol (Phaseolus vulgaris L.) bajo el sistema tapado en Valverde Vega. (Evaluation of bean cultivars and planting densities under the "covered bean" system in Valverde Vega). Boletín Técnico de la Estación Experimental Fabio Baudrit 19(2):1-9. Es., Sum. En., Es., 10 Ref.

Phaseolus vulgaris. Cultivars. Spacing. Planting. Covered bean system. Yields. Costa Rica.

The performance of improved bean var. and the effect of planting densities under the "covered bean" system were evaluated in 2 expt. carried out in Valverde Vega, Costa Rica; in the 1st, 22 bean cv. were planted at a density of 200,000 seeds/ha, and in the 2nd, 11 bean cv. from the 1st trial were selected and planted at densities of 200,000, 300,000, and 400,000 seeds/ha. The covered bean system, which consists in mowing and chopping the existing weeds, was simulated in both trials; 2 x 2 m plots were established and the bean seed was distributed under the cover of the cut weeds. No fertilizer nor weed or disease control treatments were applied, as these cultural practices are not common under this system. The planting density had a positive linear effect on production. In both trials and in all treatments the no. of plants decreased by an av. of 62 percent at harvesting, if compared with the no. of seeds planted. Several local cv. did not complete their productive cycle which indicates a possible differencial response to the microclimatic conditions prevalent in the region. Bean cv. NAG-58, RAO-4, NAG-77, and NAG-81 performed the best in the 1st trial, and Criollo Rojo and NAG-77 performed the best in the 2nd trial. (AS-CIAT)

0514

28636 RAO, M.R. 1986. Cereals in multiple cropping. In Francis, C.A., ed. Multiple cropping systems. New York, MacMillan Publishing. pp.96-132. En., 138 Ref., Il.

Phaseolus vulgaris. Intercropping. Zea mays.

A literature review is given on various aspects related to the management of cereals in multiple cropping systems (plant population and row arrangement, time of planting, fertilization, zero or minimum tillage, relay planting, and ratooning) for improved yields. Some general characteristics of the maize/bean cropping system, which predominates in Central and South America, and parts of East Africa, are described. Regarding the direction of research, it should concentrate on developing an array of cropping system options so that the farmer can choose what is appropriate to each socioeconomic and agroecological condition. The importance for determining breeding objectives to develop the genotypes required for different cropping systems is also highlighted. (CIAT)

0515

28250 ROSSET, P.M.; VANDERMEER, J.; CANO P., M.; VARRELA, G.; SNOOK, A.; HELLPAP, C. 1985. El fríjol como cultivo trampa para el combate de Spodoptera sunia Guenée (Lepidoptera: Noctuidae) en plántulas de tomate.

(Beans as a trap crop to protect tomato seedlings from attack by Spodoptera sunia (Lepidoptera: Noctuidae)). Agronomía Costarricense 9(1):99-102. Es., Sum. Es., En., 17 Ref. [Division of Biological Sciences, Univ. of Michigan, Ann Arbor, MI 48109, USA]

Phaseolus vulgaris. Intercropping. Lycopersicum esculentum. Insect control. USA.

The potential use of bean seedlings as a trap crop to protect tomato seedlings from attack by Spodoptera sunia is reported. In an expt. comparing insect attack in tomato monocultures with attack in polycultures of tomatoes and beans almost 20 times more larvae of S. sunia were found on tomato seedlings in the monocultures than in the polycultures (3.8/100 plants vs. 0.2/100 plants, P less than 0.05). Additionally, a significantly higher level of attack was found on bean seedlings in the polycultures than on tomatoes (7.3/100 plants, P less than 0.0001), indicating a strong preference for beans. Although damage was not quantified, the tomato seedlings were almost completely defoliated in the monoculture, while they showed virtually zero damage in the polyculture. In contrast, the bean seedlings appeared to tolerate the attack, probably because of the relatively larger quantity of foliage in the seedling stage. Thus, the beans apparently functioned as an effective trap crop, protecting the tomatoes from Spodoptera attack. These results, although preliminary, when taken together with other promising results in terms of yield and plant protection found in the tomato/bean system, argue strongly for further research towards the incorporation of tomato/bean polycultures as part of a pest management program for tomatoes. (AS)

0516

28014 SILVA, R.S.; AGUAS, P.M.; ALBORNOZ, G. 1984. Adaptación de 20 líneas de frejol voluble (Phaseolus vulgaris L.) asociado con maíz (Zea mays L.) en la Estación Experimental Santa Catalina-INIAP. (Adaptation of 20 climbing bean lines associated with maize at the Santa Catalina experimental station-INIAP). Rumipamba 2(1):55-67. Es., Sum. Es., En., 8 Ref.

Phaseolus vulgaris. Cultivars. Climbing beans. Intercropping. Zea mays. Adaptation. Flowering. Maturation. Yields. Yield components. Ecuador.

The degree of adaptation of 20 climbing bean lines and the response of agronomic characters to the association of maize INIAP 101 with beans were evaluated in a randomized complete block design with 3 replications. Data of the growth stages and yield components were taken for beans and data of yield components and percentage of lodging for maize. Growth stages of beans differed among the treatments. Plant height ranged between 92.00-282.72 cm on av. and 3 growth habits were observed. The response of the growth components in beans varied in function of the var. and the highest yield corresponded to line G 11820 (1.92 MT/ha). Maize lodging was in part due to the excessive bean plant height. There were a greater no. of ears and consequently greater wt. and higher yield of maize when bean plants were not so tall. (AS)

0517

28046 VANDERMEER, J. 1986. A computer-based technique for rapidly screening intercropping designs. Experimental Agriculture 22(3):215-232. En., Sum. En., Es., 29 Ref., Il. [Division of Biological Sciences, Univ. of Michigan, USA]

Phaseolus vulgaris. Intercropping. Mathematical model. Experiment design. USA.

A computer technique for predicting the yields of the component crops in intercropping systems is described. Predictions using this procedure showed reasonable agreement with results obtained in an expt. using tomatoes and dry beans. Reasons for the discrepancies observed and limitations to the applications of the technique are discussed. (AS)

0518

27722 WELLS, W.C.; FERRAT, I.R.L.; WAINES, J.G. 1986. Relative performance of tepary x common bean intercrop. Bean Improvement Cooperative. Annual Report 29:114. En. [Dept. of Botany & Plant Sciences, Univ. of California, Riverside, CA 92521, USA]

Phaseolus vulgaris. Intercropping. Phaseolus acutifolius. Varietal mixtures. Cultivars. USA.

Two Phaseolus acutifolius cv. (PI319-443 and Buff) and 2 P. vulgaris cv. (Sutter and Linden) were intercropped to determine if intercropping is more advantageous than sole cropping. The 2 P. vulgaris cv. performed differently under intercropping. Interspecific competition apparently led to a decrease in the percentage of Sutter seedlings that survived to produce progeny, while it had no effect on the survival rate of plants of cv. Linden. Both P. acutifolius cv. had a 100 percent survival rate. (CIAT)

0519

28251 ZIELKE, R.C.; CHRISTENSON, D.R. 1986. Organic carbon and nitrogen changes in soil under selected cropping systems. Soil Science Society of America Journal 50(2):363-367. En., Sum. En., 17 Ref.

Phaseolus vulgaris. Cultivation systems. Soil fertility. C. N. Rotational crops. USA.

The effect of 9 yr of selected cropping systems on organic C, N levels, and N mineralization characteristics of a Charity clay (Aeric Haplaquepts) was evaluated. The 6 cropping systems consisted of combinations of maize, oats, alfalfa, sugar beet, and navy beans. Each crop in each system was fertilized at recommended rates. Cropping systems that contained maize had up to 10 percent more organic C and 7 percent more N at the time of sampling than systems that did not contain maize. N mineralization characteristics correlated linearly with organic C and N at the time of sampling than systems that did not contain maize. N mineralization characteristics correlated linearly with organic C and N using spring 1981 soil samples but not with organic C, N, or N uptake in a greenhouse study using fall 1981 soil samples. The uptake and response to applied N in the greenhouse indicated that 9 yr of cropping with a particular system had an effect on the N supplying capacity of the soil. Reduced uptake and larger responses to applied N were observed for systems that did not contain maize and that lost larger amounts of C and N over the 9-yr cropping period. (AS)
See also 0450 0458 0484 0558 0631

D04 Seed Production

0520

27733 SCHMIT, V.; BAUDOIN, J.P. 1986. Seed multiplication and preliminary evaluations of Phaseolus coccineus germplasm collection at C.I.A.T. (Centro Internacional de Agricultura Tropical, Cali, Colombia). Bean Improvement Cooperative. Annual Report 29:63. En., 1 Ref. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus coccineus. Cultivars. Phaseolus polyanthus. Seed production. Selection. Resistance. Ascochyta. Colombia.

Seed increase of the 1300 accessions from both the cultivated subspecies (coccineus and polyanthus) and the wild forms of Phaseolus coccineus is being carried out at 2 locations of Colombia. In Popayán (1700 m alt., 18 degrees Celsius mean temp., and 2000 mm annual rainfall), 12 plants of each accession are grown in mesh cages. Flowers are hand-pollinated with pollen from the same plants or plants from the same population. In total, 70 accessions can be multiplied twice a year at this location. In Rionegro (2200 m alt., 17 degrees Celsius mean temp. and 1850 mm annual rainfall), 18 plants from each accession are grown in the open field. Plant are hand-pollinated in the same way as in Popayán but paper bags are used to protect the hand-pollinated racemes from insect activities. This method allows the seed increase of 350 accessions a year. A preliminary screening of accessions of the subspecies polyanthus has also been carried out to identify sources of resistance to Ascochyta. Four of the accessions tested were particularly outstanding: G 35336 and G 35182 (from Guatemala), G 35337 (from Mexico), and G 35372 (from Colombia). (CIAT)

0521

28632 TAPIA B., H. 1986. Producción artesanal de semilla de fríjol común de buena calidad. (Small-scale (by artisans) production of good quality common bean seed). Managua, Nicaragua, Instituto Superior de Ciencias Agropecuarias. 27p. Es., 4 Ref., Il.

Phaseolus vulgaris. Seed production. Harvesting. Storage. Tillage. Nicaragua.

An easy procedure is described for small-scale (by artisans) production of good quality bean seed in Nicaragua, indicating the crop requirements and the requirements for seed harvesting and storage. Furthermore, instructions are given for farmers who want to keep on producing their own seed; good quality seed is also defined. Finally, a list of introduced, improved commercial var. is included as well as some considerations on zero tillage and on predrying of fresh beans. (CIAT) See also 0629

D05 Varietal Trials

0522

27495 ALMEIDA, L. D'A. DE; POMPEU, A.S.; BULISANI, E.A.; BORTOLETTO, N.; VEIGA, A. DE A.; CASTRO, J.L. DE 1984. Comportamento de cultivares e linhagens de feijoeiro na regiao sudoeste do Estado de Sao Paulo. (Performance of dry bean cultivars and lines in southwestern Sao Paulo). Campinas-SP, Brasil, Instituto Agronómico. Boletim Técnico no.84. 31p. Pt., Sum. Pt., En., 10 Ref.

Phaseolus vulgaris. Cultivars. Transfer of technology. Adaptation. Yields. Brazil.

Twenty-one bean var. and lines were tested in 40 trials during the period 1973-77 in southwestern Sao Paulo (Brazil). Plantings were carried out in both rainy and dry seasons. Outstanding results were obtained with H4OC1725 (Moruna), H4OC1722 (Aroma), H38C1727 (Catu), and H38C1723 (Aete-3). These cv. were recommended for commercial planting in this region. (Abstracts on Tropical Agriculture)

0523

27467 BAERT, T.; NZIMENYA, I.; BANYIYEREKA, C.; MANAGURE, E. 1985. Légumineuses: haricot (Phaseolus vulgaris). (Legumes: common bean). In Institut des Sciences Agronomiques du Burundi. Rapport des Recherches Agronomiques 1985. Bujumbura, Burundi. pp.32-36. Fr., Il.

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

Activities carried out by the Institut des Sciences Agronomiques du Burundi (ISABU) on common bean are reported. Aspects related to the introduction of new materials and to var. assessment are discussed. Based on the regional trials carried out, Urubonobono was outstanding as well as other var. from Rwanda, comparable with ISABU ones. The procedure followed in var. trials is described, and a table with the yields and behavior of the 10 best var. evaluated is given. (CIAT)

0524

28651 BEAVER, J.S.; BADILLO-FELICIANO, J.; REYES S., I. 1985. Performance of dry beans grown on the coastal plains of Puerto Rico. Journal of Agriculture of the University of Puerto Rico 69(2):125-133. En., Sum. En., Es., 7 Ref.

Phaseolus vulgaris. Genotypes. Adaptation. Cultivars. Seed color. Yields. Resistance. Bean common mosaic virus. Uromyces phaseoli. Xanthomonas campestris pv. phaseoli. Puerto Rico.

Performance of a group of white-seeded and a group of colored dry bean genotypes was measured at the Fortuna and Isabela Research and Development Centers (Puerto Rico) during 1979-82. White-seeded lines W-117, W-142, and 2W-33-2 produced seed yields as great as or greater than the mean of the tests. Compared with the check white-seeded line Bonita, W-117, W-142, and 2W-33-2 showed more resistance to the systemic mosaic strain of BCMV and rust (Uromyces phaseoli). Violeta and Galana were among the most productive colored genotypes. Unfortunately, the seed coat color of these genotypes is unacceptable to the local consumer. Among the colored genotypes with a desirable seed type, Guayamera showed the most promising performance. Several of the color-seeded lines expressed resistance to the races of rust endemic in Isabela. On the other hand, the colored lines were generally more susceptible to bacterial blight than the white-seeded lines. Genotypes with the most promising performance will be considered for release as replacements for standard cv. or will be utilized as parents in the local bean breeding program. (AS)

0525

28090 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. PROGRAMA DE FRIJOL. 1985. Ensayos preliminares EP 1984. (Preliminary trials, EP 1984). Cali, Colombia. 71p. Es., En..

Phaseolus vulgaris. Cultivars. Transfer of technology. Plant habit. Seed characters. Yields. Technology evaluation. Colombia.

Results are presented of the 1984 preliminary trials 'EP) designed to evaluate advanced exptl. bean lines developed by CIAT and national programs. The 1984 EP consisted of 446 materials selected out of 1385 lines evaluated in the 1983 VEF. Of these 446 lines, 369 were bush types. All entries were evaluated for various characters at several locations within Colombia. Materials are grouped according to their grain characteristics (color, size) and growth habit (climbing and bush) to be located within the basic working group of the Bean Program. Yield estimates were obtained from trials conducted at CIAT farms in Palmira and Popayán under low and high inputs. Screening for disease and insect pests was carried out in the field and in the screenhouse and/or glasshouse. Disease nurseries for common bacterial blight, rust, anthracnose, and angular leaf spot in the field were inoculated with a mixture of isolates of the pathogens collected from previous nurseries grown at the same location. Data on Ascochyta, BCMV, and the leafhopper were obtained from natural incidence in the field nurseries. Plant and grain characteristics evaluated in this EP are presented in table form. Each is preceded by a no. corresponding to the resp. column of the computer printout where the results of the evaluation are presented. (CIAT)

0526

28266 DUE, J.M.; MBIHA, E.; ROCKE, T.; SCHWARTZ, R.; WHITE, M. 1986. Farming systems data and on-farm trials of beans (Phaseolus vulgaris) Mgeta and Kilosa areas, Tanzania, 1985. Morogoro, Tanzania, Sokoine University of Agriculture. Department of Rural Economy. Technical report no.5. 103p. En., Sum. En., 25 Ref., Il.

Phaseolus vulgaris. Cultivars. Technology evaluation. Yields. Adaptation. Tanzania.

During the 1985 crop yr., 2 var. of the Bean/Cowpea Collaborative Research Support Program were tested on farmers' fields in the Morogoro region of Tanzania; Kabanima, the var. for the high alt. rainfall area, was tested on farms in the Mgeta area and TMO 101, the var. for the low alt. area, was tested in the Kilosa area. In addition, farming systems data were gathered from a sample of 59 farm families in the Kilosa district. The results of these trials and farming systems data are summarized. Kabanima outyielded the traditional var. Kenia in Mgeta by 225 percent and TMO 101 outyielded the traditional var. by 68 percent in Kilosa if all 8 farmers are included or by 133 percent if the farmer with the excessively high yields is omitted. Farmers in both areas liked the new high yielding var. but the sample of farmers testing each was too small to enable much generalization of findings. Since the researchers were anxious to repurchase as much of the high yielding seed as possible for further seed generation, it was not possible to allow farmers to keep seed for taste and cooking testing. Farmers who grew TMO 101 liked the compactness of the plant and its upright stand, which keeps the pods off the ground and reduces the chance of fungal growth that can reduce yields. Compactness makes harvesting faster and threshing easier. TMO 101 appeared not to be more resistant to diseases and insects than the local var. TMO 101 matured evenly while the traditional cv. matured at more varied rates and it displayed drought resistance characteristics during 1985, an unusually dry year in the area. The color of TMO 101 is the locally preferred color (red/brown). The few families testing TMO 101 found it to be palatable with cooking time comparable with traditional var. (AS (extract))

0527

27357 INSTITUT DES SCIENCES AGRONOMIQUES DU RWANDA. 1983. Légumineuses: haricots (Phaseolus vulgaris L.). (Legumes: common bean). In _____. Rapport Annuel 1983. Rubona. pp.3-18. Fr.

Phaseolus vulgaris. Plant introductions. Selection. Cultivars. Dwarf beans. Climbing beans. Yields. Adaptation. Staking and trellising. Rhizobium. Rwanda.

The different research work carried out on beans in 1983 at the exptl. stations of Rubona, Rwerere, and Karama of the Institut des Sciences Agronomiques du Rwanda are reported. They dealt with the introduction of new var. (especially from CIAT), pedigree selection, screening trials for yield, comparative trials of bush, climbing, and semiclimbing bean var., and trials on cultural practices (staking methods, planting distances in climbing beans, Rhizobium in climbing beans). Preliminary results are given in table form. (CIAT)

0528

27481 JUNQUEIRA NETTO, A.; SEDIYAMA, T.; SEDIYAMA, C.S.; REZENDE, P.M. DE 1983. Adaptabilidade e estabilidade de comportamento de dezesseis cultivares de feijao (Phaseolus vulgaris L.) em seis municípios do sul de Minas Gerais. (Adaptability and stability of performance of sixteen bean cultivars in six municipalities of southern Minas Gerais). Ciencia e Prática 7(1):9-14. Pt., Sum. Pt., En., 4 Ref.

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Brazil.

Adaptability and stability parameters of 16 bean cv. were evaluated in 12 trials carried out at 6 localities in Minas Gerais, Brazil, during the growing seasons of 1978-79 and 1979-80. A randomized block design was used with 3 replications. Ricopardo 896, Vi.1010, and Ricobaio 1014 gave high yields and were adapted to better environments. Bico de Ouro had the lowest yield av. and the poorest stability. Amarelo, Roxao, Pintado, Paraná, and Batatinha showed stable performances. Amarelo was the cv. that best combined productivity and stability. (AS)

0529

27462 MAURITIUS. MINISTRY OF AGRICULTURE AND NATURAL RESOURCES AND THE ENVIRONMENT. 1984. Bean (Phaseolus vulgaris). In _____. Annual Report for the year 1981. Port Louis, Mauritius. pp.69-71. En.

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

The results of research carried out on beans during 1981 by the Ministry of Agriculture and Natural Resources and the Environment of Mauritius are summarized. Yields of bean var. Comprise, Cannellino, and Borlotto were compared with that of var. Local Red. Comprise gave the highest yield (1.93 t/ha) and had the greatest no. of pods/plant (7.4) and seeds/pod (5 plus or minus 1). In a bean planting date x var. trial, mid-June was found to be the best planting time. No significant differences in yield were found among the var. tested. (CIAT)

0530

28828 MORA N., O.A. 1982. Análisis de la estabilidad del rendimiento en cultivares de caraota negra (Phaseolus vulgaris L.) con fines de selección. (Analysis of yield stability in black bean cultivars for screening purposes). In Universidad Central de Venezuela. Instituto de Genética. Informe de Investigación 1982. Maracay. pp.58-59. Es.

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Selection. Venezuela.

In different states of Venezuela, 6 trials were carried out with 25 black bean cv. to estimate yield stability for screening purposes. Genotypes V-Porrillo-#, Coche, BAT-519, and 51052 were outstanding for their stability and above-av. yields; whereas bean cv. BAT-330 and BAT-240, although stable, yielded below than the general av., and cv. ICA-Pijao, BAT-179, and Manuare 1 were statistically unstable. ICA-Pijao adapted to favorable environments. Of the national checks, genotype Coche showed better stability and higher yield than Tacarigua; the latter tended to adapt more to favorable than to unfavorable environments, as shown by its regression coefficient (b = 1.33). (CIAT)

0531

28829 MORA N., O.A.; BORGES F., O.L. 1982. Mejoramiento genético de la caraota (Phaseolus vulgaris L.). Avances durante el período 1982-1983. (Breeding of common beans. Advances during 1982-83). In Universidad Central de Venezuela. Instituto de Genética. Informe de Investigación 1982. Maracay. pp.60-65. Es.

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Venezuela.

From Oct. 1982 to April 1983, trials were carried out in Saman Mocho, Venezuela, to estimate the yield potential and performance of 90 bean cv. in the presence of pests and diseases. It is concluded that there is a wide yield variation in the cv. evaluated. Genotypes BAT-304, BAT-58, and DOR-62

gave higher yields than local var. Tacarigua and Coche. Regarding the viroses reaction, there is also a wide variation in the cv. responses. Finally, 8 cv. have been selected for the bean breeding program, considering their suitable yield and wide adaptation to various environments, a certain level of resistance to rust and bacteria and to Empoasca kraemeri. (CIAT)

0532

27780 MULLINS, C.A.; COFFEY, D.L. 1982. Evaluation of snap bean cultivars, 1980-81. Tennessee Farm and Home Science no.121:19-21. En., 5 Ref., Il.

Phaseolus vulgaris. Snap beans. Yields. Cultivars. Dwarf beans. Technology evaluation. USA.

Eighteen snap bean cv. (7 of which belong to the Bush Blue Lake type) were assessed for their yield potential at the U. of Tennessee Plateau Expt. Station near Crossville, USA. Cv. Bush Blue Lake 274 gave the highest yields. The non-Bush Blue Lake cv. did not differ among themselves in yield potential. (CIAT)

0533

28832 YEMEN ARAB REPUBLIC. MINISTRY OF AGRICULTURE AND FISHERIES. 1985. Grain legumes: Phaseolus beans. In _____. Annual Report 1984. Taiz. 72-73. En.

Phaseolus vulgaris. Cultivars. Adaptation. Plant introductions. Planting. Timing. Yields. Yemen.

Results from bean observation and adaptation nurseries, observation plots, and var. and sowing date trials carried out in different locations of Yemen are reported. In the observation plots, 4 of the 21 local accessions evaluated were selected for further testing and in the observation nursery, none of the 7 CIAT var. was comparable to Yemen-1, which was very early maturing (flowering in only 23 days), relatively high yielding, and producing large seeds of high quality; however, BAT 202, A 48, and BAT 1061 merit further evaluation. In the adaptation nursery in Zabid, 93 CIAT entries, 2 var. from Sudan, and 7 local accessions are being evaluated. Var. and sowing date trials are still in progress. (CIAT) See also 0456 0463 0516 0569

0534

27726 TRUTMANN, P.; KAYTARE, J. 1986. Control of diseases of Phaseolus vulgaris L. in central Africa using cultural methods. Bean Improvement Cooperative. Annual Report 29:127. En.

Phaseolus vulgaris. Diseases and pathogens. Disease control. Cultural control. Central African Republic.

The effect of seed selection methods and removal of diseased seedlings and leaves on bean disease development and yield was studied. The best results were obtained with the removal of diseased leaves, and the combined use of diseased seedling removal plus removal of diseased leaves significantly (P = 0.05) increased yields by 67 and 43 percent, resp. (CIAT)

E02 Bacterioses

0535

27349 ALBARRACIN, M.; TRUJILLO, G.; BORGES F., O. 1982. Aislamiento e identificación de variantes de Xanthomonas phaseoli causantes de la quemazón de la caraota (Phaseolus vulgaris L.). (Isolation and identification of Xanthomonas phaseoli variants causing bean bacterial blight). In Universidad Central de Venezuela. Instituto de Genética. Informe de Investigación 1980. Maracay. pp.78-84. Es., 8 Ref.

Phaseolus vulgaris. Xanthomonas campestris pv. phaseoli. Isolation. Pathogenicity. Xanthomonas phaseoli var. fuscans. Venezuela.

The economic importance of common bacterial blight on beans in Venezuelan crops was determined and the causal agent of this disease was identified. Isolations were made from diseased plants coming from the states of Aragua, Anzoátegui, Carabobo, and Yaracuy. Once the colonies appeared and the bacterium was purified, pathogenicity tests were carried out on black bean plants 14-21 days old using bacterial suspensions sprayed on the foliage or injected into the stem. Typical bacterial colonies grew on all the samples analyzed and all isolations were pathogenic to black bean. The characteristic differentiation of pigment production in the medium, together with pathogenicity and physiological tests, showed for the 1st time the presence of Xanthomonas phaseoli var. fuscans in Venezuela as one of the pathogens causing common bacterial blight of beans and X. phaseoli was found to be the other pathogen associated with this disease. (CIAT)

0536

27411 BENIMADHU, S.P.; SOOMARY, S.; SOOBHANY, M.N. 1984. Leguminous crops: bean. In Mauritius. Ministry of Agriculture and Natural Resources and the Environment. Annual Report for the year 1981. Port Louis, Mauritius. pp.138-140. En.

Phaseolus vulgaris. Pseudomonas syringae pv. phaseolicola. Xanthomonas campestris pv. phaseoli. Cultivars. Selection. Resistance. Mauritius.

Results of a survey on bean diseases carried out in Mauritius are reported. Field, lab., and greenhouse expt. were performed to determine the degree of resistance of various cv. to halo blight and common blight, the 2 major diseases detected. Cv. Noorinbee showed a higher degree of resistance to both diseases; however, it should be tested several times during different growth periods in the field. (CIAT)

0537

27766 BISEN, P.S.; SHARMA, A.; AGARWAL, G.P. 1985. In vitro production of halo blight inducing toxin by Pseudomonas phaseolicola (Burkh.) Dowson. Phytopathologische Zeitschrift 114(3):249-255. En., Sum. En., De., 15 Ref., Il. [Dept. of Postgraduate Studies & Research in Biological Sciences, Rani Durgai Univ., Jabalpur 482001, India]

Phaseolus vulgaris. Races. Pseudomonas syringae pv. phaseolicola. Plant toxins. India.

Three pathogenic strains of Pseudomonas phaseolicola (strain 1 and 3 virulent and strain 5 weakly virulent) were tested for their toxic activity. All 3 strains produced detectable amounts of toxin in vitro. Cultural conditions and length of incubation greatly influenced toxin production. Max. amount of toxin was produced at 20 degrees Celsius and pH 6.5. Glycerol served as the best C source and 1-cysteine as the best amino acid for toxin production. (AS)

0538

27463 CHAVARRO C., A.; LOPEZ G., C.A.; LENNE, J.M. 1985. Características y patogenicidad de Corynebacterium flaccumfaciens (Hedges) Dows agente causal del marchitamiento bacteriano de Zornia s. l. y su efecto en el rendimiento de Z. glabra CIAT 7847 y Phaseolus vulgaris. (Characteristics and pathogenicity of Corynebacterium flaccumfaciens, causal agent of bacterial wilt of Zornia spp., and its effect on the yield of Z. glabra CIAT 7847 and Phaseolus vulgaris). Acta Agronómica 35(2):64-79. Es., Sum. Es., En., 10 Ref.

Phaseolus vulgaris. Corynebacterium flaccumfaciens. Isolation. Pathogenicity. Seed transmission. Disease transmission. Germination. Colombia.

The characteristics of isolates of Corynebacterium flaccumfaciens obtained from Zornia spp. were compared with those from Phaseolus vulgaris and the pathogenicity of all isolates was studied in the greenhouse and in the field. Seed transmission of the bacteria was determined as well as its incidence on germination. The effect of the disease on yields of Z. glabra CIAT 7847 and 3 P. vulgaris var. was also assessed. Results confirmed that the isolate from Zornia spp. causing bacterial wilt was C. flaccumfaciens. Isolates obtained from infected Zornia plants were pathogenic and caused disease in both Zornia and beans; P. vulgaris isolate I 615 was pathogenic and caused bacterial wilt in both Zornia and beans in the field and in the greenhouse. C. flaccumfaciens was found to be transmitted in the palisade cells forming the seed coat. Seed infection in P. vulgaris and Z. glabra reached levels of 52.5 and 88.8 percent, resp. The correlation coefficient between bacterial infection and germination was -0.87. (CIAT)

0539

27720 HAGEDORN, D.J.; INGLIS, D.A.; CARLSON, E.; MAXWELL, D.P. 1986. Detached leaves for simultaneous inoculations of Phaseolus vulgaris with four pathogens. Bean Improvement Cooperative. Annual Report 29:31-32. En. [Dept. of Plant Pathology, Univ. of Wisconsin-Madison, USA]

Phaseolus vulgaris. Growth chamber experiments. Leaves. Inoculation. Xanthomonas campestris pv. phaseoli. Colletotrichum lindemuthianum. Uromyces phaseoli. Isariopsis griseola. Analysis. USA.

The detached leaf technique for studying the reaction of beans to Colletotrichum lindemuthianum, Isariopsis griseola, Xanthomonas campestris pv. phaseoli, and Uromyces appendiculatus is briefly explained. Comparative disease reaction studies were made using 2nd or 3rd trifoliolate leaves of

various growth chamber-grown bean cv. The reaction of both detached leaves and leaves on whole plants was basically similar regardless of whether there were 0, 2, or 3 other pathogens inoculated. Preliminary results are very encouraging, and this technique can become very useful. (CIAT)

0540

28258 HARTMAN, C.L.; SECOR, G.A.; VENETTE, J.R.; ALBAUGH, D.A. 1986. Response of bean calli to filtrate from Pseudomonas syringae pv. phaseolicola and correlation with whole plant disease reaction. Physiological and Molecular Plant Pathology 28(3):353-358. En., Sum. En., 16 Ref. [Dept. of Plant Pathology, North Dakota State Univ., Fargo-ND 58105, USA]

Phaseolus vulgaris. Pseudomonas syringae pv. phaseolicola. Leaves. Tissue culture. Races. Resistance. Cultivars. USA.

Callus cultures of bean cv. were tested for response to toxic filtrates from liquid cultures of Pseudomonas syringae pv. phaseolicola. Callus reaction to the filtrates ranged from necrosis and reduced growth to no necrosis and normal growth. Plants of each cv. were also inoculated in the greenhouse with suspensions of the pathogen. Charlevoix (red kidney) was the most susceptible in the greenhouse, and Charlevoix calli were most severely affected by the filtrate. Emerson (great northern) or Admiral (navy) were most resistant to the strain in the greenhouse, and the corresponding calli developed no necrosis on medium containing filtrate. Plant and calli reactions were correlated using Spearman's ranking correlation coefficient, and a highly significant r value (0.971) was obtained. Results suggest that a callus screening system can identify bean cv. resistant to halo blight. (AS)

0541

28058 KANEDA, T. 1986. Seasonal population changes and characterization of ice-nucleating bacteria in farm fields of Central Alberta. Applied and Environmental Microbiology 52(1):173-178. En., Sum. En., 25 Ref., Il. [Alberta Research Council, Edmonton, Alberta, Canada T6H 5X2]

Phaseolus vulgaris. Pseudomonas fluorescens. Microbiology. Canada.

During the summer of 1983 in central Alberta (Canada), changes in the bacterial population inhabiting the leaves of beans and canola (Brassica napus) were studied to determine if ice-nucleating bacteria were present on these plants. Three colony types (white, yellow, and peach-colored) were found on bean and canola leaves. Approx. 25 percent of the isolates from the white colony group, which dominated the population, were ice-nucleating bacteria. No ice-nucleating bacteria were present on canola leaves. Out of a total of 76 ice-nucleating bacteria isolated, 5 representative cultures were characterized in detail and identified as Pseudomonas fluorescens. The fatty acid composition of these cultures was essentially identical to that of typical P. fluorescens cultures and was altered by varying the growth temp. from 10 to 30 degrees Celsius. (AS)

0542

27747 KHLAIF, H.M.; VENETTE, J.R. 1986. Serological detection of bean bacterial pathogens from infected plants in the dome seed assay. Bean Improvement Cooperative. Annual Report 29:40. En., 1 Ref. [Dept. of Plant Pathology, North Dakota State Univ., Fargo, ND 58105, USA]

Phaseolus vulgaris. Antisera. Xanthomonas campestris pv. phaseoli. Pseudomonas syringae pv. phaseolicola. Pseudomonas syringae pv. syringae. Serology. USA.

Antiserums to Xanthomonas campestris pv. phaseoli, Pseudomonas syringae pv. phaseolicola, and P. syringae pv. syringae were prepared from gluteraldehyde fixed whole cell preparations. Two antiserums to each pathogen were made and found to be high in titre. Antiserums were tested for specificity against 35 bacterial strains including known pathogens, common saprophytes, and saprophytes isolated from beans in the dome test. Use of highly specific antiserums with high titre showed that pathogens can be detected from bean seedlings in the dome test. (CIAT)

0543

28100 LAEMMLEN, F.; SAETTLER, F. 1980. Beans, blights and bacteria. Michigan Dry Bean Digest 4(4):7-8. En., Il.

Phaseolus vulgaris. Xanthomonas campestris pv. phaseoli. Xanthomonas phaseoli var. fuscans. Pseudomonas syringae pv. phaseolicola. Symptomatology. Disease control. USA.

Symptoms of common, fuscous, and halo blights on beans are described and some recommendations to prevent the development of these diseases are given. (CIAT)

0544

27772 LEGARD, D.E.; SCHWARTZ, H.F.; GARRETT, K.A. 1986. Pseudomonad bacterial epiphyte studies in Colorado. Bean Improvement Cooperative. Annual Report 29:29-30. En. [Dept. of Plant Pathology & Weed Science, Colorado State Univ., Ft. Collins, CO 80523, USA]

Phaseolus vulgaris. Pseudomonas syringae pv. syringae. Pseudomonas syringae pv. phaseolicola. Epidemiology. Disease control. Chemical control. USA.

Results of the research on beans carried out by the Dept. of Plant Pathology and Weed Science of Colorado State U. (USA) are briefly summarized. Surveys in the spring of 1984 and 1985 found many wild beans infected with, and/or colonized by, populations of Pseudomonas syringae pv. phaseolicola and P. syringae pv. syringae. In an evaluation of bean seedlings in commercial fields no symptoms of Pseudomonas were detected. The effect of 2 spray programs (early and late) was evaluated in commercial bean plantings. The early and late preventive spray programs were equally effective in reducing epiphytic syringae-type pseudomonads. (CIAT)

0545

28006 RIBEIRO, R. DE L.D.; ROBBS, C.F. 1984. Etiologia do crestamento de halo ou crestamento aureolado do feijoeiro no Brasil. (Etiology of halo blight of beans in Brazil). Horticultura Brasileira 2(2):3-4. Pt., 25 Ref. [Inst. de Biologia, Univ. Federal Rural do Rio de Janeiro, 23.460 Seropédica-RJ, Brasil]

Phaseolus vulgaris. Pseudomonas syringae pv. syringae. Pseudomonas syringae pv. tabaci. Etiology. Brazil.

The principal characteristics that distinguish Pseudomonas syringae pv. phaseolicola from P. syringae pv. tabaci, both bacteria attacking beans in Brazil, are briefly described. (CIAT)

0546

28005 ROUSE, D.I.; NORDHEIM, E.V.; HIRANO, S.S.; UPPER, C.D. 1985. A model relating the probability of foliar disease incidence to the population frequencies of bacterial plant pathogens. Phytopathology 75(5):505-509. En., Sum. En., 24 Ref., Il. [Dept. of Plant Pathology, Univ. of Wisconsin, Madison, WI 53706, USA]

Phaseolus vulgaris. Pseudomonas syringae pv. syringae. Mathematical model. USA.

A model has been developed that relates pathogen population size on individual leaves at time T0 to disease incidence at some later time T1. The lognormal distribution is used to describe population size of pathogenic bacteria on individual leaves, and the probit function is used to describe the probability of disease, given a bacterial population size. When integrated with respect to bacterial population frequency, the product of the probability of disease, given a bacterial population size, for individual leaves and the frequency of pathogenic bacteria on individual leaves results in a cumulative normal frequency distribution. This distribution function describes the probability of disease incidence (as frequency of diseased leaflets) in a field. To illustrate its use, the model was applied to bacterial brown spot of beans caused by Pseudomonas syringae pv. syringae. A max. likelihood technique was used to estimate the mean and variance of bacterial population size from censored samples. (AS)

0547

27708 SCHUSTER, M.L.; SMITH, C.C.; ZIEGELBEIN, M.; SALAC, S.S. 1985. Reaction of CIAT Phaseolus vulgaris to Xanthomonas phaseoli strains from Dominican Republic. Fitopatologia Brasileira 10(1):433-441. En., Sum. En., Pt., 22 Ref. [Horticulture Dept., Univ. of Nebraska, Lincoln, NB 68583, USA]

Phaseolus vulgaris. Cultivars. Pathogenicity. Xanthomonas campestris pv. phaseoli. Races. Resistance. USA.

Variability in virulence of 5 Xanthomonas phaseoli isolates from the Dominican Republic and 1 from Nebraska (USA) was determined on leaves, pods, and seeds of 13 CIAT Phaseolus vulgaris lines and the cv. Great Northern U.I. 59. Significant differences were found in leaf and pod reactions among the bean lines as well as in virulence among the X. phaseoli strains. A significant interaction between bean line x X. phaseoli isolate was found for leaf and pod reactions. Resistant bean lines did not necessarily possess resistant pods; in a few cases, the contrary was true. The most susceptible and most resistant bean lines for pod reactions were associated with the greatest and least degree of seed infection, resp. Pod reactions of the intermediate bean lines did not follow a similar pattern for seed reaction. A significant bean line x X. phaseoli strain interaction was found for seed reactions. (AS)

0548

28031 SCHUSTER, M.L.; SMITH, C.C.; SMITH, D.J. 1982. Population trends of epiphytic Corynebacterium flaccumfaciens var. aurantiacum on leaves of Phaseolus genotypes. Fitopatologia Brasileira 7(2):209-212. En., Sum. En., Pt., 6 Ref. [Dept. of Horticulture, Univ. Nebraska, Lincoln, NB 68583, USA]

Phaseolus vulgaris. Corynebacterium flaccumfaciens. Cultivars. Resistance. USA.

Population trends of the bean wilt bacterium, Corynebacterium flaccumfaciens var. aurantiacum, were determined on leaf surfaces of 4 Phaseolus genotypes: P. vulgaris L.P.I. 165708, Emerson, and Great Northern UI 59, and P. acutifolius Tepary Nebraska accession no. 10. It was found that population increased on the susceptible cv. GN UI 59 but decreased on the tolerant and resistant cv. 3 and/or 7 days after inoculation. The inhibitory effect of the tolerant/resistant cv. became evident 3 or 7 days after inoculation, depending on the var. (AS)

0549

28817 SLUSARENKO, A.J.; LONGLAND, A. 1986. Changes in gene activity during expression of the hypersensitive response in Phaseolus vulgaris cv. Red Mexican to an avirulent race 1 isolate of Pseudomonas syringae pv. phaseolicola. Physiological and Molecular Plant Pathology 29(1):79-94. En., Sum. En., 39 Ref., Il. [Dept. of Plant Biology & Genetics, Univ. of Hull, Hull HU6 7RX, England]

Phaseolus vulgaris. Snap beans. Leaves. Pseudomonas syringae pv. phaseolicola. Analysis. RNA. United Kingdom.

Total cellular and polysomal RNAs were isolated from leaves of French bean cv. Red Mexican, which had been inoculated with virulent or avirulent races of Pseudomonas syringae pv. phaseolicola. The mRNAs were translated in vitro and the polypeptide fingerprints obtained from the various treatments indicated specific changes in host mRNA activities in leaf tissue expressing a hypersensitive reaction. The mRNAs coded for several high Mr polypeptides, and coordinated decreases and transient increases in activity were observed, defining a cascade of changes in gene expression in tissues undergoing the hypersensitive reaction. Some changes were apparent as early as 2 h after inoculation. Some mRNA activities that decreased rapidly during the hypersensitive reaction also decreased in the susceptible reaction but at a slower rate. The possible function of some of the polypeptides is discussed. (AS)

0550

27731 SZARKA, J. 1986. Pathotypes of Pseudomonas phaseolicola. Bean Improvement Cooperative. Annual Report 29:60-61. En., 1 Ref., Il. [Vegetable Crops Research Inst., Budapest Station, 1775 Budapest, P.O. Box 95, Hungary]

Phaseolus vulgaris. Races. Pseudomonas syringae pv. phaseolicola. Resistance. Hungary.

Thirteen groups of isolates, races 1 and 2, and KM 4 of Pseudomonas phaseolicola were used to determine the degree of resistance of various test plants. On the basis of different host ranges, isolates were classified into 9 pathotypes, but the no. of these can increase with the further investigation of newer more aggressive isolates. (CIAT)

0551

27773 VENETTE, J.R.; LAMPPA, R.S. 1986. Use of antibiotic resistant bacterial mutants to verify a test that detects seedborne bacterial pathogens. Bean Improvement Cooperative. Annual Report 29:38-39. En., 3 Ref. [Dept. of Plant Pathology, North Dakota Univ., Fargo, ND 58105, USA]

Phaseolus vulgaris. Pseudomonas syringae pv. phaseolicola. Pseudomonas syringae pv. syringae. Xanthomonas campestris pv. phaseoli. Seed transmission. USA.

Naturally occurring mutants of Pseudomonas syringae pv. syringae, P. syringae pv. phaseolicola, and Xanthomonas campestris pv. phaseoli (resistant to either 1000 micrograms streptomycin/ml or 100 micrograms rifampin/ml) were used to monitor populations of pathogens in or on bean plants in the dome test. It was shown that (1) pathogenic bacteria can be isolated from symptomed and presymptomatic leaves when the pathogens were in the infusion, (2) no. of bacteria in leaves were higher than the no. in the original inoculum indicating pathogen increase, (3) saprophytes outnumbered pathogenic bacteria by 100-1000X making direct isolation difficult, (4) no. of pathogenic bacteria increased in inoculated seedlings in typical growth curves, and (5) no. of pathogenic mutant bacteria in

leaves with water-soaked spots were 120-240X higher than in leaves without water-soaked spots. (CIAT) See also 0472 0575 0637 0648 0661

E03 Mycoses

0552

27788 ARAYA F., C.M. 1977. Efecto de la época de producción y tratamiento de semilla en el vigor y en la transmisión de enfermedades fungosas en la semilla de fríjol (Phaseolus vulgaris). (Effect of the time of production and seed treatment on the vigor and transmission of fungal diseases in bean seed). Tesis Ing.Agr. San José, Universidad de Costa Rica. 65p. Es., Sum. Es., 50 Ref., Il.

Phaseolus vulgaris. Disease control. Chemical control. Seed vigor. Rhizoctonia solani. Colletotrichum lindemuthianum. Disease transmission. Costa Rica.

The effect of the time of production and seed treatment with benomyl, chloroneb, carboxin, thiram, and captafol on plant vigor and severity of Rhizoctonia solani and Colletotrichum lindemuthianum were evaluated. Field tests were carried out at the Fabio Baudrit M. exptl. station as well as glasshouse tests. Each expt. consisted of 4 chemical treatments on seed harvested during the dry season (postrera) or untreated seeds planted during the completely dry season under irrigated conditions (verano); these were compared with untreated postrera seed. Bean var. Turrialba 4 was used. Significant yield differences among the treatments were observed. Verano seed had the highest grain wt. at harvest and the untreated postrera seed had the lowest production. Seed origin also affected its vigor; verano seed gave the highest dry wt., differing significantly from the remaining treatments. R. solani was better controlled with chloroneb and thiram, not showing any significant difference with benomyl. None of the treatments was effective against C. lindemuthianum. The light attack occurring in the field was apparently due to the residual inoculum in the soil, since it did not occur in sterilized soil. Benomyl was the best fungicide to control Isariopsis griseola, indicating a certain degree of systemic translocation to the green leaves which protects the plant for some time after germination. (AS-CIAT)

0553

28827 BORGES F., O.L.; MORA N., O.A. 1982. Detección de resistencia parcial a la roya (Uromyces phaseoli (Ruben) Wint.) en cultivares de caraota negra (Phaseolus vulgaris L.). (Detection of partial resistance to rust (Uromyces phaseoli) in black bean cultivars). In Universidad Central de Venezuela. Instituto de Genética. Informe de Investigación 1982. Maracay. pp.53-57. Es., 1 Ref., Il.

Phaseolus vulgaris. Cultivars. Uromyces phaseoli. Plant injuries. Resistance. Venezuela.

In a field expt. set up during the rainy season of 1983, rust injury or severity (percentage of leaf area affected by the disease) on 32 bean cv. was determined. Visual observations were made 28, 35, and 42 days after planting. Bean var. DOR-45, La Vega, DOR-15, and BAT-525 have the lowest area values, thus being more resistant. Bean var. with area values less than 299 form a group with intermediate to high resistance, and it is possible to find within this group sources of partial resistance to bean rust. When 3 cv. with variable degrees of susceptibility were compared, it was observed that the use of the area under the curve may be an appropriate method to detect levels of partial resistance to the disease. (CIAT)

0554

28279 BUONASSISI, A.J.; COPEMAN, R.J.; PEPIN, H.S.; EATON, G.W. 1986. Effect of Rhizobium spp. on Fusarium solani f. sp. phaseoli. Canadian Journal of Plant Pathology 8(2):140-146. En., Sum. En., Fr., 17 Ref., Il. [Crop Protection Branch, British Columbia Ministry of Agriculture & Food, 17720 57th Avenue, Surrey, B.C. V3S 4P9, Canada]

Phaseolus vulgaris. Snap beans. Rhizobium. Strains. Fusarium solani phaseoli. Fusarium oxysporum. Pythium ultimum. Rhizoctonia solani. Disease control. Canada.

In dual culture plate assays indigenous Rhizobium strains isolated from nodules obtained from commercial snap beans in the Lower Fraser Valley of British Columbia (Canada) inhibited the radial growth of strains of Fusarium moniliforme, F. oxysporum, and F. solani f. sp. phaseoli. Growth of all Pythium spp. and Rhizoctonia solani strains tested was unaffected by Rhizobium. Growth inhibition of F. solani f. sp. phaseoli by 41 of 42 indigenous strains of Rhizobium was not correlated with ability to nodulate snap beans but was characteristic of the interaction of certain strain combinations of the 2 organisms. Only 2 of 15 Rhizobium strains causing growth inhibition in vitro also caused a significant reduction in root rot in growth pouch expt. Plants grown in pasteurized soil artificially infested with F. solani f. sp. phaseoli from seed receiving varying concn. of Rhizobium showed a significant reduction in root rot. These data suggest that the potential exists for controlling Fusarium root rot through seed inoculation with nodulating Rhizobium strains, which are also highly antagonistic to F. solani f. sp. phaseoli. (AS)

0555

28646 D'ERCOLE, N.; NIPOTI, P.; SPORTELLI, M. 1985. L'impiego di Trichoderma harzianum Rifai nella lotta contro la rizottoniosi del fagiolo. (The use of Trichoderma harzianum in the control of Rhizoctonia bean rot). Difesa delle Piante 8(2):141-146. It., Sum. It., En., 16 Ref. [Instituto di Patologia Vegetale, Univ. of Bologna, Italy]

Phaseolus vulgaris. Rhizoctonia solani. Disease control. Trichoderma harzianum. Italy.

Control trials against Rhizoctonia solani causing seed rot and stem and root lesions on bean were carried out using 2 strains of Trichoderma harzianum (types B and C) in 2 different steam-sterilized soils. Neither Trichoderma strains were pathogenic on the bean and both markedly reduced the degree of Rhizoctonia infection. A 24 h delay in the application of T. harzianum after the pathogen gave greater disease control in adult plants in one of the soils. (AS)

0556

27776 DIXON, R.A.; GERRISH, C.; LAMB, C.J.; ROBBINS, M.P. 1983. Elicitor-mediated induction of chalcone isomerase in Phaseolus vulgaris cell suspension cultures. Planta 159(6):561-569. En., Sum. En., 25 Ref., Il. [Dept. of Biochemistry, Royal Holloway College (Univ. of London), Egham Hill, Egham, Surrey TW20 0EX, England]

Phaseolus vulgaris. Colletotrichum lindemuthianum. Tissue culture. Enzymes. United Kingdom.

Approx. 4-fold increases in the extractable activity of the enzyme chalcone isomerase were observed within 24 h of treatment of cell suspension cultures of Phaseolus vulgaris with a crude elicitor preparation heat-released from the cell walls of the bean pathogen Colletotrichum lindemuthianum. The induction of chalcone isomerase activity was highly

dependent upon elicitor concn., with max. induction occurring in 2 discrete concn. ranges. The results are discussed in relation to the mechanisms of coordinate enzyme induction operating in French bean cell cultures exposed to fungal elicitors. (AS (extract))

0557

28292 ELAD, Y.; ZVIELI, Y.; CHET, I. 1986. Biological control of Macrophomina phaseolina (Tassi) Goid by Trichoderma harzianum. Crop Protection 5(4):288-292. En., Sum. En., 31 Ref., Il. [Dept. of Plant Pathology, ARO, The Volcani Center, Bet Dagan, Israel]

Phaseolus vulgaris. Macrophomina phaseoli. Disease control. Trichoderma harzianum. Chemical control. Israel.

Four isolates of Trichoderma harzianum inhibited linear growth and microsclerotia production in Macrophomina phaseoli in vitro. The antagonist proliferated in dual liquid culture with M. phaseoli and significantly decreased the no. of its viable propagules. Peat:bran preparation of T. harzianum reduced disease incidence, in greenhouse-planted beans, by 37-74 percent. In vitro growth of T. harzianum was affected less than that of the pathogen by applications of pentachloronitrobenzene or dazomet. The biocontrol agent was as effective as the chemicals, and combining the 2 under greenhouse conditions slightly enhanced disease control. (AS)

0558

27760 GILBERTSON, R.L.; RUPPEL, E.G.; SCHWEIZER, E.E. 1986. Bean root rot unaffected by herbicides in a crop rotation system. Bean Improvement Cooperative. Annual Report 29:26-27. En. [Dept. of Plant Pathology & Weed Science & United States Dept. of Agriculture, Agricultural Research Service, Colorado State Univ., Fort Collins, CO, USA]

Phaseolus vulgaris. Fusarium solani. Rhizoctonia solani. Herbicides. Rotational crops. Yields. USA.

An integrated pest management project was conducted in Windsor (Colorado, USA) from 1980 to 1984 to (1) evaluate the effects of different herbicide regimes on weeds and other parameters in a crop rotation system, (2) determine if the different herbicide systems used on beans influenced root rot and/or population densities of Fusarium solani and Rhizoctonia solani, and (3) determine herbicide effect on bean yield. There were no significant differences in bean root rot severity for any year of the study. F. solani y R. solani were consistently isolated from bean hypocotyls all 3 yr. There were no significant differences in bean yields in 1982 or 1983. Herbicide regimes did not influence population densities of R. solani or F. solani, except in 1982. (CIAT)

0559

28077 GOLD, R.E.; MENDGEN, K. 1983. Activation of teliospore germination in Uromyces appendiculatus var. appendiculatus. 1. Aging and temperature. Phytopathologische Zeitschrift 108:267-280. En., Sum. En., De., 29 Ref., Il. [Lehrstuhl fur Phytopathologie, Universitat Konstanz, D-7750 Konstanz, Federal Republic of Germany]

Phaseolus vulgaris. Uromyces phaseoli. Etiology. Disease physiology and biochemistry.

The effects of aging and temp. on teliospore germination in Uromyces appendiculatus var. appendiculatus were studied. Indoor storage was good at approx. 4 degrees Celsius in the dark. Under these conditions spores remained dormant for approx. 9 mo., but thereafter germination gradually increased to a max. (approx. 63 percent) after 36 mo. Spores stored

outdoors showed a marked increase in germination after approx. 4 mo and reached a max. (approx. 73 percent) at 7-8 mo. The optimum temp. for germination was at 18 degrees Celsius. Heat treatments from 30 to 32 degrees Celsius for 3-4 days proved effective in activating teliospore germination. Heat treatments caused an increase in spore mortality. Basidiospore release from heat-treated teliospores was markedly reduced compared with control spores. In all expt. the emergence of metabasidia was preceded by an obligatory 3-5 day lag period regardless of the treatment given, the age, or level of germinability of treated and control spores. (AS)

0560

28078 GOLD, R.E.; MENDGEN, K. 1983. Activation of teliospore germination in Uromyces appendiculatus var. appendiculatus. 2. Light and host volatiles. Phytopathologische Zeitschrift 108:281-293. En., Sum. En., De., 21 Ref., Il. [Lehrstuhl fur Phytopathologie, Universitat Konstanz, D-7750 Konstanz, Federal Republic of Germany]

Phaseolus vulgaris. Light. Uromyces phaseoli. Disease physiology and biochemistry.

The effects of light and host volatiles on teliospore germination in Uromyces appendiculatus var. appendiculatus were studied. Light intesities ranging 15-26,000 lux supported teliospore germination and basidiospore formation. The optimum light intensity was 17,000 lux under the described conditions. Light-dark alternation was necessary for teliospore germination; no germination occurred under continuous light or continuous dark conditions. Fifteen days after a 10 day exposure to host volatiles, 70-80 percent of the treated spores germinated; minor increases in spore mortality were observed. The heat and seedling activation methods developed for teliospores of bean rust proved ineffective when applied to dormant teliospores from 6 other unrelated rust species. (AS (extract))

0561

28018 GOMES, J.L.L.; DHINGRA, O.D.; SILVA, R.F. DA 1986. Influence of foliar application of fungicides during rainy and non-rainy planting season on fungal seed infection of snapbeans. Fitopatologia Brasileira 11(1):163-169. En., Sum. En., Pt., 15 Ref. [Depto. de Fitotecnia, Univ. Federal de Vicosa, 36.570 Vicosa-MG, Brasil]

Phaseolus vulgaris. Snap beans. Disease control. Chemical control. Leaves. Colletotrichum truncatum. Fusarium. Alternaria alternata. Seed. Yields. Brazil.

The efficacy of foliar application of fungicides in reducing symptomatic and asymptomatic infection of snap bean seeds was studied during the nonrainy and rainy seasons in Igarapé (Minas Gerais, Brazil). Fungicides used were benomyl, carbendazim, and RH2161 (each mixed with mancozeb), and thiabendazole and thiophanate-methyl, applied at pod formation, seed fill, and seed maturation stage. In the rainy season expt. 3 planting dates were used. The application of fungicides considerably increased total yield but, in general, had litte effect, if any, on fungal infection of seed in the rainy season. Fungicides of the benzimidazole group controlled Colletotrichum truncatum and Fusarium spp., but tremendously increased the incidence of Alternaria alternata. In the nonrainy season expt., fungicides, in general, significantly increased total yield and reduced the proportion of seeds with both symptomatic and asymptomatic infection; however, fungicides of the benzimidazole group significantly increased A. alternata-infected seeds. (AS)

0562

27756 HAGEDORN, D.J.; RAND, R.E. 1986. Rate reducing disease resistance in Phaseolus vulgaris to Isariopsis griseola. Bean Improvement Cooperative. Annual Report 29:36. En. [Dept. of Plant Pathology, Univ. of Wisconsin-Madison, USA]

Phaseolus vulgaris. Isariopsis griseola. Cultivars. Resistance. USA.

Seeds of red-seeded bean plant introductions (PIs) were planted in the greenhouse to evaluate their resistance to Isariopsis griseola. In sharp contrast to the disease development observed on bean cv. Montcalm, resistance affecting rate of lesion development was found in PI 209488 from Costa Rica. Plants of this line did not show any evidence of inoculation until about 20 days after treatment at which time a few tiny pinpoint lesions less than 0.5 mm in diameter were observed. Even though some basic studies remain to be made, the resistance of PI 209488 may be useful in breeding beans for resistance to I. griseola. (CIAT)

0563

28257 HAMDAN, M.A.M.S.; DIXON, R.A. 1986. Differential biochemical effects of elicitor preparations from Colletotrichum lindemuthianum. Physiological and Molecular Plant Pathology 28(3):329-344. En., Sum. En., 41 Ref., Il. [Dept. of Biochemistry, Royal Holloway College, Univ. of London, Egham Hill, Egham, Surrey TW20 OEX, England]

Phaseolus vulgaris. Colletotrichum lindemuthianum. Tissue culture. Isolation. Snap beans. Enzymes. Disease physiology and biochemistry. United Kingdom.

Polysaccharide-containing elicitor preparations from the culture filtrate and cell walls of Colletotrichum lindemuthianum had broadly similar monosaccharide compositions. Both preparations induced phenylalanine ammonia-lyase, chalcone synthase, and chalcone isomerase extractable activities in bean cell suspension cultures; however, although phytoalexin accumulation was observed in response to the 2 elicitors in bean endocarp tissue, the culture filtrate elicitor induced only phaseolin in bean cell suspension cultures whereas the cell wall elicitor induced both kievitone and phaseolin, the latter to a concn. 70 times greater than that induced by the culture filtrate elicitor. Only the cell wall elicitor induced deposition of wall-bound phenolics in bean cultures, and differences were also observed in the effects of the 2 elicitor preparations on levels of free and esterified hydroxycinnamic acids. Induction of prolyl hydroxylase extractable activity was observed in response to both elicitors, although increased accumulation of hydroxyproline in the cell walls of suspension-cultured bean cells was only induced following treatments with cell wall elicitor. The results are discussed in terms of the coordination and regulation of induced responses, and the possible need for more than one elicitor to induce such changes is considered. (AS)

0564

27754 INGLIS, D.A.; HAGEDORN, D.J. 1986. Temperature requirements by Isariopsis griseola for infection and disease development on red kidney beans. Bean Improvement Cooperative. Annual Report 29:35. En. [Dept. of Plant Pathology, Univ. of Wisconsin-Madison, USA]

Phaseolus vulgaris. Isariopsis griseola. Temperature. Chlorosis. USA.

Environment-controlled plant growth chambers were used to establish a temp. series to determine temp. requirements for Isariopsis griseola infection and disease development. Inoculated plants were incubated at 16, 20, 24, and 28 degrees Celsius for 40 h and then given postincubation treatments of

16, 20, 24, and 28 degrees Celsius for 21 days. Results indicate that moderate to warm temp. favor disease initiation and development, and although infection by I. griseola takes place at low temp., subsequent disease development is substantially slowed under these conditions. (CIAT)

0565

27480 ISSA, E. 1985. Estudo comparativo de aplicacoes de fungidas, isoladamente, em alternancias e em misturas, para controle de doencas das vagens do feijoeiro, Phaseolus vulgaris L. (Comparative study of fungicides, applied alone, alternated, or mixed, to control diseases affecting bean pods). Biológico 51(6):141-146. Pt., Sum. Pt., En., 6 Ref.

Phaseolus vulgaris. Colletotrichum lindemuthianum. Alternaria alternata. Disease control. Fungicides. Brazil.

During the rainy season of 1980-81 a field trial was carried out in Campinas (Sao Paulo, Brazil) on the control of bean diseases. A no. of fungicides were tested to study their effects when used alone, in alternate applications, or in mixtures. Captafol, benomyl, and mancozeb used alone, alternated, or in mixtures, and chlorothalonil used alone, alternated with mancozeb, and formulated in mixture with copper oxychloride gave the best control of anthracnose. Chlorothalonil, captafol, mancozeb alternated with captafol, and mancozeb alternated with the mixture of benomyl plus captafol were the most efficient in controlling Alternaria pod spot. Chlorothalonil, captafol, mancozeb alternated with the mixture of benomyl plus captafol, and mancozeb alternated with captafol gave the best control of both anthracnose and Alternaria pod spot. (AS)

0566

27765 KMIECIK, K.A.; BLISS, F.A. 1986. Field resistance of snap beans to root rot determined by root dry mass. Bean Improvement Cooperative. Annual Report 29:85-86. En.- 1 Ref. [Dept. of Horticulture, Univ. of Wisconsin, Madison, WI 53706, USA]

Phaseolus vulgaris. Snap beans. Mycoses. Resistance. USA.

In 1985, 32 snap bean cv. grown in 2 fields at U. Exptl. Farm in Hancock, (Wisconsin, USA) were evaluated for root rot resistance. The roots of plants in each plot were bagged, tagged, and dried. Dry wt. were then taken on root + hypocotyl portions and on roots only for the plants in each plot. Analyses of variance showed that root mass and root + hypocotyl dry mass were significantly different for both location and cv. Stand counts were not significantly different. Data precision suggests that root mass may be a useful parameter in breeding for root rot resistance. (CIAT)

0567

28099 LAEMMLEN, F.; SAETTLER, F. 1980. Be aware of anthracnose. Michigan Dry Bean Digest 4(4):8. En., Il.

Phaseolus vulgaris. Colletotrichum lindemuthianum. Symptomatology. Cultivars. Resistance. Disease control. Chemical control. USA.

Symptoms of anthracnose infection on bean stem, leaf, petiole, and pod are described. Various resistant cv. are mentioned and several fungicides commonly used to control the disease are indicated. (CIAT)

0568

27497 LANGUIDEY, P.; AGUILERA, H. 1983. Control químico de la roya (agente causal: Uromyces phaseoli (Reben Wint.) del frejol (Phaseolus vulgaris L.). (Chemical control of bean rust (causal agent: Uromyces phaseoli)). Revista Boliviana de Investigación 1(2):95-97. Es., Sum. En., Es., 8 Ref., Il.

[Inst. de Investigaciones Agrícolas El Vallecito, Univ. Gabriel René Moreno, Casilla 702, Santa Cruz de la Sierra, Bolivia]

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

The effect of 6 fungicides on the control of rust in beans was studied by applying them every 15 days during the crop cycle in a randomized complete block design with 4 replications. Bean var. BAT 76 (black-seeded) was used and the treatments consisted of benomyl, maneb, metiram, captafol, copper oxychloride, and mancozeb; an untreated check was also included. The best control of rust was obtained with mancozeb (bean yields 38.3 percent over the check) followed by benomyl, metiram, and captafol. Maneb and copper oxychloride were not efficient in controlling rust when they were applied at 15-day intervals. (AS)

0569

27499 LANGUIDEY, P.; AGUILERA, M. 1983. Enfermedades y rendimiento del frejol (Phaseolus vulgaris L.). Revista Boliviana de Investigación 1(2):106-109. Es., Sum. En., Es., 9 Ref., Il. [Inst. de Investigaciones Agrícolas El Vallecito, Univ. Gabriel René Moreno, Casilla 702, Santa Cruz de la Sierra, Bolivia]

Phaseolus vulgaris. Cultivars. Alternaria solani. Isariopsis griseola. Uromyces phaseoli. Yields. Yield components. Bolivia.

The damage caused by diseases in bean crops was assessed and the effect on yield was determined. Var. BAT 76 and SEL 1 were planted in a split-plot design, untreated or treated with fungicides (benomyl and mancozeb). The products used showed a good protection against fungal diseases, but not against Xanthomonas. Alternaria leaf spot, angular leaf spot, rust, and Oidium were observed, showing a considerable effect on yield and being closely related to the prevalent climatic conditions. The differences in yield between the treated and untreated plots were in the order of 30.9 and 41.4 percent for bean var. SEL 1 and BAT 76, resp. (AS)

0570

28820 MENDES, B.M.J.; BERGAMIN FILHO, A. 1986. Adaptacao da técnica da cultura de folha destacada para a quantificacao dos parâmetros epidemiológicos monocíclicos da ferrugem do feijoeiro (Uromyces phaseoli var. typica). (Adjustment of the detached leaf culture technique to quantify the monocyclic epidemiological parameters of bean rust (Uromyces phaseoli var. typica)). Fitopatología Brasileira 11(1):103-114. Pt., Sum. Pt., En., 19 Ref., Il. [Depto. de Fitopatología, Escuela Superior de Agricultura Luiz de Queiroz, 13.400 Piracicaba-SP, Brasil]

Phaseolus vulgaris. Leaves. Uromyces phaseoli. Analysis. Cultivars. Pathogenicity. Brazil.

To find a rapid and efficient method of quantifying resistance in breeding studies, expt. were conducted to adjust the detached leaf culture technique to the bean-rust system. The evaluation was conducted in growth chambers under controlled conditions (21 degrees Celsius; 12 h light/12 h dark) using bean lines Rosinha and Carioca. Primary and trifoliate bean leaves were tested. The monocyclic parameters of resistance evaluated were incubation period, latent period, frequency of infection, infection period, and spore production. Both primary and trifoliate leaves remained in good conditions during the evaluation period. A higher no. of pustules was formed when the lower face of the leaves was inoculated. Trifoliate leaves were more susceptible than primary leaves. Results indicated that the

detached leaf culture technique, using the frequency of infection of trifoliate leaves as parameter, can be used to quantify resistance in this pathogen-host system. (AS)

0571

27488 MILLER, D.E.; BURKE, D.W. 1986. Reduction of Fusarium root rot and Sclerotinia wilt in beans with irrigation, tillage, and bean genotype. Plant Disease 70(2):163-166. En., Sum. En., 6 Ref., Il. [Research Plant Pathologist, Soil & Water Management & Vegetable Crops Production, Agriculture Research Service, United States Dept. of Agriculture, Prosser, WA 99350, USA]

Phaseolus vulgaris. Irrigation. Genotypes. Tillage. Fusarium solani phaseoli. Whetzelinia sclerotiorum. Disease control. Yields. USA.

Near Prosser (Washington, USA), the influence of sprinkler irrigation regimes on yield of dry beans was evaluated as affected by deep tillage to reduce soil compaction, soil infestation with Fusarium solani f. sp. phaseoli, and cv. resistance to the pathogen. The effect of these practices on Sclerotinia wilt was evaluated. There was little yield response to deep tillage in the absence of the Fusarium pathogen. When it was present, yield increases attributed to deep tillage were greatest in the most Fusarium-susceptible cv. (Red Mexican UI-36) and lowest in the most Fusarium-resistant cv. (Roza Pink). Yield increases resulting from increased irrigation were greater on Fusarium-infested than on noninfested soil. Injury from Sclerotinia wilt increased with increasing irrigation in Fusarium-free fields but was negligible in Fusarium-infested fields. (AS)

0572

28288 MUNDT, C.C.; LEONARD, K.J. 1986. Effect of host genotype unit area on development of focal epidemics of bean rust and common maize rust in mixtures of resistant and susceptible plants. Phytopathology 76(9):895-900. En., Sum. En., 20 Ref., Il. [Dept. of Botany & Plant Pathology, Oregon State Univ., Corvallis, OR 97331-2902, USA]

Phaseolus vulgaris. Varietal mixtures. Resistance. Uromyces phaseoli. Snap beans. Epidemiology. USA.

The effect of host genotype unit area (ground area occupied by an independent, genetically homogeneous unit of a host population) on the effectiveness of host mixtures for controlling focal epidemics of common maize rust and bean rust was studied. For both crops, mixtures of resistant and susceptible plants with 4 genotype unit areas were established by altering the spatial arrangement of host genotypes within plots. With beans, genotype unit area was increased from 0.023 to 0.84 square meters in mixtures of either 1:1 or 1:3 susceptible/resistant plants over 3 yr (1982-84). There was always less disease on susceptible plants in mixtures with the smaller genotype unit areas than in the pure-line susceptible plants. In all 3 yr, the effectiveness of the mixture declined as the genotype unit area increased; however, the quantitative relationship between mixture efficacy and genotype unit area varied among years. (AS (extract))

0573

27469 O'CONNELL, R.J.; BAILEY, J.A.; RICHMOND, D.V. 1984. A chloroplast and other organelles of Phaseolus vulgaris within a hypha of Colletotrichum lindemuthianum. New Phytologist 96(1):35-41. En., Sum. En., 15 Ref., Il. [Long Ashton Research Station, Univ. of Bristol, Long Ashton, Bristol, BS18 9AF, England]

Phaseolus vulgaris. Chloroplasts. Colletotrichum lindemuthianum. Hypocotyls. Symbiosis. United Kingdom.

In the course of an ultrastructural study of the anthracnose pathogen (Colletotrichum lindemuthianum) infecting hypocotyls of a susceptible French bean cv., a chloroplast and other plant organelles were observed within the cytoplasm of a fungal hypha. The chloroplast retained its morphological integrity and was not enclosed by an extra membrane derived from either plant or fungus. It is possible that the plant organelles entered the fungus through a rupture in the hyphal wall and plasmalemma that permitted cytoplasmic continuity between host and pathogen. (AS)

0574

28984 PERREAUX, D. 1986. Ecology and importance of bean diseases in Burundi. Phaseolus Beans Newsletter for Eastern Africa no.5:4-5. En. [ISABU, Plant Protection Dept., Burundi]

Phaseolus vulgaris. Epidemiology. Ramularia phaseoli. Isariopsis griseola. Ascochyta phaseolorum. Colletotrichum lindemuthianum. Burundi.

The incidence and severity of bean diseases were determined in various locations of Burundi: Moso (1250 m), Murongwe (1450 m), Gitega (1600 m), and Ngozi (2100 m). The floury leaf spot (Mycovellosiella phaseoli) is the most common disease in Moso and angular leaf spot (Phaeoisariopsis griseola) in Murongwe; Ascochyta leaf spot (Ascochyta phaseolorum) and anthracnose were found at higher alt. (Gisozi). Based on preliminary results, further work on screening for resistant var. is planned. (CIAT)

0575

27465 PERREAUX, D.; BACAMBAKE, E.; GAHUNGU, E.; NKUBAYE, E.; WAKANA, E.; KIRIMONO, S. 1985. Epidémiologie des maladies du haricot en milieu rural. (Epidemiology of bean diseases in the field). In Institut des Sciences Agronomiques du Burundi. Rapport des Recherches Agronomiques 1985. Bujumbura, Burundi. pp.121-123. Fr., Il.

Phaseolus vulgaris. Epidemiology. Isariopsis griseola. Uromyces phaseoli. Colletotrichum lindemuthianum. Ascochyta phaseolorum. Xanthomonas campestris pv. phaseoli. Ramularia phaseoli. Burundi.

The field incidence of bean diseases and their variation in terms of agroecological conditions were determined. Observations were made in Burundi at 6 locations with alt. varying between 1250-2100 m. Disease incidence was evaluated over 50 randomly selected plants, and the disease severity was assessed by comparing each leaf of the diseased plants with reference diagrams from CIAT illustrating ratios of 1, 5, 25, and 50 percent of destroyed leaf area. The main diseases were present at all the locations. In Kisozi (2100 m), angular leaf spot, rust, anthracnose, and Ascochyta were present in almost the same ratio; common bacterial blight was rare. Viruses were important only in Murongwe (1450 m), and floury leaf spot (Mycovellosiella phaseoli) was the more prevalent disease there and in Gitega (1600 m). Anthracnose was the disease that appeared 1st (seed transmission). An av. of 1-5 percent of destroyed leaf area was observed at the different locations. (CIAT)

0576

28612 RAJAM, M.V.; WEINSTEIN, L.H.; GALSTON, A.W. 1986. Kinetic studies on the control of the bean rust fungus (Uromyces phaseoli L.) by an inhibitor of polyamine biosynthesis. Plant Physiology 82(2):485-487. En., Sum. En., 9 Ref., Il. [Botany Dept., Kakatiya Univ., Warangal 506 009 AP, India]

Phaseolus vulgaris. Inhibitors. Uromyces phaseoli. Disease control. India.

Alpha-difluoromethylornithine (DFMO), a specific and irreversible inhibitor of the polyamine biosynthetic enzyme ornithine decarboxylase, effectively inhibits mycelial growth of several phytopathogenic fungi on defined media in vitro and provides systemic protection of bean plants against infection by Uromyces phaseoli race 0. It was found that application of 0.5 millimolar DFMO to unifoliolate leaves of Pinto beans up to 3 days after inoculation with uredospores of U. phaseoli completely inhibits the growth of the pathogen, while application 4 or 5 days after inoculation results in partial protection against the pathogen. Spores do not germinate on the surface of unifoliolate leaves treated with DFMO 1 day before infection, but addition of spermidine to the DFMO treatments partially reverses the inhibitory effect. The titer of polyamines in bean plants did not decline after DFMO treatment; rather, putrescine and spermidine contents actually rose, probably due to the known but paradoxical stimulation of arginine decarboxylase activity by DFMO. (AS)

0577

26501 ROSADO M., F.J.; GARCIA E., R.; GLIESSMAN, S.R. 1985. Impacto de los fitopatógenos del suelo al cultivo del fríjol, en suelos bajo diferente manejo en La Chontalpa Tabasco. (Impact of soil-borne plant pathogens in bean crops in soils under different management in La Chontalpa Tabasco). Revista Mexicana de Fitopatología 3(2):15-26. Es., Sum. Es., En., 18 Ref., Il. [Colegio Superior de Agricultura Tropical, Depto. de Prácticas de Campo, Tabasco, México]

Phaseolus vulgaris. Cultivation systems. Rhizoctonia solani. Fusarium. Pythium. Zea mays. Intercropping. Mexico.

The incidence of plant pathogens on beans was evaluated in the greenhouse on soils of the same series obtained from 5 different cultivation systems. It was found that the incidence of Fusarium spp., Pythium spp., and Rhizoctonia solani was different and that it depended on the agroecosystem management. The maize-beans rotation was the agroecosystem with the lowest incidence of these fungal pathogens. A lower OM content in the soil seems to be involved in the impact of soil-borne plant pathogens. (CIAT)

0578

27704 RUSUKU, G.; LEPOIVRE, P.; MEULEMANS, M.; SEMAL, J. 1984. Effects of triphenylphosphite on bean rust development. Plant Disease 68(2):154-156. En., Sum. En., 9 Ref., Il. [Faculté des Sciences Agronomiques, 5800 Gembloux, Belgium]

Phaseolus vulgaris. Uromyces phaseoli. Disease control. Belgium.

Triphenylphosphite (TPP) at 125 micrograms/ml, when sprayed onto bean leaves 2 days before inoculation with Uromyces phaseoli, prevented formation of rust pustules. Spore germination, growth of germ tubes on the leaf surface, formation of appressoria, penetration through stomata, formation of substomatal vesicles, development of infection hyphae, and subsequent formation of haustorial mother cells proceeded normally in TPP-treated leaves; however, no haustoria were formed. Both alpha-aminooxyacetate (an inhibitor of the phenylpropanoid pathway) and cycloheximide (an inhibitor of protein synthesis) largely suppressed the inhibitory effect of TPP when applied to TPP-treated bean leaves 1 day before inoculation. Apparently, TPP triggered a resistance mechanism that prevented formation of haustoria in treated bean leaves inoculated with U. phaseoli. (AS)

0579

28223 SANCHEZ A., A. 1979. Estudio del filtrado en medio de cultivo líquido del hongo Sclerotium rolfsii Sacc., para la posible obtención de un método

de selección de material germoplásmico, para algodón (Gossypium spp.) y fríjol (Phaseolus vulgaris L.). (Study of the filtrate of the liquid culture medium of the fungus Sclerotium rolfsii to obtain a screening method of cotton and bean germplasm). Tesis Mag.Sc. Nuevo Léon, México, Instituto Tecnológico y de Estudios Superiores de Monterrey. 81p. Es., Sum. Es., 43 Ref., Il.

Phaseolus vulgaris. Sclerotium rolfsii. Selection. Germplasm. Resistance. Mexico.

Some characteristics of the filtrate in liquid culture medium, inoculated with Sclerotium rolfsii, were studied to determine the feasibility of developing a germplasm screening technique in bean and cotton seedlings. A change in pH was observed in the potato-dextrose liquid culture medium during the incubation period; the pH became stable between 3-4. In bean seedlings the adequate toxic filtrate concn. is 50 percent; however, samplings can be done in the ranges of 100 and 50 percent to further study the effects of the filtrate. (CIAT)

0580

28690 SHYAM, K.R.; CHAKRABORTY, P.K. 1985. Seed transmission of Colletotrichum lindemuthianum in different cultivars of bean (Phaseolus vulgaris L.). Seed Research 13(1):211-212. En., 4 Ref. [Dept. of Mycology & Plant Pathology, H.P. Krishi Vishva Vidyalaya, SNS Nagar, Solan - 173 203, India]

Phaseolus vulgaris. Cultivars. Disease transmission. Seed transmission. Colletotrichum lindemuthianum. India.

The extent of seed transmission of Colletotrichum lindemuthianum in commercial bean was studied using pods of cv. Kentucky Wonder, White Panchmari, Dharamsala Local, and Chamba Local. Four plots infected with anthracnose were selected for each cv., and in each plot, 10 plants were selected at random and tagged. Both healthy and diseased pods from selected plants were removed at maturity and disease incidence was determined on the basis of pod infection. The seeds from these pods were examined for the transmission of the pathogen by blotter paper and growing on test methods. The incidence of anthracnose in the field ranged from 24.48 percent for cv. White Panchmari to 59.08 percent in Dharamsala Local. A consistent decrease in percent transmission of the pathogen was observed in all cv. by the growing on test method. The extent of seed transmission of the pathogen as determined by either of the methods was not reflected in seed germination. Factors other than seed infection by C. lindemuthianum are involved in reducing the germination of infected seed. (CIAT)

0581

28695 SMITH, V.L.; PUNJA, Z.K.; JENKINS, S.F. 1986. A histological study of infection of host tissue by Sclerotium rolfsii. Phytopathology 76(8):755-759. En., Sum. En., 31 Ref., Il. [Dept. of Plant Pathology, North Carolina State Univ., Raleigh, NC 27695-7616, USA]

Phaseolus vulgaris. Sclerotium rolfsii. Disease physiology and biochemistry. USA.

Hyphae from germinating sclerotia of Sclerotium rolfsii ramified over various host tissues (sugar beet leaves, bean hypocotyls, and carrot roots or petioles) within 24-48 h following inoculation. Hyphae frequently coalesced to form mycelial aggregates that functioned as infection cushions. Crystals of Ca oxalate were associated with these aggregates and with individual hyphae growing over the host surface. Penetration occurred after death and collapse of cells beneath infection cushions and from

appressoria that formed at the tips of individual hyphae. Penetration pegs (1-3 microns thick) formed below infection cushions and from appressoria. The cuticle was apparently not dissolved, but was pulled away from the epidermis, and subsequent subcuticular hyphal growth occurred both inter- and intracellularly. Hyphal growth was parallel to the longitudinal axis of host cells and to the tissue surface. Cell wall components that stained positive with ruthenium red and alizarin red S (pectic materials and Ca, resp.) were depleted from cell walls in advance of the mycelium. Cells distal to the hyphae were necrotic and stained positive with thionin. Crystals of Ca oxalate stained black with AgNO3-dithiooxamide and were produced in abundance in necrotic tissues. Infection cushions produced by S. rolfsii appeared to facilitate infection of host tissue by secreting enzymes and oxalic acid that macerated and killed tissue in advance of fungal penetration. (AS)

0582

28068 STAVELY, J.R.; BAKER, C.J. 1985. Scientists attack rust with resistance and biocontrol. Agricultural Research 33(9):15. En., Il. [United States Dept. of Agriculture, Agricultural Research Service, Plant Pathology Laboratory, Bldg. 004, BARC-West, Beltsville, MD 20705, USA]

Phaseolus vulgaris. Uromyces phaseoli. Disease control. Snap beans. USA.

The advances in research achieved by scientists in Beltsville (Maryland, USA) regarding the control of rust in dry bean and snap bean through var. resistance and biocontrol (Bacillus subtilis) are briefly described. (CIAT)

0583

27735 STEADMAN, J.R.; LINDGREN, D.T.; RAMIREZ, W. 1986. Relationship of rust disease progress and yield components in pinto beans. Bean Improvement Cooperative. Annual Report 29:89-90. En., Il. [Univ. of Nebraska, Lincoln, NE 68583-0722, USA]

Phaseolus vulgaris. Uromyces phaseoli. Disease control. Chemical control. Yield components. USA.

In 1984, 18 different fungicide treatments were used to evaluate rust control on pinto bean cv. UI 111 and to compare different degrees of rust intensity with several yield components. Rust severity readings, expressed as percentage leaf area infected, were recorded 56, 62, 71, 77, 83, and 91 days after planting. There was a highly significant correlation of rust severity with yield, total pods, total seeds, and seeds/plant except at the 56-day reading. Thus, early rust intensity readings (62-71 days after planting) could be used to predict yield loss and final disease intensity. (CIAT)

0584

27734 STEADMAN, J.R.; RAMIREZ, W.; SHAIK, M.; HINDMAN, D.; COYNE, D.P. 1986. Variation in virulence of the rust pathogen in the Dominican Republic and high plains of the U.S.: implication for control. Bean Improvement Cooperative. Annual Report 29:6. En. [Depts. of Plant Pathology & Horticulture, Univ. of Nebraska, Lincoln, NE 68583, USA]

Phaseolus vulgaris. Races. Uromyces phaseoli. Pathogenicity. Dominican Republic.

Rust culture collections isolated from the main bean growing areas of San Juan, Dominican Republic, were compared with collections from the high plains of the central USA. All of the cultures from the Dominican Republic differed in their pattern of reactions to the differentials from those of the central USA. The no. of races was higher during years when rust

incidence and severity were high; however, virulence as measured by the no. of differential cv. with large pustules (grades 5 and 6) did not appear to be associated with the degree of pathogen variability. This would indicate a major effect of environment on the appearance of pathogen races rather than a selection by host genotype. Resistant genes must be identified in both field and greenhouse trials for use in a breeding program. (CIAT)

0585

27739 STUMPF, M.A.; HEATH, M.C. 1985. Cytological studies of the interactions between the cowpea rust fungus and silicon-depleted French bean plants. Physiological Plant Pathology 27(3):369-385. En., Sum. En., 28 Ref., Il. [Botany Dept., Univ. of Toronto, Toronto, Ontario, Canada M5S 1A1]

Phaseolus vulgaris. Snap beans. Uromyces phaseoli. Si. Cell walls. Nutrient solution. Resistance. Canada.

To investigate the role of silica-rich wall deposits in resistance to the cowpea rust fungus, French bean plants were grown hydroponically in nutrient solutions supplemented with or depleted in Si. Primary leaves supplied with adequate Si responded to fungal infection by the autoflourescence of guard cell walls, the limited autofluorescence of mesophyll cell walls (both visualized in cleared tissue), and the deposition in and on the latter of silica. If infected, Si-depleted plants, light microscopy, electron microscopy, and energy dispersive X-ray analysis indicated that silica deposits were absent. The incidence of autofluorescence of guard cells was comparable with that in the Si-supplemented plants, but the incidence and extent of mesophyll wall autofluorescence was greatly enhanced. The autofluorescence of mesophyll cells, but not guard cells, corresponded to areas of the wall that gave a color reaction with toluidine blue indicative of phenolic compounds. Callose (aniline blue positive material), in the form of papillae, was also extremely common at infection sites in Si-depleted leaves. Infection hyphae rarely formed haustoria in either Si-depleted plants or those given adequate Si, although these hyphae grew as well, and appeared equally healthy, in both types of plants. In Si-depleted plants, preinoculation heat treatments or injection of intercellular fluids from bean rust-infected bean leaves, increased the incidence of haustorium formation and decreased the incidence of all observed plant responses. The results suggest that either silica deposition is not the primary barrier to haustorium formation in normal plants, or that a 2nd barrier, such as the impregnation of the plant wall with phenolic materials, comes into play if silica deposition is prevented. (AS)

0586

26754 THURSTON, H.D. 1984. Web blight of beans. In _____. Tropical Plant diseases. St. Paul, Minnesota, The American Phytopathological Society. pp.88-93. En., 15 Ref., Il.

Phaseolus vulgaris. Rhizoctonia solani. Epidemiology. Symptomatology. Host range. Insect biology. Disease control. Cultural control. Chemical control. USA.

The history and geographical location of bean web blight and its causal agent, Thanatephorus cucumeris, are briefly described as well as its importance, symptoms, host plants, pathogen cycle, control mechanisms (systemic fungicides, organic manure, covered bean, rice husks, PCNB), its advantages and disadvantages. Research results show that control measures must point to the reduction of the inoculum level in the soil, avoiding splashing on bean tissues. (CIAT)

0587

28060 TU, J.C. 1986. A detached leaf technique for screening beans (Phaseolus vulgaris L.) in vitro against anthracnose (Colletotrichum lindemuthianum). Canadian Journal of Plant Science 66(3):805-809. En., Sum. En., Fr., 9 Ref., Il. [Research Station Agriculture Canada, Harrow, Ontario NOR 1GO, Canada]

Phaseolus vulgaris. Selection. Resistance. Colletotrichum lindemuthianum. Canada.

An effective alternative method of screening white beans for anthracnose (Colletotrichum lindemuthianum) resistance was developed using excised leaves of leaflets. The inoculum was brushed on the underside of the excised leaves and leaflets. The inoculated leaves were placed, inoculated side up, on several layers of wet paper towels in a tray that was then covered with a transparent lid or plastic to maintain high humidity. The trays were kept at 22 plus or minus 1 degree Celsius with 9 h light daily for 6 days for symptom development. With this method 1 plant can be-assayed several times either for the same race or for different races of the pathogen. The latter is particularly important when resistance to different races involves different genes. (AS)

0588

28289 VAN BRUGGEN, A.H.C.; WHALEN, C.H.; ARNESON, P.A. 1986. Effects of inoculum level of Rhizoctonia solani on emergence, plant development, and yield of dry beans. Phytopathology 76(9):869-873. En., Sum. En., 28 Ref., Il. [Dept. of Plant Pathology, Univ. of California, Davis, CA 95616, USA]

Phaseolus vulgaris. Rhizoctonia solani. Emergence. Growth. Yields. Yield components. USA.

The effect of inoculum density of Rhizoctonia solani on hypocotyl infection, plant development, and yield of dry beans was evaluated in 2 field expt. using microplots near Ithaca (New York, USA). Fumigated soil was mechanically mixed with 0-800 sclerotia/kg of soil. The population means of the periods from sowing to emergence, flowering, and pod set increased linearly with inoculum level. The proportion of plants infected, no. of lesions, and lesion areas increased with higher inoculum levels in the form of a saturation curve, the max. being reached at 250-350 sclerotia/kg of soil. Of the yield components, only the no. of plants/plot decreased significantly with increasing inoculum densities, and the overall yield was not affected by level of infestation (100-800 sclerotia/kg of soil). Initial no. of lesions/hypocotyl was the only disease measurement that was negatively correlated with yield. (AS)

0589

28274 VAN BRUGGEN, A.H.C.; ARNESON, P.A. 1986. Path coefficient analysis of effects of Rhizoctonia solani on growth and development of dry beans. Phytopathology 76(9):874-878. En., Sum. En., 17 Ref., Il. [Dept. of Plant Pathology, Univ. of California, Davis, CA 95616, USA]

Phaseolus vulgaris. Rhizoctonia solani. Inoculation. Growth. Yields. Yield components. Emergence. Flowering. USA.

A path coefficient analysis is presented for the data of 2 field expt. in which the effects of 8 inoculum levels of Rhizoctonia solani on growth, development, and yield of dry beans were assessed. The analysis indicated that all 3 measures of disease (no. of plants infected, no. of lesions, and lesion area) were equally important in reducing and delaying emergence in the 1st yr, whereas only no. of plants infected determined these effects in the 2nd yr. Of the yield components, pods/plant exerted the largest

influence on yield/unit area. Plants/row was the 2nd most important yield component, but its correlation with yield was not significant or only weakly so, because of a negative correlation between plants/row and pods/plant. The most important path of influence of infection on yield was via no. of plants infected, no. of plants established (at flowering), and final no. of plants/row (at harvest) in both years, and via no. of lesions, shoot dry wt. (at flowering), and no. of pods/plants in the 1st yr. Of the yield components only the no. of plants/row was significantly reduced by inoculum, but because of compensation by the other yield components, R. solani did not affect overall yield. (AS)

0590

27725 VARNER, G. 1986. White mold control programs on irrigated dry beans. Bean Improvement Cooperative. Annual Report 29:56-57. En. [Michigan Dry Edible Bean Production Research Advisory Board 3066 S. Thomas, Saginaw, MI 48603, USA]

Phaseolus vulgaris. Whetzelinia sclerotiorum. Disease control. Chemical control. Cultivars. Yields. USA.

Since 1982 expt. have been conducted on the control of white mold by spraying fungicides on irrigated colored beans in Michigan, USA, at 100 percent bloom, peak bloom, and at both 100 percent and peak bloom. In 1982 and 1984, fungicide sprays increased yields by 25 percent in irrigated colored beans. One fungicide spray at 100 percent bloom to peak bloom reduced the incidence of white mold. These fungicide sprays should be ground applied to achieve consistent yield increases. On the other hand, var. tolerance to this disease was observed in bean var. Bunsi, C-20, and Domino. (CIAT)

0591

27724 WIJESUNDERA, R.L.C.; BAILEY, J.A.; BYRDE, R.J.W. 1984. Production of pectin lyase by Colletotrichum lindemuthianum in culture and in infected bean (Phaseolus vulgaris) tissue. Journal of General Microbiology 130:285-290. En., Sum. En., 23 Ref., Il. [Long Ashton Research Station, Univ. of Bristol, Long Ashton, Bristol BS18 9AF, England]

Phaseolus vulgaris. Colletotrichum lindemuthianum. Enzymes. United Kingdom.

The properties and activity of pectin lyase produced by Colletotrichum lindemuthianum race gamma are described. It was found to secrete 2 forms of pectin lyase, having pI values of 8.2 and 9.7, when grown in culture with sodium polypectate or isolated Phaseolus vulgaris hypocotyl cell walls as the main source of carbon. A single form of polygalacturonase was also present in both media. A pectin lyase, with a pI value of 9.7, was detected in necrotic P. vulgaris tissue infected with race gamma, but polygalacturonase activity was absent. (AS) See also 0477 0539 0636 0639 0640 0644

E04 Viroses

0592

28032 CUPERTINO, F.P.; COSTA, C.L.; LIN, M.T.; KITAJIMA, E.W. 1982. Infeccao natural do feijoeiro (Phaseolus vulgaris L.) pelo vírus do mosaico severo do feijao macassar. (Natural infection of bean by cowpea severe mosaic virus). Fitopatologia Brasileira 7(2):275-283. Pt., Sum. Pt., En., 23 Ref., Il. [Inst. de Ciencias Biológicas, Univ. de Brasilia, Caixa Postal 153081, 70910 Brasilia, D.F., Brasil]

Phaseolus vulgaris. Cultivars. Resistance. Cowpea severe mosaic virus. Symptomatology. Brazil.

Natural infection of beans by cowpea severe mosaic virus was found in the Federal District of Brazil. Naturally infected bean plants showed vein clearing, systemic mottling and chlorotic spots of the leaves, and mottling and distortion of the pods. Isometric particles of ca. 28 nm in diameter were detected in leaf dip preparations. In double diffusion tests in agar gel, the sap of infected plants formed a sharp, well defined line with the cowpea severe mosaic virus antiserum at 1:20 dilution, but not with the antisera to 6 other isometric legume viruses (all at 1:20 dilutions). Most of the bean ov., but few of those of cowpea, were susceptible to the virus in mechanical inoculation tests. (AS)

0593

28013 HERRERA G., G.; SEPULVEDA R., P. 1984. Una nueva raza del virus del mosaico amarillo del poroto. (A new strain of bean yellow mosaic virus). Investigación y Progreso Agropecuario La Platina no.26:19-20. Es., Il.

Phaseolus vulgaris. Bean yellow mosaic virus. Symptomatology. Chile.

The symptomatology of a new strain of BYMV, detected on resistant bean var. in Chile, is described. A study was carried out to determine whether it was a new strain; based on the results, it was called the Orfeo INIA strain because it was isolated from this bean var. The remaining bean var., both traditional and improved, were all affected to a lesser or greater extent. (CIAT)

0594

28236 JIMENEZ G., E.; NELSON, M.R. 1986. Los virus del fríjol en las áreas agrícolas de Sonora. (Bean viruses in agricultural areas of Sonora). Hermosillo, Sonora, México, Instituto Nacional de Investigaciones Forestales y Agropecuarias. Secretaría de Agricultura y Recursos Hidráulicos. Folleto Técnico no.2. 16p. Es., 11 Ref., Il. [Campo Agrícola Experimental Costa de Hermosillo, Apartado Postal 1031, Hermosillo, Sonora, México]

Phaseolus vulgaris. Bean common mosaic virus. Bean southern mosaic virus. Bean chlorotic mottle virus. Symptomatology. Host range. Disease transmission. Disease control. Resistance. Mexico.

Bean cropping conditions in the state of Sonora, Mexico, are described as well as its yield potential, factors affecting its development, and viruses identified by characteristic symptoms such as typical mosaic, yellowing, chlorotic mottling, leaf curling, and severe plant dwarfing. BCMV strains NY-15 and YV-1, BSMV, and bean chlorotic mottle virus are widespread on both intercropped and sole cropped beans on the Hermosillo coast, in the Sonora river region, and in the Yaqui and Mayo valleys. Virus characteristics, shape and size of the viral particle, and ways of transmission and dissemination are described as well as alternate hosts or reservoirs, effects on yield, and control measures with their advantages and disadvantages. The ELISA technique can be helpful in the production of virus-free seed. (CIAT)

0595

28098 LAEMMLEN, F. 1980. Bean common mosaic virus. Michigan Dry Bean Digest 4(4):9. En., Il.

Phaseolus vulgaris. Bean common mosaic virus. Symptomatology. Cultivars. Resistance. USA.

Symptoms of BCMV are described and both susceptible and resistant var. (the latter expressed as hypersensitive type of resistance) are mentioned. (CIAT)

0596

28988 OMUNYIN, M.E.; GATHURU, E.M.; MUKUNYA, D.M. 1986. Effect of bean common mosaic virus on growth and yield of beans. (Abstract). Phaseolus Beans Newsletter for Eastern Africa no.5:11-12. En. [National Horticultural Research Station, Thika, Kenya]

Phaseolus vulgaris. Bean common mosaic virus. Growth. Yields. Cultivars. Kenya.

The effect of BCMV on stem height, pod production, wt. of DM, and yield of beans was examined in locally grown var. Bean var. GLP-2 (Rose Coco (1828 kg/ha)), GLP-24 (Canadian Wonder (1662 kg/ha)), and GLP-1004 (Mwezi Moja (1437 kg/ha)) were inoculated with 3 BCMV strains: Nch2 (KN4), 510 (KN3), and N (KN1). Forty days after inoculation, the stem heights of BCMV-infected and noninfected plants were measured. Infected plants resulted in significantly shorter stems, fewer pods, and lower DM wt. than the controls. Yields of Rose Coco, Canadian Wonder, and Mwezi Moja were reduced by 55, 64, and 67 percent due to virus infection. The var. reacted differently to the virus strains, which were significantly different on the var. Canadian Wonder only. (Full text)

0597

28249 SILBERNAGEL, M.J.; MILLS, L.J.; WANG, W.-Y. 1986. Tanzanian strain of bean common mosaic virus. Plant Disease 70(9):839-841. En., Sum. En., 21 Ref.

Phaseolus vulgaris. Bean common mosaic virus. Races. Pathogenicity. Genes. Tanzania.

A strain of BCMV isolated from seed of Phaseolus vulgaris grown in Tanzania was found to be similar pathogenically and serologically to temp.-insensitive strains found initially in Europe and recently in the USA. This is the 1st report of a strain of BCMV from Tanzania. The Tanzanian strain (TN-1) induced typical mosaic mottle on cv. with the recessive ii gene but caused lethal systemic vascular necrosis (black root) on many resistant cv. with the dominant II gene at normal (23-27 degrees Celsius) growing temp. The combination of the dominant II gene and unidentified presumed-recessive genes gave complete protection to both the mosaic mottle and the systemic necrosis phases of TN-1. (AS)

0598

27474 SZCZEPANSKI, M.; REDOLFI, P. 1985. Changes in the proteins of bean leaves infected with tobacco necrosis or alfalfa mosaic viruses. Phytopathologische Zeitschrift 113(1):57-65. En., Sum. En., De., 17 Ref., Il. [Polish Academy of Sciences, Inst. of Plant Genetics, 60-479 Poznan, Strzeszynska 30/36, Poland]

Phaseolus vulgaris. Leaves. Alfalfa mosaic virus. Tobacco necrosis virus. Protein content. Proteins.

Acidic extracts from tobacco necrosis virus- and alfalfa mosaic virus-infected Saxa bean leaves were electrophoretically examined for protein content. In native conditions of resolution (polyacrylamide gel electrophoresis) at least 3 protein bands (PS1-3) not present in the control were found. In denaturing conditions (SDS-polyacrylamide gel electrophoresis) at least 1 (PSa), but often 2 or 3 such proteins (PSb, c) were found in the same extracts. Chromatographic resolution of proteins on Sephadex G-100 column resulted in partial purification of the PS-proteins. Additional, not known before, slow-migrating protein (PSO) induced by hypersensitive viral infection was discovered in some of the eluted

fractions. Both PSO-3 and PSa-c proteins were present in the same fractions. This fact suggests their similarity in mol. wt. and/or shapes. (AS)

0599

28008 TREMAINE, J.H.; RONALD, W.P.; MacKENZIE, D.J. 1985. Southern bean mosaic virus monoclonal antibodies: reactivity with virus strains and with the virus antigen in different conformations. Phytopathology 75(11):1208-1212. En., Sum. En., 20 Ref., Il. [Agriculture Canada, Research Station, 6660 N.W. Marine Drive, Vancouver, British Columbia, Canada V6T IX2]

Phaseolus vulgaris. Bean southern mosaic virus. Antibodies. Analysis. Pathogenicity. Races. Canada.

Monoclonal antibodies B4 to B10 were produced against BSMV bean-type strain and C1 and C3 against the cowpea-type strain. They were tested against virus, swollen virus, and virus protein antigens from 5 bean strains and 4 cowpea strains in gel diffusion, immunoelectron microscopy, indirect ELISA, double antibody sandwich-ELISA, antigen competition ELISA, and latex agglutination tests. B5, B6, and B10 were predominantly virus reactors with bean strains only. They precipitated virus, but not swollen virus and protein, in gel diffusion and immunoelectron microscopy; they reacted well with virus in indirect ELISA, but B6 and B10 had lower reactivities with protein and with swollen virus and protein, resp. B4, B7, B8, B9, C1, and C3 were predominantly swollen virus and protein reactors with both bean and cowpea strains. They did not react with virus, swollen virus, or protein in gel diffusion or immunoelectron microscopy but reacted with swollen virus and protein and weakly with virus in indirect ELISA. B7 and C1 reacted strongly with virus in double antibody sandwich-ELISA and B7 reacted with virus in latex agglutination tests; however, B7 and B9 were inhibited by swollen virus and protein but not by virus in competitive inhibition assays. The reaction of these antibodies with virus in indirect ELISA, latex agglutination tests, and double antibody sandwich-ELISA was attributed to denaturation of virus on polystyrene plates and latex beads or by reaction with polyclonal antibodies in double antibody sandwich-ELISA. The binding sites of B5, B6, and B10 on the virion of the bean-type strain were not blocked by the reaction of the virus with trinitrobenzenesulfonic acid. (AS)

0600

27736 TU, J.C. 1986. A necrotic strain of bean common mosaic virus found in southwestern Ontario. Bean Improvement Cooperative. Annual Report 29:66-67. En., 3 Ref. [Agriculture Canada, Research Branch, Research Station, Harrow, Ontario NOR 1GO, Canada]

Phaseolus vulgaris. Bean common mosaic virus. USA.

Expt. were conducted to determine whether a necrotic strain of BCMV exists in Ontario, Canada. Leaves of Sanilac plants showing mosaic and vein necrosis were collected and inoculated to greenhouse-grown Sanilac plants. Disease reactions were observed 10 days after inoculation. Based on the differential host reactions, the new necrotic isolate was determined to be race NL-8 of BCMV. This new strain differs from strain NL-3 reported in Michigan; it causes veinal necrosis on inoculated leaves and severe tip necrosis of Ontario cv. which carry the I gene. A breeding program to incorporate bc2(2) gene into the cv. with the I gene is urgently needed to alleviate the hypersensitive reaction caused by the resistant I gene. (CIAT)

0601

28071 VARNER, G.V. 1984. Research report. Michigan Dry Bean Digest 9(1):16. En., Il.

Phaseolus vulgaris. Bean common mosaic virus. Resistance. Cultivars. Epidemiology. Disease control. USA.

The epidemiology, resistant var., and recommended control measures for black root, a hypersensitive reaction to a necrotic strain of BCMV, in beans in Michigan, USA, are briefly described. (CIAT)

0602

27339 WANG, W-Y. 1985. Production and characterization of hybridoma cell lines and a broad spectrum monoclonal antibody against bean common mosaic virus. Ph.D. Thesis. Pullman, Washington State University. 199p. En., Sum. En., 110 Ref., Il.

Phaseolus vulgaris. Bean common mosaic virus. Analysis. Serology. Antibodies. USA.

A total of 669 hybridoma lines were produced by somatic cell fusion between murine myeloma cell line P3X63Ag8.653 and spleen cells from BALB/c mice immunized with mixtures of BCMV strains. Among them, 212 hybrid cell lines secrete antibodies with various specificities against 22 BCMV strains tested in indirect ELISA. One hybridoma line (No. 197) was cloned that secreted a monoclonal antibody (BC-1) of the IgG2aK type that reacted with all 22 BCMV strains and several other potyviruses. Nine purified BCMV strains representing both major serogroups and 6 of 7 pathogroups reacted similarly with BC-1 in a semiquantitative manner. The BC-1 antibody does not precipitate BCMV in agar double-diffusion test. Conjugation of BC-1 to alkaline phosphatase of biotin destroyed antibody activity. Capsid proteins of 5 BCMV strains were analyzed by SDS-polyacrylamide gel electrophoresis and by electro-blot immunoassay using BC-1. All virus preparations revealed protein heterogeneity and the polypeptide patterns were unique for individual strains, which could be used for strain verification. The effect of host material on the sensitivity of indirect ELISA detection of BCMV in crude sap was examined. Highest absorbance values at 405 nm were obtained when tissue extracts were diluted 1/40 and 1/160 in buffer, and 1/40 dilution for polystyrene coating is recommended for routine testing. The conditions necessary to dissociate enzyme conjugated and nonconjugated antibodies from polystyrene-bound BCMV by low pH buffers were tested. Glycine-HCl buffers at pH below 2.5 are able to remove all the enzyme-conjugated and most of the nonconjugated antibodies. Polystyrene-bound virus particles maintained their antigenicity after the low pH buffer treatment. A simple and sensitive technique called enzyme-linked immunoblot assay (EIBA) was developed to detect BCMV in individual bean seeds and retain the seed viability. The EIBA technique was superior to conventional ELISA and appears useful to rapidly screen seed lots or breeding lines for the presence of BCMV prior to planting. (AS) See also 0641 0656 0657

E05 Nematodes

0603

28047 SPIEGEL, Y.; COHN, E.; CHET, I. 1986. Use of chitin for controlling plant parasitic nematodes. 1. Direct effects on nematode reproduction and plant performance. Plant and Soil 95(1):87-95. En., Sum. En., 11 Ref., Il. [Dept. of Nematology, Agricultural Research Organization, The Volcani Center, P.O. Box 6, Bet Dagan, Israel]

Phaseolus vulgaris. Soil amendments. Meloidogyne javanica. Nematode control.

Bean and tomato plants were grown in soil amended with Clandosan, which is prepared from crustacean chitin at concn. of 0.05-0.30 percent (wt./wt.), and inoculated with the root knot nematode Meloidogyne javanica. After the 1st mo. following inoculation, Clandosan caused a decrease in fresh root wt. and a relatively small reduction in gall formation, but when the soil was replanted with fresh plants there was an increase in fresh wt. and gall formation in beans was precluded almost totally. Chitin itself appeared less phytotoxic and more effective against M. javanica than Clandosan-treated soil during the 1st mo., while the differences in plant and nematode responses to the different formulations were negligible during the 2nd mo. In separato expt., the addition of phosphoric acid (in order to convert NH4 released by the chitin to NH4(+)) improved growth of both infected and nematode-free plants. It also reduced phytotoxicity in chitinated plants, especially those which were infected. Maize seedlings were found to be less sensitive to chitin treatment than beans, and tomatoes were the most sensitive. (AS) See also 0639

F00 PEST CONTROL AND ENTOMOLOGY

0604

28026 HUEZO DE MIRA, A.; LAINEZ, M.A. 1986. Daño de la babosa del fríjol y su control en El Salvador. (Damage caused by slugs in beans and their control in El Salvador). La Libertad, El Salvador, Centro de Tecnología Agrícola. Boletín Divulgativo no.35. 20p. Es., Sum. Es., 4 Ref., Il. [Centro de Tecnología Agrícola, Depto. de Granos Básicos, División de Investigación Agrícola, La Libertad, El Salvador]

Phaseolus vulgaris. Vaginulus plebeius. Limax maximus. Plant injuries. Pest control. Chemical control. El Salvador.

A detailed literature review is presented of taxonomic aspects, biological characteristics, damage caused, and control measures of the slugs Vaginulus plebeius and Limax maximus. V. plebeius is considered more damaging and it is found in larger populations. The female lays an av. of 67 eggs/clutch, with an incubation period of 28-30 days under normal temp. and moisture conditions. Ovipositions occur during Aug. and Sept. High moisture conditions are necessary for slug survival. Damage to the bean crop is greater during Aug. Slugs consume plants during the 1st 22 days of plant growth; 1 active slug/square meter can damage 20 percent of the plants. The critical injury threshold is 0.25 slug/square meter. Samplings for population estimates can be carried out by placing empty cans containing bait in moist places. The most effective and economical control measure for slugs in a 1-ha bean crop is a mixture of 28.57 kg maize mass, 0.17 kg methomyl (water-soluble powder 90 percent), 0.29 kg Ortho B, 1.0 liter molasses, and 3.5 g sodium benzoate. The insecticides carbofuran and mephosfolan and commercial baits are also effective. (AS-CIAT)

0605

27498 MELLORS, W.K.; ALLEGRO, A. 1984. Comparison of constant and alternating temperatures for determining developmental rates of Mexican bean beetle eggs and pupae. Annals of the Entomological Society of America 77(1):6-10. En., Sum. En., 17 Ref., Il. [Dept. of Entomology, Univ. of Maryland, College Park, MD 20742, USA]

Phaseolus vulgaris. Epilachna varivestis. Insect biology. Temperature. USA.

Eggs and pupae of the Mexican bean beetle, Epilachna varivestis, were incubated at 4 constant temp. (15, 20, 25, and 30 degrees Celsius) and at 4

alternating-temp. regimes (10 and 20, 15 and 25, 20 and 30, or 25 and 35 degrees Celsius), with 12 h of each temp./day. Except for the intermediate constant temp. of 20 and 25 degrees Celsius, the percent survival and median developmental rate were lower at each other constant temp. compared with the same temp. within an alterning regime. This suggests that only an intermediate range of constant temp. is suitable for developmental studies and that alternating temp. regimes should be utilized for determining developmental rates at both lower and higher temp. An alternative interpretation would be that development accumulation under alternating temp. regimes is not simply the additive result of the development observed under constant temp. conditions. (AS)

0606

28017 MONGE, J.P. 1985. L'importance des contacts de la nymphe ou de l'imago d'Acanthoscelides obtectus Say avec sa plante-hote (Phaseolus vulgaris L.) dans la régulation de l'activité reproductrice des femelles: quelques données préliminaires. (Importance of contacts between nymph or early imago of Acanthoscelides obtectus and its host plant (Phaseolus vulgaris) for reproductive activity regulation: some preliminary data). Comptes Rendus de l'Academie des Sciences (Serie 3)301(1):17-20. Fr., Sum. Fr., En., 8 Ref.

Phaseolus vulgaris. Acanthoscelides obtectus. Oviposition. Insect biology. Stored grain pests.

Egg laying of the bean weevil (Acanthoscelides obtectus) is induced by the host plant. Mating and oocyte production is, nevertheless, observed in individuals isolated from the plant since hatching. After having determined the length of time that the imago remains in the seed, it was shown that sexual activity is not induced by the plant at the nymphal stage but occurs even if larval development is completed outside of the seed. Contact between A. obtectus and seed at the nymph and early imago stages, however, modifies the intensity of ovarian activity without affecting recognition of the plant by insects. (AS)

F01 Injurious Insects, Mites and their Control

0607

28986 AUTRIQUE, A.; NTAHIMPERA, L. 1986. Biological control of the black bean aphid in Burundi. Phaseolus Beans Newsletter for Eastern Africa no.5:9-10. En. [ISABU, Dept. Defense des Vegetaux, B.P. 795, Bujumbura, Burundi]

Phaseolus vulgaris. Aphis fabae. Biological control. Predators and parasites. Burundi.

To improve the natural regulation of black bean aphid (Aphis fabae) populations, a pest of economic importance in Burundi, 4 species of Aphidiidae were introduced from Czechoslovakia (Lysiphlebus fabarum, L. cardui, Ephedrus nacheri, and Lipolexis gracilis) since Jan. 1986. These parasitoids were multiplied on A. fabae grown in cages on broad bean plantlets. The 1st 3 species are regularly released at 10- to 15-day intervals, since Feb. of the same year, in 1 location in Kisozi (2100 m) where aphid sources have been maintained. Since then, more than 30,000 parasitoids have been released, consisting mainly of L. fabarum, and more will be released at the beginning and during the dry season. In the same way, the establishment of these parasitoids and their impact on aphid population will be followed on spontaneous and cultivated plants. (CIAT)

0608

28992 AUTRIQUE, A. 1986. Prospects for the control of bean fly (Ophiomyia phaseoli Tryon) in Burundi. Phaseolus Beans Newsletter for Eastern Africa no.5:18-19. En. [ISABU, B.P. 795, Bujumbura, Burundi]

Phaseolus vulgaris. Ophiomyia phaseoli. Insect control. Chemical control. Integrated control. Burundi.

General objectives of the main investigations to be developed by the research program on the control of the beanfly in Burundi are given. This program was initiated in late 1985. (CIAT)

0609

27466 COHEN, A.C.; PATANA, R. 1984. Efficiency of food utilization by Heliothis zea (Lepidoptera:Noctuidae) fed artificial diets or green beans. Canadian Entomologist 116(2):139-146. En., Sum. En., Fr., 17 Ref., Il. [Biological Control of Insects Laboratory, United States Dept. of Agriculture, Agricultural Research Service, Tucson, AZ 85719, USA]

Phaseolus vulgaris. Heliothis zea. Insect biology. Snap beans. USA.

Second-instar Heliothis zea (more than the 275th generation) larvae, from a 16-yr-old culture, were fed either green beans or artificial diet until they reached the pupal stage and then were compared to determine their relative fitness to the 2 diets. They proved at least as well adapted to beans as to artificial diet with regard to most parameters. Final larval wt. were equal, as were pupal dry wt. Wet wt. were higher in diet-fed than in bean-fed pupae. Dry food consumption was higher in diet-fed larvae than in bean-fed larvae, but the reverse was true of wet food consumption. Total food consumption by larvae was limited by food vol. rather than wt. or composition. The larval stage was shorter in diet-fed than in bean-fed larvae, and diet-fed larvae had better survival, higher body N, and body energy content. O consumption was lower in bean-fed than in diet-fed larvae. Efficiency of food utilization was higher for bean-fed than for diet-fed larvae both in terms of DM conversion and energy conversion. N utilization efficiencies were the same for both diets. (AS)

0610

28028 COSTA, E.C.; LINK, D. 1984. Efeitos de níveis populacionais de Nezara viridula (Linnaeus, 1758) sobre quatro cultivares de feijoeiro (Phaseolus vulgaris L.). (Effects of population levels of Nezara viridula on four bean cultivars). Revista do Centro de Ciencias Rurais 14(2):81-86. Pt., Sum. Pt., En., 13 Ref., Il. [Depto. de Defesa Fitossanitária, Centro de Ciencias Rurais da Univ. Federal de Santa María, 97.100-RS, Brasil]

Phaseolus vulgaris. Cultivars. Nezara viridula. Yields. Yield components. Plant injuries. Brazil.

The effect of 5 population densities of Nezara viridula (0, 2, 4, 6, and 8 insects/hill) on 4 black bean cv. (Mouro Grosso, Grosso Salpicado, Carioquinha, and Rio Tibagi) was studied in fields located in Sao Sepe (Rio Grande do Sul, Brazil). Observations were made at 1st flowering and pod fill. Yield and seed wt. decreased as insect population increased. Cv. Rio Tibagi presented the least damage and Mouro Grosso the most. (AS)

0611

28993 GONZALES V., F.; MENENDEZ F., L. 1986. The bean fly, Ophiomyia phaseoli (Tryon) (Diptera: Agromyzidae). Phaseolus Beans Newsletter for Eastern Africa no.5:19-35. En., 43 Ref., Il. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Ophiomyia phaseoli. Host range. Insect biology. Plant injuries. Cultural control. Chemical control. Resistance. Biological control. Integrated control. Colombia.

A vast literature review is given on the bean fly (Ophiomyia phaseoli). Aspects dealt with are geographical distribution, host plants, biology, plant damage, and pest management (cultural, biological, and chemical control, and var. resistance). The importance of an integrated pest management is highlighted, based on the correct identification of the pest and a profound knowledge of its biology and the factors regulating its population. (CIAT)

0612

28811 KAREL, A.K.; SCHOONHOVEN, A. VAN 1986. Use of chemical and microbial insecticides against pests of common beans. Journal of Economic Entomology 79(6):1692-1696. En., Sum. En., 12 Ref., Il.

Phaseolus vulgaris. Insecticides. Biological control. Thysanoptera. Maruca testulalis. Heliothis zea. Insect control. Tanzania.

The effects of the application of chemical insecticides and a microbial insecticide to control insect pests on bean yield were investigated. Two preflowering applications of lindane or carbaryl, 2 postflowering applications of Bacillus thuringiensis, and a spray of lindane or carbaryl effectively controlled bean pests. Lindane or carbaryl applications controlled preflowering pests and flower thrips (Taeniothrips sjostedti). Two applications of B. thuringiensis during the postflowering growth stage of bean plants controlled the larvae of the pod borers Maruca testulalis and Heliothis armigera as effectively as 2 applications of lindane or carbaryl over the same period. Two applications of lindane during the preflowering and the late pod stages, combined with 2 applications of B. thuringiensis gave high seed yields of 1308 and 1307 kg/ha for 1982 and 1983 trials, resp. Thus, B. thuringiensis is as effective as chemical insecticides in controlling pod borers. Integrated use of chemical and biological insecticides could be used for controlling bean pests. (AS)

0613

28653 KHAEMBA, B.M.; OGENGA-LATIGO, M.W. 1985. Effects of the interaction of two levels of the black bean aphid, Aphis fabae Scopoli (Homoptera: Aphididae), and four stages of plant growth and development on the performance of the common bean, Phaseolus vulgaris L., under greenhouse conditions in Kenya. Insect Science and its Application 6(6):645-648. En., Sum. En., Fr., 20 Ref. [Dept. of Zoology, Univ. of Nairobi, P.O. Box 30197, Nairobi, Kenya]

Phaseolus vulgaris. Aphis fabae. Plant injuries. Seedling. Anthesis. Podding. Yield components. Kenya.

Damage caused by the black bean aphid, Aphis fabae, on the common bean, was severest when the aphids were transferred onto bean plants during the preflowering stage. There were significant reductions in the av. length of the central shoot, production of flowers, pods, and seeds/plant. Seed wt./plant was also significantly reduced when aphid infestation occurred during the preflowering stage. Smaller, but significant reductions to the length of the central shoot, no. of pods, and wt. of seeds produced/plant caused by A. fabae were also recorded when the aphids were transferred onto plants at anthesis. When aphid infestation occurred during the grain filling stage the damage caused was minimal and insignificant. The results obtained indicated that the preflowering stage was the vulnerable stage of bean development during which aphid attack is most harmful and, if unchecked, could lead to drastic yield losses. (AS)

0614

27779 LEROI, B.; CHARARAS, C.; CHIPOULET, J.M. 1984. Etude des activités osidasiques du tube digestif des adultes et des larves de la bruche du haricot, Acanthoscelides obtectus. (Study of glycosidase activities of the digestive tract of larvae and adults of Acanthoscelides obtectus). Entomologia Experimentalis et Applicata 35(3):269-273. Fr., Sum. Fr., En., 19 Ref. [Univ. F. Rabelais, Inst. de Biocénotique Expérimentale des Agrosystemes, Avenue Monge, Parc Grandmont, 37200 Tours, France]

Phaseolus vulgaris. Acanthoscelides obtectus. Insect biology. France.

The digestive activity of larvae and adults of Acanthoscelides obtectus on 22 different substrates was studied to determine the activity of their glycosidase enzymes. Larvae and adults have a very important complement of alpha- and beta-glucosidases, alpha- and beta-galactosidases, and very high activity against certain polysaccharides, notably starch and pectin. The activity was weak on the hemicelluloses tested, notably on xylan, arabinogalactan, and glucomannan. No activity was found on carboxymethylcellulose, cellulose, and inuline. The close correlation between the carbohydrate composition of the food and the glycosidase activity of the alimentary canal in both larvae and adults enables optimal utilization of carbohydrate resources. The striking similarity between the glycosidase systems of adults and larvae is explained by the similar carbohydrate composition of pollen and bean endosperm. (AS)

0615

28205 LUZENSKE, T. 1979. Beans & bugs. Michigan Dry Bean Digest 3(3):2-4. En., Il.

Phaseolus vulgaris. Injurious insects. Insecticides. USA.

Some general considerations on the different pests affecting bean crops are given as well as the conditions that favor their establishment. The importance of carrying out periodical checks in the field to detect and identify the pests is highlighted and some directions about handling, application, and storage of insecticides are included. The main advantages of the systemic insecticides commonly used to control bean nematodes are enumerated, and the common bean pests in Michigan, USA, are described, including recommended control measures: white grubs, wireworms, seedcorn maggot, cutworms, thrips, bean beetle, green cloverworm, aphids, leafhoppers, tarnished plant bug, spider mites, slugs, grasshoppers, armyworms, and nematodes. (CIAT)

0616

28218 MAY, A.W.; RUPPEL, R.F. 1982. Tarnished plant bug in dry beans. Michigan Dry Bean Digest 7(2):7. En., Il. [Dept. of Entomology, Michigan State Univ., East Lansing, MI 48824-1115, USA]

Phaseolus vulgaris. Lygus lineolaris. Plant injuries. Insect biology. Insect control. USA.

Plant injuries, biological aspects, and recommended control measures of Lygus lineolaris in beans in Michigan, USA, are briefly described. (CIAT)

0617

27496 MELLORS, W.K.; ALLEGRO, A.; WILSON, A.M. 1984. Temperature-dependent simulation of the effects of detrimental high temperatures on the survival of Mexican bean beetle eggs (Coleoptera: Coccinellidae). Environmental Entomology 13(1):86-94. En., Sum. En., 12 Ref., Il. [Dept. of Entomology, Univ. of Maryland, College Park, MD 20742, USA]

Phaseolus vulgaris. Epilachna varivestis. Temperature. Insect biology. USA.

Eggs of the Mexican bean beetle, Epilachna varivestis, were exposed for durations of 2, 3, 15, and 30 min, and 1, 2, 4, 6, and 24 h to temp. of 30, 35, 38, 40, 42, and 44 degrees Celsius and then were hatched at 25 degrees Celsius. Unexposed controls were maintained at 25 degrees Celsius. Survival as a percentage of that for unexposed eggs decreased with increasing exposure times at temp. above 30 degrees Celsius, but developmental periods did not differ for any temp.-exposure combination at which hatch occurred. From the survival-exposure relationship for each temp., the exposures that resulted in 90, 70, 50, 30, and 10 percent survival were determined, and the reciprocals of the exposures (x 100 percent) gave the rates of injury accumulation required to cause mortality of 10, 30, 50, 70, and 90 percent of the eggs, resp. The injury accumulation rate-temp. relationships for those 5 mortality levels were used successfully to simulate the survival of 9 egg cohorts under fluctuating temp. conditions in the greenhouse and to predict the abundance of 1st-instar larvae from observed oviposition in 1 soybean field. (AS)

0618

28291 NONO, L.; SAILER, R.I. 1986. Arrhenotokus reproduction of Pediobius foveolatus (Hymenoptera: Eulophidae). Annals of the Entomological Society of America 79(4):737-741. En., Sum. En., 18 Ref. [Dept. of Entomology & Nematology, Univ. of Florida, Gainesville, FL 32611, USA]

Phaseolus vulgaris. Epilachna varivestis. Predators and parasites. Insect biology. Biological control. USA.

The reproductive biology of Pediobius foveolatus, a parasite of the coccinellid Epilachna varivestis, a pest of common beans and soybeans, was investigated in the lab. When each of 38 virgin females of P. foveolatus, reared from isolated pupae was allowed to oviposit in a different 4th-instar E. varivestis each day for 3 days, 36 of the females produced 1342 progeny (all male); this confirms that the species is arrhenotokous. One host mummy was observed to contain 1 dead female (parasite) pupa, which possibly was the result of tychoparthenogenesis. Eighty-four female P. foveolatus isolated from males immediately after emergence from 4 4th-instar host mummies also produced only male progeny. Again 1 4th-instar Mexican bean beetle was exposed to each female each day for 3 days. Twenty-four females produced no progeny. The 60 remaining females produced 2438 progeny, all of which were male. This is evidence that no preemergence mating occurred inside host mummies. Two factors mitigate against preemergence mating: (1) crowding of female and male adults, which together with pupal exuviae makes courtship and mating of the parasite impossible; (2) failure of some virgin females to oviposit, suggesting a behavioral adaptation that tends to maximize reproductive fitness of haplodiploid species. (AS)

0619

27308 OWN, O.S.; BROOKS, W.M. 1986. Interactions of the parasite Pediobius foveolatus (Hymenoptera: Eulophidae) with two Nosema spp. (Microsporidia: Nosematidae) of the Mexican bean beetle (Coleoptera: Coccinellidae). Environmental Entomology 15(1):32-39. En., Sum. En., 27 Ref. [Faculty of Science, El Fateh Univ., Tripoli, Libya]

Phaseolus vulgaris. Epilachna varivestis. Predators and parasites. Biological control. Insect biology. USA.

The hymenopterous parasite Pediobius foveolatus was highly susceptible to Nosema epilachnae and N. varivestis, 2 naturally occurring microsporidia of the Mexican bean beetle, Epilachna varivestis. After female parasites

oviposited in late-instar larvae exposed previously to spores of each microsporidium as either early-instar larvae or as late-instar larvae 24 h before parasite oviposition, progeny of the parasites were infected directly by the microsporidia and infection appeared to be systemic in nature. In heavily infected hosts, incidence of infection by both microsporidia in the parasites' progeny approached 100 percent and percentage mortality was also high. Mortality occurred primarily in the pupal stage and incidences of infection and mortality were directly related to degree of host infection or microsporidian virulence. Most infected adults were normal in appearance but some had malformed wings, greatly swollen abdomens, or both. Infection did not adversely affect the development period of emerging adults but adult longevity was significantly reduced. Adults were also susceptible to both microsporidia per os. Relatively few female parasites of the P generation that were infected with N. epilachnae were capable of ovipositing in host larvae, and only 1 female transmitted the pathogen transovarially to some of her progeny. Female parasites, infected with N. varivestis, successfully transmitted the microsporidian transovarially to F6 individuals at rates varying from 5.8 to 70.0 percent. Both microsporidia were also transmitted mechanically from diseased to healthy hosts during parasite oviposition. (AS)

0620

27795 PARRA, J.R.P.; CARVALHO, S.M. DE 1984. Biologia e nutricao quantitativa de Spodoptera frugiperda (J.E. Smith, 1797) em meios artificiais compostos de diferentes variedades de feijao. (Biology and quantitative nutrition of Spodoptera frugiperda on artificial diets containing different bean varieties). Anais da Sociedade Entomologica do Brasil 13(2):305-319. Pt., Sum. En., Pt., 18 Ref., Il. [Escola Superior de Agricultura Luiz de Queiroz, Universidade de Sao Paulo, 13.400 Piracicaba-SP, Brasil]

Phaseolus vulgaris. Spodoptera frugiperda. Cultivars. Insect biology. Brazil.

The development and nutrition of Spodoptera frugiperda were studied by rearing them on an artificial diet with cooked beans of the var. Aroana, Moruna, Carioca, Jalo, Branco-de-Uberlandia, Goiano Precoce, and Rosinha (control). There was a remarkable difference of S. frugiperda development on the different diets; the larval phase lasted 18.69 days longer in the diet containing bean var. Moruna (black seed) than that with var. Branco-de-Uberlandia (white seed). There were no differences in the duration of the larval phase when the insects were reared on different diets containing var. Branco-de-Uberlandia, Aroana, or Carioca. The food intake was the same in the diets containing var. Branco-de-Uberlandia, Goiano Precoce, Carioca, or Rosinha. The approximate digestibility was higher in the diet with Branco-de-Uberlandia, probably due to the lower tannin content in this white-seeded var. There was no correlation between the protein contents and protein availability. Based on a principal component analysis, the diet with Carioca bean was more suitable for replacing Rosinha as a protein source. Although Carioca belongs to the same group as Goiana Precoce, Aroana, and Rosinha, it promoted a shorter life cycle. (AS (extract))

0621

28009 PEREZ, G. 1985. Himenópteros parasitoides de Apion spp. (Coleoptera: Curculionoidea: Apionidae) en Tepoztlán, Morelos. (Parasitoid hymenoptera of Apion spp. (Coleoptera: Curculionoidea: Apionidae) en Tepoztlán, Morelos). Folia Entomológica Mexicana 63:39-46. Es., Sum. Es., En., 16 Ref. [Inst. de Ecología, Apartado Postal 18-845, México 11800, D.F., México]

Phaseolus vulgaris. Apion godmani. Apion aurichalceum. Predators and parasites. Mexico.

Work was carried out to identify the parasitoids associated with the pod bean weevils Apion godmani and A. aurichalceum, serious pests of green pods of wild and cultured Phaseolus vulgaris and P. coccineus in Tepoztlán (Morelos, Mexico). Larvae of these pod weevils were attacked by 6 parasitoid hymenoptera species: Bracon sp. and Triaspis sp. (Braconidae), Zatropis sp. (Pteromalidae), Cerambycobius sp. (Eupelmidae), Eurytoma sp. (Eurytomidae), and a eucoilid (Cynipoidea), which has not yet been identified. Furthermore, Cerambycobius and Eurytoma are hyperparasitic, attacking larvae of Zatropis as well. (AS)

0622

28693 RODRIGUEZ R., C.E.; MADRIÑAN G., L.M.; HALLMAN, G. 1985. Complejo de insectos que atacan las estructuras reproductivas del fríjol común (Phaseolus vulgaris L.): épocas de presencia, intensidad de infestación y daño. (Insect complex attacking reproductive structures of common bean: time of presence, infestation intensity, and injury). Acta Agronómica 35(4):68-77. Es., Sum. Es., En., 7 Ref., Il.

Phaseolus vulgaris. Heliothis virescens. Maruca testulalis. Pseudoplusia includens. Estigmene acrea. Plant injuries. Flowers. Pods. Colombia.

Habits, type of injury, and time of appearance of insects associated with reproductive structures of bean var. Diacol-Calima, ICA-Pijao, and VRB-81023 were studied. Expt. were carried out at CIAT on 4 successive planting dates, using a randomized block design with 4 replicates. Observations were made weekly after the 1st month of planting until the crop cycle was completed, taking 20 plants/plot. Chrysomelidae and Heliothis virescens were found attacking from buds to pods, and Maruca testulalis, Tortricidae, Pseudoplusia includens, Strymon melinus, Estigmene acrea, and Pentatomidaes (plant bugs) were found attacking pods. Chrysomelidae, H. virescens, and M. testulalis appeared most frequently. Blossom and pod forming stages are the ideal times to monitor bean crops. (CIAT)

0623

28082 RUPPEL, R.F. 1984. Be your own consultant on dry bean insecticides. Michigan Dry Bean Digest 8(4):2-4. En., Il. [Dept. of Entomology, Michigan State Univ., East Lansing, MI, USA]

Phaseolus vulgaris. Injurious insects. Insecticides. Leaves. Seed treatment. Insect control. USA.

Some considerations on the main insect pests affecting dry beans in Michigan, USA, and the most commonly used insecticides for their control are given, mentioning those of restricted use. Some general recommendations on the use of foliar insecticides and insecticides that can be applied to the soil or seed to control bean pests are included. (CIAT)

0624

28087 SOTO P., O.M.; ZAMORA P., J. 1984. Reconocimiento de las principales plagas del fríjol en Lambayeque. (Survey of the main bean pests in Lambayeque). Chiclayo, Perú, Centro de Investigación y Promoción Agropecuaria. Informe especial no.32. 20p. Es., 11 Ref., Il.

Phaseolus vulgaris. Liriomyza. Epinotia aporema. Laspeyresia leguminis. Heliothis virescens. Plant injuries. Insect control. Peru.

In Lambayeque, Peru, a study was carried out to determine the major bean pests and their prevention or control. Samples at the initiation of development, at flowering, and during pod formation were collected at 7 different sites. The percentage of leaf injury was determined by visual evaluation using a 1-5 scale (between 5 and 60 percent or more, resp.).

Results showed that except in Chongoyape, the miner fly (Liriomyza huidobrensis) caused the greatest injury on primary leaves, decreasing as of the pod filling stage. It is probable that leaf age incides on adult preference for ovipositing and feeding. There is a direct relatioship between the no. of punctures and that of mines. Observations made in the greenhouse and in the field present a highly significative relationship (69 percent). Egg eclosion was found to last 3-4 days. Epinotia aporema, Laspeyresia leguminis, and Heliothis virescens are the main pests after flowering. The farmers only use chemical control, although the presence of several predators (Zehus sp., Aknysus sp., and Chrysopa sp.) and parasites was detected. (CIAT)

0625

27781 TRUJILLO A., F.J.; LARRAGOITI F., G.; ORTEGA M., E.; ROMERO R., F. 1983. Evaluación del parasitismo de Pediobius foveolatus (Hymenoptera: Eulophidae) sobre Epilachna varivestis (Coleoptera: Coccinellidae). (Evaluation of parasitism of Pediobius foveolatus (Hymenoptera: Eulophidae) on Epilachna varivestis (Coleoptera: Coccinellidae)). Chapingo 8(39):62-67. Es., Sum. Es., En., 12 Ref., Il.

Phaseolus vulgaris. Epilachna varivestis. Predators and parasites. Insect biology. Mexico.

To determine the parasitism of Pediobius foveolatus on Epilachna varivestis in the field, 5000 parasitoids were released at one single point in a bean field of 735 square meters in Chapingo, Mexico, in 1979. The percentage of parasitism was estimated by a mathematical method that allows the degree of reliability to be determined. The method consists of estimating the E. varivestis population before and after being parasitized by P. foveolatus. The estimation of the pest population before parasitization was based on data obtained through the meticulous inspection of 1.9 percent of the plants; the total estimate of larvae was 32,010 individuals. The total no. of parasitized individuals was estimated using a model that gives the no. of larvae (modified by the effect of parasitism) present at several distances from the release point; the total estimated parasitized larvae was 15,102 but only 14,950 were parasitized by P. foveolatus, since Aplomyopsis epilachnae emerged from 1 percent of the parasitized larvae collected in the field. According to the estimates, 46.7 percent of the larvae of E. varivestis present were parasitized by P. foveolatus. (AS)
See also 0451 0515 0622 0642 0643 0645 0647 0711

G00 GENETICS AND PLANT BREEDING

0626

27767 BLISS, F.A.; OSBORN, T.C.; ROMERO-ANDREAS, J.; GEPTS, P.L. 1986. Mutant alleles affecting bean seed protein expression. Bean Improvement Cooperative. Annual Report 29:18-19. En., 5 Ref. [Dept. of Horticulture, Univ. of Wisconsin, Madison, WI 53706, USA]

Phaseolus vulgaris. Protein content. Seed. Mutation. USA.

The alleles that control the protein content in bean seeds are briefly analyzed. (CIAT)

0627

28080 ESQUINAS-ALCAZAR, J.T. 1985. Los recursos fitogenéticos de Paraguay. (Plant genetic resources of Paraguay). Plant Genetic Resources Newsletter no.64:38-41. Es., Res. En., Fr.

Phaseolus vulgaris. Germplasm. Paraguay.

The current situation of plant genetic resources activities in Paraguay is described. Information is provided on national crop priorities, existing collections, conservation facilities, evaluation, and documentation and other activities. Intermediate priority is given to Phaseolus vulgaris. (AS)

0628

28231 LEE, J.S. 1984. Chromosomal arrangement of leghemoglobin genes in soybean and kidney bean. Thesis Ph.D. Montreal, Quebec, Canada, McGill University. 170p. En., Sum. En., Fr., 208 Ref., Il.

Phaseolus vulgaris. Genes. Chromosomes. DNA. Canada.

To investigate the possible mechanism by which 4 leghemoglobin (Lb) loci were generated, the structure and chromosomal arrangement of Lb genes in kidney bean were determined. The nucleotide sequence of a kidney bean Lb gene showed the same intron/exon arrangement as that of soybean Lb genes, indicating their close evolutionary relationship. The presence in the kidney bean genome of 4 Lb genes with 2 sequences, each specific to the 5' or 3' region of the soybean Lb loci, suggests that tandom duplication of a single primordial plant globin gene had occurred to generate a 4 Lb gene locus before Glycine and Phaseolus species diverged. A large deletion in 1 of the 2 four-gene loci in soybean resulted in the generation of the Lbc2 locus containing 2 Lb genes. The truncated gene appears to have been generated in the genome of Glycine species, prior to the chromosome duplication by tetraploidization before the divergence of G. max and G. soja. (AS (extract))

0629

15396 MASAYA, P. 1981. Problemas en el mejoramiento y producción de semilla. (Problems of seed breeding and production). In Reunión Anual del Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios, 27a., Santo Domingo, República Dominicana, 1981. Memoria. Santo Domingo, Secretaría de Estado de Agricultura. pp.P2-1-P2-8. Es.,

Phaseolus vulgaris. Plant breeding. Seed production. Transfer of technology. Central America.

Problems of bean and maize seed breeding and production in Central America are examined, particularly those concerning the national demand of these products and the welfare of the rural population. Based on the restrictions placed on the production of basic grains, 4 groups of farmers were analyzed to orientate breeding programs towards each type of producer. It is suggested to intensify the resistance to diseases and pests, plant breeding to allow mechanized operations, and the adaptation of a technology transfer program. (CIAT)

0630

27072 NAKAMURA, R.R. 1986. Maternal investment and fruit abortion in Phaseolus vulgaris. American Journal of Botany 73(7):1049-1057. En., Sum. En., 40 Ref., Il. [Botany Dept., Univ. of California, Davis, CA 95616, USA]

Phaseolus vulgaris. Outcrossing. Flowering. Podding. Plant reproduction. Pod characters. USA.

The patterns of maternal investment in floral cohorts of domesticated and wild beans were determined. According to the resource conservation theory, late pod cohorts have the highest fruit abortion rates. When domesticated beans are grown in smaller pots, late cohort survivorship declines. When domesticated beans are crossed with pollen donors of different degrees of relatedness, the fruit abortion rate is the same even though seeds from the

outbred crosses weigh more. The challenge for ecologists is to model and test the combined and possibly conflicting effects of selection for resource conservation and high offspring quality. (AS)

0631

28638 SMITH, M.E.; FRANCIS, C.A. 1986. Breeding for multiple cropping systems. In Francis, C. A., ed. Multiple cropping systems. New York, MacMillan Publishing. pp.219-249. En., 103 Ref., Il.

Phaseolus vulgaris. Plant breeding. Cultivation systems. USA.

A literature review is given on aspects related to the genetic diversity of multiple cropping systems (including bean), genetic traits of importance for these systems (crop maturity, photoperiod sensitivity, plant morphology, root systems, stress tolerance, density response, resistance to insects and diseases, grain quality, cv. uniformity, and yield stability), and appropriate breeding methodologies (yield reduction in intercrops, correlation analysis, analysis of variance, regression analysis, and methods of selection). It was verified that breeding for multiple cropping systems is a complicated process and researchers must strive to define clear objectives and limit the no. of variables included in any one expt. (CIAT) See also 0358 0359 0455 0471 0572

G01 Breeding, Selection and Germplasm

0632

27410 ALVARADO-RODRIGUEZ, B. 1985. Identification of resistance to Lygus hesperus Knight (Hemiptera: Miridae) in common bean, Phaseolus vulgaris (L.). Ph.D. Thesis. Davis, University of California. 124p. En., Sum. En., 159 Ref., Il.

Phaseolus vulgaris. Cultivars. Resistance. Lygus hesperus. Germplasm. USA.

Research was undertaken to identify common bean germplasm carrying resistance to Lygus hesperus, as well as to elucidate the mechanisms of resistance involved. Estimates of gross population increase, ovipositional preference, nymphal development, and survival of lygus bugs were measured on 38 entries. Resistance through ovipositional nonpreference was found in entries BAT 1258, DOR 42, Gloria, BLAN (7644), Bountiful, and C 15. Antibiosis was evident through reduced developmental rates on entries BAT 1081, BAT 1258, BAT 1299, BAT 1254, Gloria 0424, and CIAT 5979, as well as through reduced survival on these same entries, with the exception of Gloria and CIAT 5979. Counts of newly hatched nymphs proved to be a reliable estimate of oviposition. Oviposition-site preference of L. hesperus in relation to plant phenological stage and plant genotypes was determined on selected entries. Plants at peak flower production were preferred by lygus bugs for oviposition. CIAT 5683 and Red Kidney received 4 to 3 times more eggs, resp., than the less preferred entries BAT 1081 and BAT 1299. Ovipositional preference was shown by L. hesperus for 3-day-old pods, inflorescence stems, leaf petioles, and the leaf pulvinus where 80 percent or more of the eggs were deposited. Life tables were developed for L. hesperus on resistant (BAT 1081, BAT 1299, and CIAT 5979) and susceptible (Red Kidney and CIAT 5683) cv. as measure of resistance in demographic terms. Lygus bugs on the resistant cv. produced lower survival to the adult stage (20, 34, and 36 percent, resp.) than bugs on the susceptible cv. (45 and 66 percent, resp.). Female lygus bugs reared on the resistant genotypes demonstrated low gross reproductive rates, net reproductive rates, and intrinsic rates of increase than bugs held on the susceptible genotypes. The life table values for CIAT 5683 were significantly greater than for the other cv. Lygus bug population can be expected to increase 4-8 times on the susceptible cv. because of shorter

doubling time. These life table results confirmed resistance to lygus bugs in common bean cv. based on reduced survivorship to adulthood, reduction of fecundity and longevity of females. The findings of this research point to feasibility of breeding common bean cv. for resistance to L. hesperus. (AS)

0633

28011 BASTIDAS R., G.; AGUDELO D., O. 1986. Frijolica P-1.1 nueva variedad arbustiva de fríjol con amplia adaptación. (Frijolica P-1.1 a new bush bean variety with wide adaptation). ICA Informa 20(1):29-31. Es., Il.

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Colombia.

The new bean var. Frijolica P-1.1, obtained by hybridization of var. Red Kote and Diacol Nima, is described. This var. has a wide adaptation range. Good yields were obtained in areas with moderate warm and temperate climates, located 900-1600 m.a.s.l. Exptl. yields have averaged 1900 kg/ha, whereas in on-farm trials, yields varied between 800-2400 kg/ha. The new var. shows resistance to diseases (bacterial blight, rust, BCMV, and root knot nematode) and pests, although susceptibility to Thanatephorus cucumeris was noticed in temperate climate areas with a high humidity. Harvesting can be done manually or using a combine harvester, as soon as seed moisture reaches 13 percent. (CIAT)

0634

27769 BAUDOIN, J.P.; CAMARENA, F.; MARECHAL, R. 1986. Interspecific crosses between Phaseolus coccineus subsp. polyanthus M.M. & S., as seed parent, and Phaseolus vulgaris L. Bean Improvement Cooperative. Annual Report 29:64. En., 2 Ref. [Faculté des Sciences Agronomiques de l'Etat, 5800 Gembloux, Belgium]

Phaseolus vulgaris. Phaseolus coccineus. Hybridizing. Belgium.

The hybridization of Phaseolus vulgaris (parent) with P. coccineus exhibit in F1 hybrids genetic disorder or fertility depression; therefore, a new direct combination has been obtained by the Faculté des Sciences Agronomiques de l'Etat (Gembloux, Belgium) using the cytoplasm of the other cultivated P. coccineus, e.g. P. coccineus subsp. polyanthus, with the help of embryo-culture. Two resulting F1 plants were regenerated showing intermediate characteristics for bracteole size and shape, flower color, and stigma position. Only 1 hybrid produced pods and well-developed seeds. (CIAT)

0635

27768 BLISS, F.A.; ROSAS, J.C.; ST. CLAIR, D.A.; KMIECIK, K.A. 1986. Breeding beans for increased nitrogen fixation. Bean Improvement Cooperative. Annual Report 29:15-17. En., 6 Ref. [Dept. of Horticulture, Univ. of Wisconsin, Madison, WI 53706, USA]

Phaseolus vulgaris. Plant breeding. Backcrossing. Cultivars. Nitrogen fixation. Yields. USA.

The different methods to determine the N2 fixation potential in beans are briefly analyzed. Evaluation of inbred backcross lines of navy and black beans selected for increasing N2 fixation potential has shown that compared with the recurrent parents Sanilac and Porrillo Sintético, progenies showed increased total N fixed and percentage N derived from the atmosphere as well as similar or higher seed yields. (CIAT)

0636

28610 CASTAÑO D., B. 1986. Evaluación de materiales de fríjol (Phaseolus vulgaris L.) por su reacción a Thanatephorus cucumeris (Frank) Donk, causante de la mustia hilachosa, en la región de Santagueda, Municipio de Palestina, Departamento de Caldas. (Evaluation of bean cultivars for their reaction to Thanatephorus cucumeris, causal agent of web blight, in the region of Santagueda, municipality of Palestina, Caldas). Tesis Ing.Agr. Manizales, Colombia, Universidad de Caldas. 141p. Es., Sum. Es., 21 Ref., Il.

Phaseolus vulgaris. Germplasm. Resistance. Rhizoctonia solani. Selection. Colombia.

The performance of 100 bean materials from CIAT's International Web Blight Nursery when attacked by Thanatephorus cucumeris was evaluated in the municipality of Palestina (Caldas, Colombia). A lattice design with 3 replications was used, including bean var. Talamanca (tolerant) and BAT-1155 and Calima (both susceptible) as checks. Disease incidence and intensity were measured in the stages V4 (3rd trifoliate leaf), R6 (1st opened flower), R7 (pods longer than 2.5 cm), and R8 (filling of 1st pod). Additionally, the stage in which the disease begins, yield, wt. of 100 seeds, and no. of plants/furrow were determined. Most of the material showed the 1st disease symptoms in the stage R5 and R6. Based on the epidemiological curve, it was determined that rainfall is the climatic factor that most influences disease incidence. Considering the reaction to the disease and yield, various groups of materials were obtained, being recommended for this region PAI 1, PAI 11, PAI 27, PAI 56, PAI 80, PAI 89, PAI 110, PAI 113, and PAT 2, which can undergo regional tests. (CIAT)

0637

28203 COYNE, D.P.; SCHUSTER, M.L.; STEADMAN, J.R. 1980. Breeding disease resistant beans in Nebraska. Michigan Dry Bean Digest 4(3):23-24. En.

Phaseolus vulgaris. Cultivars. Resistance. Xanthomonas campestris pv. phaseoli. Xanthomonas phaseoli var. fuscans. Corynebacterium flaccumfaciens. Whetzelinia sclerotiorum. Plant breeding. USA.

A dry bean breeding program was launched in Nebraska, USA, in the early 1960's to develop great northern (GN) var. resistant to common blight, fuscous blight, and bacterial wilt in order to reduce yield losses and provide a basis for the establishment of a seed industry. GN Nebraska #1, a late maturing var., was found resistant to common and fuscous blight, while PI 165078, a white dry bean var. from Turkey, was found to have a high resistance to bacterial wilt. Var. GN Harris is tolerant to common blight and GN Star combined earliness and high tolerance to both blight and wilt. Bean var. Black Turtle Soup and Aurora were found to be resistant to white mold as well as several pinto and great northern selections, which will be field tested in 1980. In addition to the research in disease resistance, studies for improving yielding ability and for developing lines with resistance to seed coat cracking are in progress. (CIAT)

0638

27764 DICKSON, M.H.; PETZOLDT, R. 1986. Inheritance of low temperature tolerance in beans at several growth stages. Bean Improvement Cooperative. Annual Report 29:7-8. En. [New York State Agricultural Experiment Station, Geneva, NY, USA]

Phaseolus vulgaris. Cultivars. Crossbreeding. Resistance. Temperature. Inheritance. Genes. Germination. Seedling. Flowering. USA.

Three white bean lines (NY590, NY23, and BBL92) were used to study low

temp. tolerance. NY590 and NY23 were crossed with BBL92 and F2 and backcross seed were developed. The F2 and BC seed were planted in the field and harvested on an individual plant basis. Seeds were planted in late Nov. in Cornell mix prewetted and cooled to 5 degrees Celsius in growth chambers. After 5 days the pots were moved to a greenhouse at 16 degrees Celsius. Two pots with seed from individual F2 or BC plants, each containing 5 seeds, were planted in 1983 and 1 pot in 1984. Germination, seedling and plant vigor, and days to bloom were recorded. For the cross NY590 x BBL92, the results indicate very workable narrow sense heritability, although the environmental effects were larger than desirable as interpreted from the broad sense heritability data. All results indicate additive effects, but the generally high narrow sense heritability values indicate few genes were involved. Studies on the ability to set under cool conditions suggest a single gene controlled the ability to set at 16 degrees Celsius. Screening for cold tolerance is more efficient and reliable under controlled cool greenhouse conditions than in the field. (CIAT)

0639

27755 HARTMANN, R.W. 1986. Release of Poamoho pole snap bean. Bean Improvement Cooperative. Annual Report 29:135. En. [Univ. of Hawaii, Honolulu, HI, USA]

Phaseolus vulgaris. Snap beans. Cultivars. Resistance. Meloidogyne incognita. Rhizoctonia solani. Seed characters. USA.

The Hawaii Institute of Tropical Agriculture and Human Resources (USA) announced the introduction of Poamoho pole bean originating from crosses involving P.I. 289372, Manoa Wonder, E8207, and P.I. 165426. It is a vigorous bean that produces long, straight, white-seeded, flat pods of the type preferred by Hawaiian consumers. This var. is resistant to root knot nematodes and there are some indications that it is also tolerant to Rhizoctonia. (CIAT)

0640

28987 KANNAIYAN, J.; HACIWA, C.H.; GREENBERG, D.C.; MBEWE, M.N. 1986. Zambia: Ascochyta blight of bean in Zambia. Phaseolus Beans Newsletter for Eastern Africa no.5:10-11. En. [Grain Legume Research Team, Msekera Regional Research Station, P.O. Box 510089, Chipata, Zambia]

Phaseolus vulgaris. Ascochyta phaseolorum. Cultivars. Resistance. Selection. Zambia.

Background information is given on Ascochyta leaf spot (Ascochyta phaseolorum) in Zambia, a minor disease which appeared in a severe form in a no. of bean trials during the 1984-85 season in Mbala, Northern Province. Of the 835 bean lines screened for their reaction to the disease, 8 were highly resistant, 6 of which were from the CIAT bean program: ZAA, ZAA 84007, ZAA 84072, A-345, A-484, and A-493; line G-05477 from USA and Muragiraki from Uganda were also highly resistant. Bean lines A-345, A-484, and A-493 were also resistant to angular leaf spot, rust, and anthracnose, resp.; therefore they may be useful in developing multiple disease-resistant cv. (CIAT)

0641

27774 KLEIN, R.E.; WYATT, S.D.; KAISER, W.J. 1986. Virus eradication from a bean germplasm collection. Bean Improvement Cooperative. Annual Report 29:37. En. [Dept. of Plant Pathology & United States Dept. of Agriculture, Agricultural Research Service, Washington State Univ., Pullman, WA 99164, USA]

Phaseolus vulgaris. Germplasm. Bean common mosaic virus. Disease control. USA.

A pilot program was initiated at Washington State U. (USA) to determine the feasibility of eliminating BCMV from the Phaseolus germplasm collection without the loss of genetic variability. The immuno-blot assay and ELISA were compared to determine which assay was more applicable to seed testing for BCMV. Also, research was initiated to determine methods of eradicating BCMV from infected seeds. (CIAT)

0642

28621 KORNEGAY, J.L.; TEMPLE, S.R. 1986. Inheritance and combining ability of leafhopper defense mechanisms in common bean. Crop Science 26(6):1153-1158. En., Sum. En., 13 Ref. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Cultivars. Resistance. Empoasca kraemeri. Inheritance. Crossbreeding. Genes. Colombia.

Studies were undertaken to determine the inheritance and combining ability of leafhopper (Empoasca kraemeri) defense mechanisms in beans under field conditions in Colombia. Bean lines EMP 81 and EMP 82, tolerant to leafhopper feeding damage, and lines EMP 89, EMP 94, and EMP 97, containing antixenosis resistance (a defense mechanism that makes these lines less preferred for leafhopper oviposition) were selected for the studies. A generation means analysis using EMP 81, EMP 89, and EMP 94, in crosses with a susceptible line, BAT 41, showed that the additive-dominance genetic model was sufficient to explain the inheritance of tolerance and antixenosis defense mechanisms in these lines. Additive and dominance gene effects were significant for yield of plants under leafhopper attack and feeding damage, although dominance gene effects appeared to be more important in the inheritance of yield. Only additive gene effects were significant for nymphal counts. Similar results were found in the estimation of general and specific combining ability effects in a diallel study of F1 and F2 progeny of crosses among the 5 resistant bean lines. Certain crosses, combining antixenosis and tolerance defense mechanisms, resulted in higher F2 yields than would be expected on the basis of the mean performance of their parental lines. The results suggest that transgressive segregation for higher resistance levels may result from crosses among bean lines containing different defense mechanisms. (AS)

0643

27787 KORNEGAY, J.L. 1985. Studies on the mechanisms of resistance to the leafhopper Empoasca kraemeri in common beans and their use in a resistance breeding program. Ph.D. Thesis. Ithaca, Cornell University. 128p. En., Sum. En., 76 Ref.

Phaseolus vulgaris. Cultivars. Resistance. Empoasca kraemeri. Inheritance. Plant breeding. Colombia.

Resistance in common beans to Empoasca kraemeri was studied to determine (1) the types of resistance mechanisms (antibiosis, nonpreference, or tolerance) present in bean lines originating from a E. kraemeri resistance breeding program; (2) the inheritance of resistance under field conditions; (3) whether resistance to E. kraemeri could be increased by combining different mechanisms of resistance. Five resistant bean lines (EMP 81, EMP 82, EMP 89, EMP 94, and EMP 97), plus a susceptible check (BAT 41), were tested in the greenhouse and field for their mechanisms of resistance to E. kraemeri. Results were comparable under both environments. EMP 81 was tolerant of E. kraemeri feeding damage, having high insect populations, but low damage scores compared with the check. EMP 89 and EMP 94 were not preferred for oviposition as measured by lower egg oviposition,

nymphal counts, and damage scores than BAT 41. EMP 82 and EMP 97 were intermediate in their response and may contain combinations of resistance mechanisms. Studies on the inheritance of resistance to E. kraemeri in 3 bean lines (EMP 81, EMP 89, and EMP 94) showed that resistance, as measured by nonprotected yield, was controlled primarily by dominance gene effects, though additive effects were also significant, but of less importance. Tolerance to feeding damage was conditioned by dominance and additive gene effects. Resistance to insect oviposition was recessively inherited in 1 bean line (EMP 89), while in another line (EMP 94), the nonpreference resistance was due mainly to additive effects. Heritability estimates for resistance to E. kraemeri were very low in all crosses. Correlations among resistance measurements were significant for only damage scores and nonprotected yield. Diallel analysis of combining ability of 5 resistant bean lines showed that general combining ability was significant for damage scores and nymphal counts, while specific combining ability was significant for damage scores, nymphal counts, and nonprotected yield. Significant specific combining ability effects for nonprotected yield were detected in the F1, but not F2 generations; however, some crosses appeared to be more resistant to leafhoppers than expected, based on the response of their parents, and suggested that resistance could be increased by combining different resistant bean lines. An alternative breeding strategy is proposed. (AS)

0644

27749 KUEHN, M.E.; BAGGETT, J.R. 1986. Screening Phaseolus cultivars for white mold resistance. Bean Improvement Cooperative. Annual Report 29:73-74. En., 2 Ref. [Dept. of Horticulture, Oregon State Univ., Corvallis, OR 97331, USA]

Phaseolus vulgaris. Cultivars. Selection. Resistance. Whetzelinia sclerotiorum. USA.

Thirty bean lines and cv. were evaluated for resistance to white mold (Sclerotinia sclerotiorum) in field and greenhouse tests in 1982 and 1983. Measurements of disease reaction in field tests included percentage of infected pods, no. of infected plants, and disease severity ratings. Disease severity rating was correlated with percentage of infected pods ($r = 0.76$, $P = 0.01$) and no. of infected plants ($r = 0.74$, $P = 0.01$), resp. Based on results of both greenhouse and field tests, the following 9 entries appear to possess useful levels of resistance: Cape, PI 204717, Red Kidney, B3749, PI 169787, Contender, PI 415965, Taylor's Dwarf Horticultural, and Ex Rico 23. (CIAT)

0645

27786 LOZADA R., C.H. 1985. Evaluación de la resistencia a Empoasca kraemeri Ross y Moore en cultivares de caraota (Phaseolus vulgaris L.) y su interacción con dosis de insecticida. (Evaluation of resistance of bean cultivars to Empoasca kraemeri and its interaction with insecticide doses). Tesis Mag.Sc. Maracay, Universidad Central de Venezuela. 107p. Es., Sum. Es., En., 51 Ref., Il.

Phaseolus vulgaris. Empoasca kraemeri. Cultivars. Resistance. Insecticides. Venezuela.

Two expt. were conducted from Dec. 1983 to March 1984 and from Nov. 1984 to March 1985 in the exptl. field of the Instituto de Genética, U. Central de Venezuela, to evaluate the resistance of 5 bean cv. (J.G. 6101, J.G. 6118, J.G. 6119, J.G. 6483, and Tacarigua) to Empoasca kraemeri and its interaction with 4 doses of the systemic insecticide demeton-s-methyl (0, 0.1875, 0.375, and 0.750 liter/ha). The evaluation of the no. of nymphs/leaflet showed a differential response of the bean cv. to the

insecticide dose. Cv. J.G. 6101 and J.G. 6119 showed a significant interaction with the insecticide dose in both trials. The yield ratio ranked cv. J.G. 6119 and J.G. 6118 as resistant and cv. J.G. 6483 as tolerant to E. kraemeri. (AS (extract))

0646

27746 MANRIQUE C., A.; NAKAHODO, J.N. 1984. Mejoramiento de fríjol (Phaseolus vulgaris L.) mediante mutaciones. (Bean improvement through mutations). In Regional Seminar on the Utilization of Induced Mutations for Crop Improvement for Countries in Latin America, Lima, Peru, 1982. Proceedings. Vienna, Austria, International Atomic Energy Agency. Technical Document-305. pp.203-210. Es., Sum. Es. [Univ. Nacional Agraria, Depto. de Fitotecnia, La Molina, Lima, Perú]

Phaseolus vulgaris. Irradiation. Mutation. Yields. Plant habit. Flowering. Poru.

In 1978, 250-g samples of local postrate bean var. Bayo were irradiated at 5.0, 7.5, 10.0, and 12.5 krad, at the plant breeding dept. of the U. Nacional Agraria (La Molina, Peru). Based on the percentage of plants harvested from treated seeds, the dose of 10 krad was determined to be the most adequate. Treated seeds were planted for several generations. As of the M3, individual plants of types 1, 2, and 3 showing good health, vigor, and production were isolated to form families or lines. In the M5 generation the families were grouped into early maturing, intermediate, and late maturing; these were evaluated in the field in 1981. Gamma radiations have allowed a broader variability in the characteristics for yield, early maturity, healthiness, and flower color. (AS (extract)-CIAT)

0647

28994 MUIGAI, S.G.S.; PERÈ, W.M. 1986. Beanfly: resistance screening of Phaseolus germplasm and beanfly species identification in Kenya. Phaseolus Beans Newsletter for Eastern Africa no.5:35-37. En. [Grain Legume Project, National Horticultural Research Station, Thika, Kenya]

Phaseolus vulgaris. Ophiomyia phaseoli. Cultivars. Resistance. Insect control. Ophiomyia spencerella. Kenya.

The occurrence and distribution of species of the bean fly in Kenya were determined and Phaseolus cv. and lines were screened for resistance in Thika. Ophiomyia spencerella was found in all the sampled plants while O. phaseoli occurred in only 25 percent of the sampled plants, associated with the former species. O. centrosomatis was not observed. The performance of several bean lines from CIAT's bean program was similar to that of the local check regarding bean fly tolerance, although complete resistance was not observed in any of the accessions. (CIAT)

0648

28985 MUNIMBAZI, C.; PERREAUX, D. 1986. Screening for resistance to common and halo bacterial blights. Phaseolus Beans Newsletter for Eastern Africa no.5:5-6. En.

Phaseolus vulgaris. Xanthomonas campestris pv. phaseoli. Pseudomonas syringae pv. phaseolicola. Selection. Resistance. Agricultural projects. Burundi.

In March 1986 in Burundi the International Bean Halo Blight Nursery and the International Bean Common Blight trials were installed in Gisozi (2100 m) and in Bujumbara (830 m), resp.; both are CIAT trials. Mechanical artificial inoculation was performed for each var. to be tested and inoculum pressure was maintained with regular sprays of concentrated

bacterial suspension at an ultralow vol. Uniform infection of susceptible checks was achieved for halo blight, whereas infection by common blight bacteria did not reach satisfactory levels. The observations are not yet completed, but sources of resistance to pv. phaseolicola strains of Burundi appear to be quite numerous. (CIAT)

0649

27741 NIKOLOVA, V.; PORJAZOV, I.; RODEVA, V. 1986. Hybridization between Phaseolus vulgaris and Phaseolus acutifolius A. Gray. Bean Improvement Cooperative. Annual Report 29:124-125. En. [Maritsa Vegetable Crops Research Inst., 4003 Plovdiv, Bulgaria]

Phaseolus vulgaris. Hybridizing. Phaseolus acutifolius. Crossbreeding. Hybrids. Plant fertility.

During 1983-85, a total of 2958 crosses were made of Phaseolus vulgaris x P. acutifolius and 338 crosses of P. acutifolius x P. vulgaris. Fifteen cv. and 5 lines of P. vulgaris and 15 samples of P. acutifolius were used. Plants were hydroponically grown in greenhouses. P. acutifolius being mother plant showed lower capacity for hybridization (3.08 percent), reduced av. (3.6 cm) and max. (7.2 cm) length of the ovaries, and decreased no. of germs in 1 pod (2.2). Interspecific hybrids had indeterminate habit and climbing stem like P. acutifolius; the size of flower buds and flowers was similar to that of P. vulgaris. F1 hybrids had low pollen fertility (from 8.18 to 12.03 percent). The high pollen sterility and stigma deformation led to F1 hybrid seed sterility. (CIAT)

0650

28230 NUÑEZ B., A.; ACOSTA G., J.; IBARRA P., F.J. 1986. Antecedentes y estrategias del estudio genético-fisiológico de fríjol bajo condiciones de sequía. (Background and strategies of a bean genetic-physiologic study under drought conditions). In Taller sobre Sequía, Pabellón, Aguascalientes, México, 1984. Memoria. Aguascalientes, México, Instituto Nacional de Investigaciones Agrícolas. Publicación Especial no.8. pp.57-60. Es., 5 Ref., Il.

Phaseolus vulgaris. Genotypes. Germplasm. Plant breeding. Selection. Resistance. Drought. Mexico.

Research was carried out in Mexico to screen bean genotypes for their productive level and intrinsic characteristics of productivity under drought conditions, and to define the plant type providing a high and more stable yield under the existing climate and soil conditions. Sixty materials from the germplasm banks at CIAT, Michigan, and Instituto Nacional de Investigaciones Agrícolas were selected for their yields, healthiness, adaptation, and appearance, and they were subjected to 2 new screenings. The 8 best meterials were studied in detail regarding their physiological and morphological response to drought conditions. The performance of the studied germplasm is closely linked to climate and soil changes. A flow chart showing the suggested strategy is included. (CIAT)

0651

27737 PRATT, R.C.; MARCARIAN, V.; BRESSAN, R.A. 1986. Stress tolerance improvement of Phaseolus vulgaris L. by gene introgression from Phaseolus acutifolius A. Gray. Bean Improvement Cooperative. Annual Report 29:47-48. En., 7 Ref. [Horticulture Dept., Purdue Univ., W. Lafayette, IN 47907, USA]

Phaseolus vulgaris. Phaseolus acutifolius. Drought. Resistance. Backcrossing. Hybrids. USA.

To ascertain whether or not BC2 common bean x tepary (Phaseolus

acutifolius) populations show promise for the selection of more stress-tolerant genotypes, field trials in southern Arizona (USA) were performed during 1982-85. In 1983, a population study was also conducted in Safford under nonirrigated conditions. No F4BC2-2-5 plants survived whereas 26.5 percent of the F4BC2-5-1 plants survived and produced a mean seed yield/plant value of 0.5 g. Results from the 1984 planting in Safford showed a greater gap between the yielding potential of common bean (35-95 kg/ha) vs. the white tepary accessions (1450-1530 kg/ha). (CIAT)

0652

27483 RAMALHO, M.A.P.; PINTO, C.A.B.P.; TEIXEIRA, A.L.S. 1983. Tolerancia diferencial de cultivares de feijao (Phaseolus vulgaris L.) ao alumínio em casa de vegetacao e no campo. (Differential tolerance of common bean cultivars to aluminum in the greenhouse and in the field). Ciencia e Prática 7(1):75-85. Pt., Sum. Pt., En., 22 Ref.

Phaseolus vulgaris. Genotypes. Agricultural lime. Dry matter. Yields. Al. Toxicity. Resistance. Brazil.

The performance of 18 common bean genotypes under high and low Al saturation was examined in the field as well as in the greenhouse and the possibility of predicting grain yield in the field by total plant DM production in the greenhouse was analyzed. In the field, grain yield (kg/ha) was evaluated under 2 liming levels (0 and 2 t/ha). In the greenhouse, total plant DM production was evaluated 10 days after flowering, under 3 liming levels (0, 1, and 2 t/ha). In both cases, there were significant differences among genotypes, depending on liming levels. When no lime was applied, plant DM production in the greenhouse was significantly correlated with grain yield in the field (r = 0.52). It was concluded that the performance of the genotypes as measured by grain yield in the field, can be predicted by total plant DM in the greenhouse only when the Al saturation is high. The Spearman's rank correlation among tolerance indices in the greenhouse and in the field was 0.57 indicating a good agreement between the evaluations for Al tolerance under both conditions. Among the 18 genotypes, ESAL 294, Mulatinho 46, IPA 7419, and ESAL 1 were the most tolerant under both conditions. (AS)

0653

27448 REDDEN, R.J.; DIATLOFF, L.; USHER, T. 1985. Germplasm screening for nitrogen fixation. Annual Report 28:104. En. [Dept. of Primary Industries, Hermitage Research Station, Warwick, Qld. 4370, Australia]

Phaseolus vulgaris. Germplasm. Selection. Nitrogen fixation. Cultivars. Australia.

A total of 1462 germplasm lines of Phaseolus vulgaris were screened for N fixation in sandy soil of low fertility at Inglewood Field Station (Australia); 90 lines were selected. Two other lines rated as N fixers at CIAT (Puebla 152 and BAT 76) were selected for confirmation trials. The best entries from this evaluation will then be evaluated both in controlled Rhizobium inoculation studies and across a wider range of locations. (CIAT)

0654

27487 SINGH, A.K.; SAINI, S.S. 1983. Heterosis and combining ability studies in French bean. Sabrao Journal 15(1):17-22. En., Sum. En., 5 Ref. [Dept. of Vegetable Crops & Floriculture, Himachal Pradesh Agricultural Univ., Solan, H.P., India]

Phaseolus vulgaris. Snap beans. Cultivars. Dwarf beans. Climbing beans. Crossbreeding. Yields. Yield components. Heterosis. Hybrids. India.

Seven French bean lines of pole and bush types were evaluated in a diallel cross for general combining ability, specific combining ability, and percentage of heterosis for yield, no. of pods/plant, and pod diameter in the field in Solan, India. The general combining ability and specific combining ability mean squares were highly significant. Mean squares of general combining ability effects were higher than those of specific combining ability effects for no. of pods/plant and pod diameter, indicating a dominance of additive gene effects, the contrary being true for seed yield. Heterosis was observed for yield and no. of pods/plant in most cases. For pod diameter it was highly significant in all combinations. Crop improvement by hybrid seed production using male sterile factors or by conventional selection methods for self-pollinated crops using selected crosses is suggested. (AS)

0655

27732 STOCKINGER, E.J.; WAINES, J.G. 1986. Interspecific hybridization between Kenyan common beans and tepary beans. Bean Improvement Cooperative. Annual Report 29:93-94. En. [Dept. of Botany & Plant Sciences, Univ. of California, Riverside, CA 92521, USA]

Phaseolus vulgaris. Hybridizing. Phaseolus acutifolius. Resistance. Drought. Cultivars. Backcrossing. Africa.

An interspecific bean breeding program between Phaseolus vulgaris and P. acutifolius was launched to develop common beans resistant to drought conditions in East Africa. Preliminary results indicate that three Kenyan common bean lines (NB86, NB585, and PB13) readily cross with the 4 tepary bean lines used. Also, 1 in 150 backcross pollinations resulted in a viable BC1F1 plant. Desirable common bean lines such as Rose Coco, which will not produce viable F1 plants, can be used as the recurrent parent in a backcrossing scheme. Seed size and seed coat color of the original common bean parent were found to be quickly restored. Likewise, a very high level of fertility was observed in the BC1F1 generation when the backcross common bean parent was a specific wild Mexican common bean. (CIAT)

0656

27729 TAY, J.; FRANCE, A. 1986. Bean genotypes resistant to the necrotic and other BCMV strains breed at the legume program of Quilamapu research station (INIA). Bean Improvement Cooperative. Annual Report 29:95-96. En. [Estación Experimental Quilamapu, Inst. Nacional de Investigaciones Agrícolas, Casilla 426, Chillán, Chile]

Phaseolus vulgaris. Genotypes. Resistance. Bean common mosaic virus. Crossbreeding. Chile.

Several bean genotypes and their reactions to the necrotic and other BCMV strains are listed. These germplasm selections were carried out at the Quilamapu exptl. station (Chillan, Chile) and some of these genotypes were obtained by crossing susceptible local var. to the type strain of BCMV such as the cv. and lines obtained from a cross between Manteca and Burros Argentino. (CIAT)

0657

28259 TEMPLE, S.R.; MORALES, F.J. 1986. Linkage of dominant hypersensitive resistance to bean common mosaic virus to seed color in Phaseolus vulgaris L. Euphytica 35:331-333. En., Sum. En., 7 Ref. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Cultivars. Seed color. Crossbreeding. Resistance. Bean common mosaic virus. Genetics. Inheritance. Colombia.

Evaluation of Phaseolus vulgaris germplasm bank materials and progenies from a large no. of crosses using red- or yellow-colored, BCMV-susceptible bean lines, crossed to purple- or grey/brown-colored, hypersensitive-resistant lines, suggested strong trait association between seed color and BCMV resistance. The cross of red-mottled I(+)I(+) (susceptible) BAT 1255R to isogenic purple-mottled II (resistant) BAT 1255M was made to study the segregation of the 2 characters and to recover red-mottled resistant progenies. No recombinant genotypes were observed among 353 F3 families inoculated with BCMV-NL3, suggesting that linkage of purple-mottled seed color and dominant BCMV resistance is very close. (AS)

0658

27744 TULMANN NETO, A.; MENTEN, J.O.M.; ANDO, A.; VEIGA, A.A. 1984. Use of induced mutations in bean (Phaseolus vulgaris L.) in Brazil. In Regional Seminar on the Utilization of Induced Mutations for Crop Improvement for Countries in Latin America, Lima, Peru, 1982. Proceedings. Vienna, Austria, International Atomic Energy Agency. Technical Document-305. pp.269-284. En., Sum. En., 22 Ref.

Phaseolus vulgaris. Mutation. Seed coat. Seed color. Plant habit. Brazil.

The 2 basic philisophies involved in the utilization of mutation in bean breeding programs are briefly reviewed; the methods applied, difficulties found, and some of the results obtained at the Centro de Energía Nuclear na Agricultura (Sao Paulo, Brazil) are described. Some examples of mutation breeding for seed coat color and growth habit in bean in Brazil are given, including more recent and unpublished data. (CIAT)

0659

27784 VANDERBORGHT, T. 1983. Evaluation of P. vulgaris wild types and weedy forms. Plant Genetic Resources Newsletter 54:18-25. En., Sum. Fr., Es., 10 Ref., Il. [Faculté des Sciences Agronomiques de l'Etat, B. 5800 Gembloux, Belgium]

Phaseolus vulgaris. Crossbreeding. Germplasm. Agronomic characters. Resistance. Diseases and pathogens. Belgium.

The crossing of common bean with its wild relatives as well as with other species of the Phaseolus genus was studied. Studies were carried out to evaluate plant morphological characters and resistance to diseases and pests. A preliminary study of the viability was conducted to find discriminating characters to eliminate duplicates among the wild P. vulgaris germplasm and to establish a possible relationship among the 3 wild P. vulgaris forms. (AS-CIAT)

0660

28991 VENGE, O.Z. 1986. Bean improvement research in Zimbabwe. Phaseolus Beans Newsletter for Eastern Africa no.5:16-18. En. [Crop Breeding Inst., P.O. Box 8100, Causeway, Zimbabwe]

Phaseolus vulgaris. Plant breeding. Plant introductions. Crossbreeding. Canned beans. Zimbabwe.

Major constraints to bean production in Zimbabwe and general objectives of the bean breeding program in that country, initiated in 1984, are mentioned. The approach used and the activities carried out by the 2 components of the program, the edible dry bean program and the specialized white canning bean program, are described. Furthermore, the objectives and location of the different ongoing trials on beans are mentioned. (CIAT)

0661

27715 VICTORIA, J.I.; BASTIDAS, O.; AGUDELO, O. 1983. Resistencia al añublo común (Xanthomonas campestris pv. phaseoli) en fríjol. (Resistance to common blight (Xanthomonas campestris pv. phaseoli) in beans). Fitopatologia Colombiana 11(1):14-17. Es., Sum. Es., En., 2 Ref. [Centro de Investigaciones de la Caña de Azúcar, Apartado Aéreo 9138, Cali, Colombia]

Phaseolus vulgaris. Cultivars. Selection. Resistance. Xanthomonas campestris pv. phaseoli. Uromyces phaseoli. Bean common mosaic virus. Crossbreeding. Colombia.

In 1969 several bean var. were evaluated as to their level of resistance to artificial inoculations of Xanthomonas campestris pv. phaseoli, BCMV, and Uromyces phaseoli var. typica, main diseases of dry beans in Valle del Cauca (Colombia). Sources of resistance were selected and included in a bean breeding program of commercial var. Diacol Calima, Diacol Nima, ICA Guali, ICA Duva, ICA Tuí, and ICA Huasanó. In 1974 several progenies were evaluated for agronomic characteristics and level of resistance to common bacterial blight, BCMV, rust, and several other constraints of beans. Since 1977, selected lines have been included in yield trials and compared with commercial var. in different localities of Valle del Cauca and different Caribbean countries. Finally a line (ICA L-23) has been selected and will soon be released as a new commercial var. The level of resistance of ICA L-23 has recently been increased by crossing to var. Jules and backcrossing to the original line. (AS)

0662

28227 WEBSTER, B.D.; WAINES, J.G. 1985. Tepary beans: a resource for improvement of common beans. Research Highlights 2(3):1-4. En., 8 Ref., Il. [Dept. of Agronomy and Range Science, Univ. of California, Davis, CA 95616, USA]

Phaseolus vulgaris. Phaseolus acutifolius. Hybridizing. USA. Kenya.

The main characteristics of tepary beans (Phaseolus acutifolius) that should be taken into account in breeding programs for common beans (P. vulgaris) are discussed. The trials carried out by the U. of California (USA) and the U. of Nairobi (Kenya) on the transfer of the best characteristics of tepary bean to common bean are summarized. (CIAT)

0663

27721 ZAITER, H.Z.; COYNE, D.P.; CLARK, R.B.; NULAND, D.S. 1986. Genetic variation in field and nutrient solutions and the effect of temperature for leaf chlorosis in dry beans (Phaseolus vulgaris L.). Bean Improvement Cooperative. Annual Report 29:34. En. [Dept. of Horticulture & Agronomy & United States Dept. of Agriculture, Agricultural Research Service, Univ. of Nebraska, Lincoln, NE 68583, USA]

Phaseolus vulgaris. Cultivars. Resistance. Mineral deficiencies. Fe. Chlorosis. Nutrient solution. Mineral content. Leaves. Genotypes. Adaptation. Temperature. USA.

A total of 100 dry bean cv./lines were evaluated to determine bean gerotypic variation and the extent of bean genotype x environment interaction for Fe chlorosis in the field and in nutrient solutions in growth chambers. Also, the effect of temp. on the development of Fe chlorosis in beans grown in nutrient solutions was investigated. The cv./lines differed in the severity of Fe chlorosis symptoms ranging from high to intermediate resistance and susceptibility. No correlation was found between the degree of Fe chlorosis symptoms and total Fe content in leaves. The rate of Fe chlorosis development was more rapid and the

severity of symptoms greater under low temp. than under high temp. in the growth chambers. (CIAT) See also 0456 0472 0506 0531 0536 0547 0553 0562 0579 0587 0601

G02 Cytogenetics

0664

28057 ASHRAF, M.; BASSETT, M.J. 1986. Cytogenetic analysis of translocation heterozygosity in the common bean (Phaseolus vulgaris L.). Canadian Journal of Genetics and Cytology 28(4):574-580. En., Sum. En., Fr., 21 Ref., Il. [Vegetable Crops Dept., Univ. of Florida, Gainesville, FL 32611, USA]

Phaseolus vulgaris. Cultivars. Mutation. Sterility. Crossbreeding. Chromosomes. USA.

Twelve semisterile lines of Phaseolus vulgaris (2n = 22) were submitted to cytological investigations; 5 of the 12 stocks were found to be chromosome translocations. Cytological analysis of a half diallel set of crosses indicated that these 5 stocks involved 8 different chromosomes in reciprocal translocations. Pollen and ovule abortion rates increased with the increasing no. of interchanges in a stock. Cytological behavior and morphological abnormalities with respect to pollen and ovule abortion produced by translocation heterozygosity in the common bean, as observed, were similar to those reported in other crops. (AS)

G03 Polyploidy

0665

27723 WEILENMANN DE TAU, M.E.; BAUDOIN, J.P.; MARECHAL, R. 1986. Fertile allopolyploids from the cross Phaseolus vulgaris x Phaseolus filiformis. Bean Improvement Cooperative. Annual Report 29:65. En., 2 Ref. [Faculté des Sciences Agronomiques de l'Etat, 5800 Gembloux, Belgium]

Phaseolus vulgaris. Phaseolus filiformis. Hybridizing. Hybrids. Colchicine. Buds. Plant fertility. Polyploidy. Belgium.

To overcome the strong incompatibility barriers between Phaseolus vulgaris and P. filiformis, the chromosome no. of the resulting hybrids was doubled. Colchicine was applied at 0.25 percent solution during 36 h on the apical buds of the young F1 seedlings through imbibed-water cotton wool, allowing several Co colchiploids showing larger leaves, flowers, and bractlets to be obtained compared with the corresponding diploid hybrids. The pollen grains stainability, after squashing the anthers in 45 percent acetocarmin solution, averaged 50 percent. The most significant result was, however, the fertility restauration of some hybrids producing pods and full-grown seeds. It is now planned to examine the meiotic behavior of the Co colchiploids and to multiply through selfed generations the allotetraploid materials to favor the genetic exchanges between the [illegible] rental genomes. (CIAT)

0666

28698 WEILENMANN DE TAU, M.E.; BAUDOIN, J.P.; MARECHAL, R. 1986. Obtention d'allopolyploides fertiles chez le croisement entre Phaseolus vulgaris et Phaseolus filiformis. (Production of fertile allopolyploids from the cross between Phaseolus vulgaris and Phaseolus filiformis). Bulletin des Recherches Agronomiques de Gembloux 21(1):35-46. Fr., Sum. Fr., En., 6 Ref., Il.

Phaseolus vulgaris. Phaseolus filiformis. Hybridizing. Hybrids. Polyploidy. Belgium.

Hybridizations were carried out between Phaseolus vulgaris and the wild species P. filiformis. The latter contains interesting characters of adaptation and resistance to diseases for the improvement of cultivated beans. The F1 hybrids are completely sterile, confirming the phylogenetic distance between the 2 taxa. When the hybrid seedlings were treated with colchicine, the chromosome no. of several combinations was doubled and the fertility of the interspecific hybrids was restored. The possible use of these fertile allotetraploid hybrids for the improvement of the common bean is discussed. (AS)

H00 NUTRITION

0667

28042 DONANGELO, C.M.; PEDERSEN, B.; EGGUM, B.O. 1986. Protein, energy and mineral utilization in rats fed rice-legume diets. Qualitas Plantarum Plant Foods for Human Nutrition 36(2):119-137. En., Sum. En., 40 Ref. [National Inst. of Animal Science, Dept. of Animal Physiology & Biochemistry, 25 Rolighedsvej, DK-1958 Frederiksberg C, Denmark]

Phaseolus vulgaris. Animal nutrition. Diets. Digestibility. Proteins. Fe. Cu. Zn. Nutritive value. Denmark.

Protein, energy, and mineral utilization was examined in growing rats fed cooked, dry legume seeds in combination with polished rice. The legumes tested included 3 var. of common beans (black, white, and brown), lentils, and peas. The rice:legume mixtures (1:1 N ratio) were the only dietary sources of protein, Zn, Fe, and Cu. The rice:black bean mixture was also tested at a 4:1 N ratio. Nutrient utilization was studied by balance trials and mineral utilization was further assessed by tissue analyses. True protein digestibility and energy digestibility of the rice:legume (1:1) mixtures were high. The BV varied little but was lowest in the rice:lentil mixture. The rice:brown bean mixture had the lowest amount of utilizable protein. The rice:legume (1:1) mixtures did not adversely affect Fe status, as measured by liver Fe content and blood hemoglobin and hematrocrit, or Cu status, as measured by liver Cu content and plasma ceruloplasmin. Femur Zn content, however, indicated a suboptimal Zn status. Increasing the dietary N from rice in combination with black beans resulted in a substantial improvement of BV, NPU, and Zn status of the animals but had a negative effect on utilizable protein and Fe status of the rats. (AS)

0668

28655 HARA, T.; TSUKAMOTO, I.; MIYOSHI, M. 1983. Oral toxicity of Kintoki bean (Phaseolus vulgaris) lectin. Journal of Nutritional Science and Vitaminology 29(5):589-599. En., Sum. En., 24 Ref., Il. [Graduate Division of Human Culture, Nara Women's Univ., Nara 630, Japan]

Phaseolus vulgaris. Laboratory animals. Animal nutrition. Lectins. Diets. Japan.

Expt. with mice and rats revealed that lectin is mainly responsible for growth impairment. Mice fed raw Kintoki (Phaseolus vulgaris) bean as the only protein source lost body wt. and died in 8 days, while mice fed autoclaved bean (120 degrees Celsius for 20 min) grew normally. When mice on a 10 percent albumin diet ingested 20, 40, or 60 mg Kintoki bean lectin by daily stomach feeding, their body wt. were reduced to 84, 74, and 71 percent of the control group after 5 days, resp., and some of them did not live to complete the expt. The apparent rates of the intestinal absorption of carbohydrate, lipid, and protein were considerably reduced when rats were fed a diet containing 0.4 percent lectin. The rate of protein absorption was decreased from 55.5 to 26.3 percent of the control rate. The main tissues of mice that had ingested Kintoki bean lectin by stomach

feeding were subjected to microscopic observation. No changes were observed in the liver, kidney, spleen, and pancreas, but in the small intestine the epithelial cells lining the villi were considerably disordered and conspicuously disrupted. These results indicate that the Kintoki bean lectin is one of the main factors promoting growth impairment in exptl. animals and that the 1st target organ in the case of oral feeding is the small intestine. (AS)

0669

28054 PAREDES L., O.; MONTES R., R.; GONZALEZ C., J.; ARROYO F., M.G. 1986. Comparison of selected food characteristics of three cultivars of bean Phaseolus vulgaris. Journal of Food Technology 21(4):487-494. En., Sum. En., 26 Ref. [Inst. Politécnico Nacional, Unidad Irapuato, Apartado Postal 629, 36500 Irapuato, Gto, México]

Phaseolus vulgaris. Cultivars. Seed. Cooking. Timing. Phytic acid content. Digestibility. Organoleptic properties. Mexico.

Three bean cv., Bayocel, Canario 101, and Flor de Mayo, were selected to study some of the physical properties of the seeds, hydration capacity, cooking time, phytic acid content, digestibility, color changes as a function of soaking and cooking, and sensory properties. The water uptake was much lower for the cv. with larger seeds. Some slight losses of phytic acid were found due to the cooking treatment; cooking improved the protein digestibility. Cv. Flor de Mayo exhibited the most desirable sensory attributes. (AS)

0670

27456 ROUANET, J.M.; LAFONT, J.; CHALET, M.; CREPPY, A.; BESANCON, P. 1985. Effects of dietary kidney bean (Phaseolus vulgaris) lectins in growing rats. Nutrition Reports International 31(1):237-244. En., Sum. En., 24 Ref. [Laboratoire de Physiologie de la Nutrition, Université de Montpellier II, 34060 Montpellier, France]

Phaseolus vulgaris. Phytohemagglutinins. Diets. Animal nutrition. Animal physiology. France.

Growing rats were fed for 17 days with a diet containing purified lectins (0.25 percent of the DM) from Phaseolus vulgaris (phytohemagglutinin). The dietary lectins elicited mainly a food intake decrease and extensive alterations of the small intestinal mucosa; growth was concomitantly impaired, but this impairment appeared to be a consequence of the food intake decrease. In this process, however, a possible contribution of the mucosal alterations is not ruled out. Besides, mucosal alterations did not appear to be mediated through direct inhibition of brush border hydrolases by phytohemagglutinin. (AS)

0671

28216 WESTCOTT, C. 1980. Nebraska dry bean protein extraction process. Michigan Dry Bean Digest 5(1):7-8. En., Il.

Phaseolus vulgaris. Proteins. Processing. Uses. Human nutrition. USA.

The advantages of using bean protein concentrate in human nutrition, in particular in bread making or as a protein emulsifier and extender in processed meat, are briefly discussed. A flow chart of the Nebraska (USA) dry bean protein extraction process is also included. (CIAT)

H01 Foods and Nutritive Value

0672

28084 UEBERSAX, M.A.; HOSFIELD, O.L. 1984. Nutritional perspective of dry beans. Michigan Dry Bean Digest 8(4):12-13,23. En., Il.

Phaseolus vulgaris. Nutritive value. Amino acids. Mineral content. Diets. USA.

The nutritional properties of beans, such as protein and mineral content, are analyzed in detail. A series of comparisons are made with other foodstuffs consumed in the USA as to satisfying the recommended daily allowance. (CIAT) See also 0432 0458 0712

I00 MICROBIOLOGY

I01 Rhizobium spp., Nitrogen Fixation and Nodulation

0673

28277 ARAUJO, R.S.; MAYA-FLORES, J.; McCONNELL, D.B.; YOKOYAMA, C.; DAZZO, F.B.; BLISS, F.A. 1986. Semienclosed tube cultures of bean plants (Phaseolus vulgaris L.) for enumeration of Rhizobium phaseoli by the most-probable-number technique. Applied and Environmental Microbiology 52(4):954-956. En., Sum. En., 8 Ref., Il. [Empresa Brasileira de Pesquisa Agropecuaria, Centro Nacional de Pesquisa de Arroz e Feijao, Caixa Postal 179, 74.000 Goiania-GO, Brasil]

Phaseolus vulgaris. Rhizobium phaseoli. Nodulation. Brazil.

The semienclosed tube culture technique of Gibson was modified to permit growth of bean roots in humid air, enabling enumeration of the homologous (nodule forming) symbiont, Rhizobium phaseoli, by the most-probable-no. plant infection method. A bean genotype with improved nodulation characteristics was used as the plant host. This method of enumeration was accurate when tubes were scored 3 wk. after inoculation with several R. phaseoli strains diluted from aqueous suspensions, peat-based inoculants, or soil. A comparison of population sizes obtained by most-probable-no. tube cultures and plate counts indicated that 1-3 viable cells of R. phaseoli were a sufficient inoculant to induce nodule formation. (AS)

0674

27789 DURAN P., A. 1986. Respuesta del fríjol (Phaseolus vulgaris L.) a la inoculación, fertilización edáfica y foliar nitrogenada. (Response of beans to inoculation and soil and foliar nitrogen fertilization). Tesis Mag.Sc. Chapingo, México, Colegio de Postgraduados. 210p. Es., Sum. Es., 101 Ref.

Phaseolus vulgaris. Cultivars. Inoculation. Rhizobium phaseoli. Fertilizers. N. Leaves. Plant habit. Foliage. Yields. Mineral content. Pods. Mexico.

Four expt. were conducted at the Colegio de Posgraduados (Chapingo, Mexico) to study the response of beans to Rhizobium inoculation and to soil and foliar N fertilization using 3 bean var. of different growth habit and cropping cycle. The individual and combined effect of the abovementioned factors was also studied. The 1st expt. evaluated the effect of Rhizobium inoculation and soil and foliar N fertilization in 2 var. of different growth habit and cropping cycle: Flor de Mayo (type IIIb and 120-day cropping cycle) and Cacahuate 72 (type I and 72 days). Expt. 2 evaluated 2 var. of the same growth habit (type I) but different cropping cycle: Bayomex (106 days) and Cacahuate 72 (72 days). The 3rd expt. evaluated the response of Cacahuate 72 to soil fertilization (mineral and in solution).

The 4th expt. evaluated the residual effect of fertilizers applied in expt. 3. Bayomex showed a higher response to soil fertilization in terms of leaf canopy than Cacahuate 72. Soil fertilization with a solution showed higher effects on var. than mineral fertilization. Foliar N fertilization increased N concn. (percentage) in foliage of Bayomex and Cacahuate 72, leaves and pods of Cacahuate 72, and the amount of N (mg/plant). Inoculation with R. phaseoli (strain Mex-1) was only yield-effective in var. Flor de Mayo. (AS (extract)-CIAT)

0675

28034 EB, P.; BACLE, B.; TAILLIEZ, R. 1985. Etude de la symbiose Rhizobium-légumineuse: préparation de cellules isolées pour l'étude in vitro. (Study of the symbiosis Rhizobium-legume: preparation of isolated cells for in vitro study). Plant and Soil 88:223-230. Fr., Sum. Fr., En., 26 Ref. [Univ. des Sciences et Techniques de Lille, Inst. Agricole, Laboratoire de Microbiologie Appliquée SN 2-59655 Villeneuve d'Ascq Cédex, France]

Phaseolus vulgaris. Rhizobium phaseoli. Nodulation. Symbiosis. France.

To study the processes of nodulation and plant-bacteria symbiosis in vitro, preparations of mesophyll and root nodule protoplasts were made from Phaseolus vulgaris var. Constant. For every preparation, the exptl. conditions and the optimum cellulase and pectinase concn. diluted in mannitol 0.6 molar were defined. After a 15-day period, 10-15 percent of the mesophyll protoplasts divided 2 or even 3 times in Gambourg's B5 medium. Although a low cell concn. was used, root nodule and mesophyll protoplasts were able to fuse at a rate of 2.43 percent. (AS)

0676

28286 PEREIRA, J.C.; LOVATO, P.E.; VIDOR, C. 1986. Resistencia a antibióticos e fungicidas associada com a capacidade simbiótica de estirpes de Rhizobium phaseoli. (Resistance to antibiotics and fungicides associated with symbiotic effectiveness of Rhizobium phaseoli strains). Pesquisa Agropecuária Brasileira 21(4):383-392. Pt., Sum. Pt., En., 24 Ref., Il. [Empresa Brasileira de Pesquisa Agropecuária, Unidade de Apoio ao Programa Nacional de Pesquisa em Biologia do Solo, Km 47, Caixa Postal 23460 Seropédica-RJ, Brasil]

Phaseolus vulgaris. Rhizobium phaseoli. Strains. Inoculation. Yields. Mineral content. N. Canopy. Brazil.

Expt. with Phaseolus vulgaris grown in sand irrigated with N-free nutrient solution were conducted to evaluate the mutagenic stability, infectivity, and N2-fixing ability of Rhizobium phaseoli spontaneous mutants resistant to antibiotics and fungicides. There were variations on resistance levels to the different biocides among the Rhizobium strains. Loss of infective ability or decrease in efficiency for N2 fixation observed for several mutants were not related to the type of antibiotic and fungicide nor to the different concn. used. Some mutant strains exhibited a higher N2-fixing ability when compared with SEMIA 487 and SEMIA 492, which are being used by inoculant manufacturers. The mutant SEMIA 4002-ST1 was mutagenically stable. The results support the idea about the possibility of using spontaneous mutants in ecological studies of Rhizobium as long as they have mutagenic stability and have no cross-resistance to the antibiotics. (AS)

0677

28639 PUEPPKE, S.G. 1986. Physiology of nodule initiation in the nitrogen-fixing legume-Rhizobium symbiosis. Physiologia Plantarum

67(2):262-266. En., 19 Ref., Il. [Dept. of Plant Pathology, Univ. of Missouri, Columbia, MO 65211, USA]

Phaseolus vulgaris. Symbiosis. Rhizobium. Nodulation. Nitrogen fixation. USA.

The specificity found in the legume-Rhizobium symbiosis is discussed and the 4 steps of the nodulation process are described in detail: colonization of the rhizosphere, adsorption of rhizobia to roots, marked curling of root hairs, and infection. Nodule initiation is a poorly understood process of vast agricultural significance, and although 4 steps have been described, many questions are unanswered. There is also a need for an expanded database on nodule initiation in legumes. (CIAT)

0678

28007 RENNIE, R.J.; KEMP, G.A. 1986. Temperature-sensitive nodulation and N2 fixation of Rhizobium leguminosarum biovar phaseoli strains. Canadian Journal of Science 66(2):217-224. En., Sum. En., Fr., 33 Ref. [Research Station, Agriculture Canada, Lethbridge, Alberta T1J 4B1, Canada]

Phaseolus vulgaris. Rhizobium leguminosarum. Strains. Nodulation. Nitrogen fixation. Temperature. Canada.

Two strains of Rhizobium leguminosarum biovar phaseoli, both previously Nod(+)Fix(+) (efficient in nodulation and N2 fixation), now have altered symbiotic properties presumably through spontaneous mutation. R. leguminosarum biovar phaseoli strain RCR 3605 was Nod(-)Fix(-) (noninfective) in a cool growth temp. regime (14-23 degrees Celsius) and Nod(+)Fix(-) (ineffective) in a warm regime (17-23 degrees Celsius) on 7 of 9 bean cv. studied. R. leguminosarum biovar phaseoli strain CIAT 57 was Nod(+)Fix(-) in both temp. regimes. CIAT 57 and RCR 3605 are synonyms for strains derived from the same parent strain but housed in different culture collections. The nodulation deficiency in CIAT 57 is presumably genetically predetermined in the bacterium rather than in the plant because no Nod(+)Fix(+) phenotype was identified on 9 bean cv. tested. A control R. leguminosarum biovar phaseoli strain, RCR 3644, was efficient on all cv. In the warm temp. regime, the Nod(+)Fix(-) phenotype was observed with strain RCR 3605 only on some cv., suggesting that the host plant genome played a role in this ineffective symbiosis. It is likely that deleterious genetic mutations during prolonged storage may be altering the N2-fixing ability of these rhizobial strains and that commercial inoculants must be continually monitored for symbiotic performance of strains with a var. of host plant cv. (AS)

0679

28625 STREETER, J.G. 1986. Effect of nitrate on acetylene reduction activity and carbohydrate composition of Phaseolus vulgaris nodules. Physiologia Plantarum 68(2):294-300. En., Sum. En., 18 Ref., Il. [Dept. of Agronomy, Ohio State Univ., Ohio Agricultural Research & Development Center, Wooster, OH 44691-0900, USA]

Phaseolus vulgaris. Nutrient solution. Inoculation. Strains. Rhizobium phaseoli. Nodulation. Carbohydrate content. Acetylene reduction. N. USA.

When Phaseolus vulgaris cv. Kentucky Wonder plants were supplied with various levels of nitrate for 34 days, nodule wt./plant, acetylene reduction activity/g nodule, and sugar concn. in nodules were depressed equal to or less than 60 percent (7.5 millimolar nitrate vs. nil nitrate). Starch concn. in nodules was more than double the sugar concn. and declined only slightly in response to nitrate level. At the highest level of nitrate, sugar concn. in nodules was 50 percent greater than that in roots

and nodule starch was about 6-fold greater than root starch on a fresh wt. basis. When plants were grown with 1 millimolar nitrate and then supplied with 12 millimolar nitrate for 7 days, the rapid decline in acetylene reduction activity coincided with a decline in sucrose concn. Glucose and fructose concn., however, declined only after the largest decrease in acetylene reduction had occurred, and the quantitative decrease in glucose and fructose in nodules was small relative to sucrose. Other results showed that the magnitude of the effect of nitrate on some nodule carbohydrate compounds depends on Rhizobium phaseoli strain and on whether plants were grown with or without nitrate prior to exptl. treatments. Some of the results are consistent with the carbohydrate-deprivation hypothesis for inhibition of legume nodules by nitrate. There are, however, several complications involved in the interpretation of results of this type, and other possible explanations for the results are suggested. (AS)

0680

27475 STREETER, J.G. 1985. Nitrate inhibition of legume nodule growth and activity. 1. Long term studies with a continuous supply of nitrate. Plant Physiology 77(2):321-324. En., Sum. En., 17 Ref. [Dept. of Agronomy, The Ohio State Univ. & Ohio Agricultural Research & Development Center, Wooster, OH 44691, USA]

Phaseolus vulgaris. Nodulation. Rhizobium. Strains. Acetylene reduction. USA.

The relationship between nitrite accumulation and nodule growth and activity was explored using additional Rhizobium japonicum strains and nitrate reductase-deficient mutants, and legume species Glycine max, Phaseolus vulgaris, and Pisum sativum. Also, the accumulation of nitrite in nodules after long-term exposure (5-7 wk.) to moderate nitrate concn. is discussed. (CIAT)

0681

27484 TRIVELIN, P.C.O.; SALATI, E.; MATSUI, E.; SAITO, S.M.T.; LIBARDI, P.L. 1984. Medida da fixacao do nitrogenio atmosferico em feijoeiro (Phaseolus vulgaris L.) cv. Carioca, empregando-se o método com (15)N2 a baixo enriquecimento. (Measurement of nitrogen fixation in bean cultivar Carioca, using (15)N2 low enrichment method). Energia Nuclear e Agricultura 6(1):55-74. Pt., Sum. Pt., En., 9 Ref., Il.

Phaseolus vulgaris. Nitrogen fixation. Mineral content. N. Dry matter. Nodulation. Brazil.

Exptl. work was carried out under field conditions (Piracicaba, Brazil) to develop a method to measure atmospheric N2-fixation by leguminous plants, using a low enrichment (15)N2 technique. A N2-fixation measuring chamber, installed in the middle of a bean plot of 25 square meters on Terra Roxa Estruturada, was used. The chamber was constructed with galvanized steel sheets, with its open end placed in the soil and its closed top at ground level. The aerial part of the bean plants grew under normal conditions but the rooting system was confined, through which a mixture of Ar, O2, and (15)N-labelled N2 (1.9 percent atom excess) was circulated from day 22 to 31 after planting. Samples of the gaseous mixture of Ar, O2, and N2 were periodically taken and analyzed by mass spectrometry to determine (15)N concn. and O2 and CO2 contents. The N2 fixed was measured by determining total N and isotopic concn. of N in the plants. Considering the period of time for atmospheric N2 fixation, from day 22 to 31 of the crop cycle, it was noted that 6.7 plus or minus 0.6 mg N/plant (27 percent of total plant N) was derived from fixation. Based on the methodology developed, it is suggested that the direct method of measuring atmospheric N2 fixation may

be used under field conditions and in pot expt. for the total legume crop cycle. (AS)

0682

27095 UNIGARRO S., A.E.; BURBANO O., H.; MOLINA V., L. 1984. Evaluación general de la capacidad de fijación de nitrógeno por algunas leguminosas de clima frio. (General evaluation of the nitrogen fixation capacity of some cold-climate legumes). Revista de Ciencias Agrícolas 8(1-14):121-131. Es., Sum. Es., En., 19 Ref.

Phaseolus vulgaris. Dry matter. Protein content. Fertilizers. N. P. K. B. Mo. Nitrogen fixation. Colombia.

In a greenhouse trial in 1982-83, the DM production potential of the aerial part, roots, and nodules, percentage of protein in the aerial part, and N fixation of peas, beans, and alfalfa were evaluated. Direct relationships were observed between DM production of nodules and roots and between aerial part DM and nodule DM and the percentage of protein in the aerial part. A significant correlation was observed between DM wt. of the aerial part and root DM wt. Soil fertility conditions were adequate for symbiosis; however, Mo and B fertilization was important. (AS)

0683

27460 WASFI, M.; PRIOUL, J.L. 1986. A comparison of inhibition of French-bean and soybean nitrogen fixation by nitrate, 1 percent oxygen or direct assimilate deprivation. Physiologia Plantarum 66(3):481-490. En., Sum. En., 27 Ref., Il. [Structure et Métabolisme des Plantes, Bat. 430, Univ. de Paris-Sud, F-91405, Orsay Cédex, France]

Phaseolus vulgaris. Snap beans. Acetylene reduction. Carbohydrate content. Nodulation. Nitrogen fixation. France.

Inhibition by NO3(-) of acetylene reduction in bean cv. Contender and soybean was measured parallel with nodule carbohydrate and nitrate metabolism. In bean, the onset of inhibition of C2H2 reduction (6 h) coincided with decreased import of assimilates and a lowering of carbohydrate pools (sucrose, glucose, and starch). Nitrate reductase activity was induced in all plant organs after 3 h, but no nitrite was detected in the nodules. The nitrate-induced inhibition of nitrogenase was compared with the inhibition observed with low O around the roots (1 percent O2) or with direct assimilate deprivation (girdling or decapitation). Soybean and bean appeared equally sensitive to these treatments regarding acetylene reduction. The results are discussed in relation to the current hypotheses explaining nitrate-induced inhibition of dinitrogen fixation: assimilate deprivation or nitrite poisoning. Present data are in favor of the 1st for bean and of the 2nd for soybean. (AS (extract)) See also 0383 0452 0461 0467 0476 0478 0479 0499 0554 0635 0653

J00 ECONOMICS AND DEVELOPMENT

0684

13675 BLUMENSCHEIN, A.; GUAZZELLI, R.J. 1980. A contribuicao das ciencias agrárias para o desenvolvimento agrícola do arroz e do feijao. (Contribution of agricultural sciences to rice and bean crop development). Revista de Economia Rural 18(3):435-446. Pt., 4 Ref., Il.

Phaseolus vulgaris. Agricultural projects. Brazil.

Background information is given on rice and bean crop development in Brazil as well as research performed on these 2 products. Concerning beans, in

spite of research efforts, Brazilian production has been stagnant during the last 10 yr at 2 million t, and the productivity has sharply decreased. Agricultural policy has recently begun to encourage bean consumption, therefore producers tend to raise the technological level of the crop, achieving yields up to 2000 kg/ha. The new technologies designed allow their adoption by producers, who fear the risk and uncertainty presented by this crop. (CIAT)

0685

22505 BOUET, A. 1980. Contribution a l'etude du haricot vert; facteurs technico-economiques de la production: memoire. (A contribution to the study of snap bean production; technical-economic production factors; proceedings). France, Ecole Nationale Supérieure Agronomique de Montpellier. 88p. Fr., 14 Ref., Il.

Phaseolus vulgaris. Snap beans. Production. Statistical data. Developmental stages. Trade. Legal aspects.

A survey was carried out by the Centre Téchnique du Génie Rural des Eaux et des Forets in Provence (Ecole Nationale Supérieure Agronomique de Montpellier), as part of a more general study on pulse production in France, to determine the causes of the decreasing post-war production of snap beans for fresh consumption. An overview is presented on the economic aspects of production, including statistical and geographical data. The vegetative cycle of the bean plant and the objectives of var. selection are described. The main production regions (90 percent of total production) are Bretagne, Picardie, some northern localities, Aquitaine, Provence, some central provinces, Pays de Loire, and a few sites in the Parisian area. National consumption reaches 3 kg/capita/yr. Information is given on EEC participation, imports and exports, and quality standards and classification. First results are presented for 59 production plots (marsh and field crops) surveyed in the following localites: Lot-et Garonne, Maine-et-Loire, Ile-de-France, and the SW. The famers' problems and motivations are analyzed as well as the cropping techniques used, time schedules, and commercialization channels. Emphasis is given to the harvest difficulties met by farmers in Lot-et-Garonne and to market organization in Loire. It is concluded that the future of this product depends largely on a better organization of production schedules, particularly regarding labor shortages, flowering cycles of var., irrigation, and fertilization. (CIAT)

0686

13352 CAMARGO, J.R.V. DE, MELLO, N.T.C. DE 1980. Estimativas de custo operacional para as culturas do amendoim e feijao, Estado de Sao Paulo, Janoiro de 1980. (Production costs estimates for peanut and bean crops, state of Sao Paulo, January 1980). Informacoes Econômicas 10(1):41-47. Pt., Il.

Phaseolus vulgaris. Costs. Brazil.

Production costs estimates for peanut and bean crops on irrigated and nonirrigated land in Brazil are reviewed. The basis for estimated input costs during the season are given in detail, emphasizing that for nonirrigated land production the costs are slightly higher than for irrigated land. Basic costs are compared with the estimated production costs. For beans, the relatively wide margin (14-19 percent) between the min. price and the production costs both for irrigated and nonirrigated land demonstrates the government's interest to promote this crop. (World Agricultural Economics and Rural Sociology Abstracts)

0687

28263 CHITEDZE AGRICULTURAL RESEARCH STATION. ADAPTIVE RESEARCH PROGRAMME. MANAGEMENT UNIT. 1984. Farming system overview EPA 22 in the Lilongwe North East rural development project: results of an exploratory survey 12-14 March. 1984. Lilongwe, Malawi. 13p. En.

Phaseolus vulgaris. Agricultural projects. Cultivation. Malawi.

Farmer's external circumstances and constraints that justify the Lilongwe NE rural development project (Malawi) are described. This project aims to increase crop and livestock production, and consequently farm income, through provision of improved extension coverage, roads, marketing, and credit. Since the project is only in its 2nd yr of funding, it is too early to assess impact. Farmer's internal circumstances (land, labor, cash, and capital), objectives, and priorities as well as main farming systems (local maize, hybrid maize, groundnuts, and tobacco) are described. Beans are planted in pure stand, for consumption. If intercropped with local maize, this is done after the 1st weeding during the same station. (CIAT)

0688

28095 1980. CIAT AND its bean program. Michigan Dry Bean Digest 4(4):17-18,29. En., Il.

Phaseolus vulgaris. Agricultural projects. Transfer of technology. Colombia.

General information about CIAT is given with special emphasis on the bean program. General and specific goals are pointed out as well as the characteristics of dry bean production in Latin American countries. The main projects in progress on breeding, evaluation of promising materials, and production of genotypes showing resistance or tolerance to pests and diseases are mentioned. Finally, the importance of training activities offered to professionals worldwide is highlighted. (CIAT)

0689

28248 CONKLIN, N.C. 1986. The business of beans. Farmline 7(6):12-13. En., Il.

Phaseolus vulgaris. Consumption. Production. Trade. Prices. Statistical data. Mexico. USA.

The main reasons for the decline in bean consumption in the US are mentioned and analyzed, and the 12 major classes of dry bean are enumerated. Michigan and Nebraska rank 1st and 2nd in production, resp. Data on US dry bean exports throughout the 1960's and early 1970's are given, and the Mexican bean situation during the early 1980's is mentioned and analyzed. Finally, the trend of bean production and prices from the 1960's to the 1980's is explained. (CIAT)

0690

28989 DUE, J.M. 1986. Summary of farming systems bean research in Tanzania, 1982-85. Phaseolus Beans Newsletter for Eastern Africa no.5:12-15. En., Sum. En.

Phaseolus vulgaris. Cultivation systems. Socioeconomic aspects. Human nutrition. Tanzania.

The results of research on farming systems with beans in Tanzania, carried out during 1982-85, are summarized. Data on size and nature of farming unit and importance of beans in the farming systems were gathered from 262 small farm families from different regions of the country. Some considerations on

calorie and protein adequacy and socioeconomic characteristics of the families are given. (CIAT)

0691

27468 1986. EL MERCADO externo del frejol: situación actual y perspectivas. (Present situation and perspectives of external bean marketing). Panorama Económico de la Agricultura no.44:12-20. Es.,

Phaseolus vulgaris. Trade. Production. Statistical data. Europe. Asia. Latin America.

To provide guidelines for decisions on investment of Chilean bean producers, an attempt was made to identify the elements that have obstructed a regular flow of exports. Therefore, the following aspects of the bean market were analyzed: characteristics of international supply and demand, composition of Chilean exportable supply, characteristics of national production, and internal structure of production costs and prices. It was concluded that the large price instability throughout the year is due to the reduced proportion of worldwide production that takes part of the international market. Since Chile represents a small fraction of the international supply, external prices of beans are not sharply affected by its export vol. Perspectives of black bean in the international market will depend on foreign currency availability from Latin America countries (the greatest consumers). (CIAT)

0692

27470 FEDERACION NACIONAL DE CAFETEROS DE COLOMBIA. 1985. Fríjol verde. (Fresh bean). In _____. Productos agrícolas perecederos: bases de análisis, proyecciones 1986. Bogotá, Departamento de Mercadeo. Series de Precios 1984-1985. Boletín no.14. pp.103-106. Es., Il.

Phaseolus vulgaris. Prices. Fresh products. Colombia.

Fresh bean wholesale prices in markets of Bogotá, Cali, and Medellín (Colombia) during 1984 and 1985 are compared; forecasts for 1986 are given. (CIAT)

0693

27471 FEDERACION NACIONAL DE CAFETEROS DE COLOMBIA. 1985. Habichuela. (Snap beans). In _____. Productos agrícolas perecederos: bases de análisis, proyecciones 1986. Bogotá, Departamento de Mercadeo. Series de Precios 1984-1985. Boletín no.14. pp.107-110. Es., Il.

Phaseolus vulgaris. Snap beans. Prices. Colombia.

Snap bean wholesale prices in markets of Bogotá, Cali, and Medellín (Colombia) during 1984 and 1985 are compared; forecasts for 1986 are given. (CIAT)

0694

27798 FRANCISCO G., E.; BENEDETTI R., H.; RUIZ T., M.T.; VIDAL G., H. 1985. Precios esperados de productos y resultado económico para cultivos en la temporada 1984-85. (Forecasting producer prices and economic returns for crops during the 1984-85 season). Ciencia e Investigación Agraria 12(1):77-86. Es., Sum. En., 3 Ref.

Phaseolus vulgaris. Prices. Income. Chile.

Production decisions in the agricultural sector were found to be strongly influenced by the uncertainty in yields and prices. Estimated harvest prices for wheat, maize, potatoes, rice, and beans for internal consumption

in Chile are presented, together with potential economic returns based on these price estimates. The economic returns use information from the VI and VII Regions to calculate costs of production. (AS)

0695

28265 GARGIULO, C.A. 1986. Adopción de nuevas variedades de poroto negro en Argentina y retorno social de la inversión en investigación. (Adoption of new black bean varieties in Argentina and social rates of return of investment in research). Tucumán, Argentina, Estación Experimental Agro-Industrial Obispo Colombres. Publicación Miscelánea no.80. pp.55-104. Es., Sum. Es., 10 Ref., Il.

Phaseolus vulgaris. Cultivars. Transfer of technology. Income. Argentina.

Three years after the release of new black bean var., the Obispo Colombres agroindustrial exptl. station in collaboration with CIAT decided to evaluate the degree of adoption of the new technology and, based on this information, calculated the social rates of return to the investments in research. To do so, the characteristics of the farmers that adopted or not technology were studied as well as the differences between the traditional and the new var. from the farmer's viewpoint, transfer mechanisms, adoption curves for northwestern Argentina and for the province of Tucumán, and the returns to bean research for both were assessed. The internal rates of return obtained for 6 yr of mean future prices were 50.65 percent for northwestern Argentina and 46.83 percent for Tucumán, with cost-benefit ratios of 5.43 and 1.94 percent, resp. Taking into consideration the cash flows up to 1985, the internal rates of return obtained were 40.06 percent for northwestern Argentina and 29.95 percent for Tucumán, with cost-benefit ratios of 2.92 and 1.38, resp. (AS-CIAT)

0696

28264 GARGIULO, C.A.; PACHICO, D. 1986. Análisis descriptivo del sector porotero del Noroeste Argentino. (Descriptive analysis of the bean sector of northwestern Argentina). Tucumán, Argentina, Estación Experimental Agro-Industrial Obispo Colombres. Publicación Miscelánea no.80. pp.1-54. Es., Sum. Es.

Phaseolus vulgaris. Cultivars. Cultivation. Socioeconomic aspects. Argentina.

In 1982 new black bean var. were released for the 1st time in Argentina, result of an agreement between CIAT and the Obispo Colombres agroindustrial exptl. station. In 1985 a survey was carried out with 15 percent of the bean producers in northwestern Argentina to achieve their characterization, establish the motives for planting this crop, determine the geographical distribution of both new and traditional var., and identify the technology used in the productive process as well as production and commercialization constraints. It was determined that 60 percent of the producers have less than 10 yr of experience with the crop and that most of them belong to Jujuy, Norte de Salta, and Tucumán-Santiago; 44 percent have high school education, 36 percent grade school, and 20 percent university studies. A total of 72 percent worked exclusively in agricultural tasks, and only 36.6 percent resided on the farm. Constraints to expansion were the low profitability and marketing and commercialization problems. Incentives were the existence of new var., availability of machinery, and land clearance. In 1984, 85.8 percent planted Alubia, 27.3 percent Dor 41, and 16.9 percent Negro Común with av. yields of 1003, 1355, and 1091 kg/ha, resp. (AS (extract)-CIAT)

0697

28091 GARGIULO, C.A. 1986. El cultivo del poroto negro en el NOA. (Black bean cultivation in northwestern Argentina). Avance Agroindustrial 6(25):2-6. Es., Il.

Phaseolus vulgaris. Technology evaluation. Cultivation. Yields. Storage. Trade. Argentina.

Background information on the evolution of black bean cultivation in Argentina, particularly in the northwest, is given. The characteristics of producers from the different regions are indicated as well as the var. grown, their distribution, and the cultivated area. General characteristics of new var. and data related to chemical application, harvesting methods, comparative yields, storage, and commercialization are included. Finally, the type of technical assistance given to producers is indicated as well as the information sources that they prefer. (CIAT)

0698

14853 HONDURAS. SECRETARIA DE RECURSOS NATURALES. 1980. Proyecto piloto de maiz y frijol (PROMYF); informe final. 2. Comprobación de tecnología. (The maize and bean pilot project; final report. 2. Technology verification). Tegucigalpa, Honduras. 55p. Es.,

Phaseolus vulgaris. Agricultural projects. Transfer of technology. Technological package. Cultivation. Honduras.

The main activities carried out by the Honduran maize and bean pilot project, PROMYF, regarding the verification of technology during 1976-79 are described in detail. Activities were conducted on farms of both independent farmers and beneficiaries of the land reform to improve the results obtained at national and international exptl. stations and then recommend the best technological options for producers. During the execution of the project, 89 verification units were established, in which trials were conducted on var., fertilizers, densities, and weed and pest control. At the end of project, all the farmers had adopted new cropping systems. Results from each type of trial for both maize and beans are included; likewise, the bases and final data collected from the 1st regional exhibition of maize production, which was a part of the project, are shown. Specific recommendations for both crops are also given. (CIAT)

0699

28208 McGILL JUNIOR, J.A. 1978. Dry bean production in South Africa. Michigan Dry Bean Digest 2(2):12-14. En., Il.

Phaseolus vulgaris. Production. Trade. Statistical data. Consumption. Uses. Yields. South Africa.

Information is given about dry bean production, marketing, export/import, consumption, use and promotion, and research in South Africa. Agroecological conditions of the areas where this crop is grown are mentioned. Morphological characteristics of the main bean var. grown in the country, Large White Kidney Bean, are described. On the other hand, NEP II is considered a promising var. yielding up to 2070 kg/ha. (CIAT)

0700

28219 1985. MICHIGAN, UNITED States, and world dry bean statistics. Michigan Dry Bean Digest 9(3):14-18,22. En., Il.

Phaseolus vulgaris. Production. Trade. Statistical data. Mexico. Argentina. Chile. India. Venezuela. USA. South Africa. Brazil.

Statistical data on production, supply, and distribution of beans during 1983-85 are given in table form for Mexico, Argentina, Chile, India, Venezuela, and USA (North Dakota). Statistical data on US exports of different bean types during 1983-84 are also included and the South African bean situation is briefly described. (CIAT)

0701

28072 1984. MICHIGAN, UNITED States, and world dry bean statistics. Michigan Dry Bean Digest 9(1):24-26. En., Il.

Phaseolus vulgaris. Trade. Statistical data. Production. Egypt. Japan. USA. Canada.

An outlook on the perspectives of dry bean (white, colored, and black) market for 1984 is given and analyzed as well as the Egyptian pulse situation in 1983 (imports, production, trade policy and financing, and per capita consumption). Data on Japan bean imports (1979-84) are given. The bean situation in Ontario, Canada, is also analyzed. Finally, estimates for dry bean acreage and production in the main producing states of the USA are included. (CIAT)

0702

28086 1984. MICHIGAN, UNITED States, and world dry bean statistics. Michigan Dry Bean Digest 8(4):21-23. En., Il.

Phaseolus vulgaris. Statistical data. Production. Consumption. Trade. Argentina. Brazil. Dominican Republic. India. Turkey. Mexico. Japan. USA.

Data on Argentina dry bean production, consumption, and exports in 1984 are given, and the pulse situation in Brazil, Dominican Republic, India, and Turkey is described. The Mexico bean situation and Japan pulse quotas for the 1st half of 1984 are mentioned as well as Michigan's (USA) 1984 acreage estimate. (CIAT)

0703

28825 SCHLUTER, M. 1984. Pulses and horticultural crops. In _____. Constraints on Kenya's food and beverage exports. Washington, D.C., International Food Policy Research Institute. Research Report no.44. pp.78-90. En., 34 Ref.

Phaseolus vulgaris. Trade. Prices. Marketing. Agricultural projects. Kenya.

Background information is given on pulses in Kenya, with emphasis on dry edible beans. Data on imports/exports, official prices, cultivated area, marketing, research projects, and yields are included. Constraints to increased pulse exports and to the diffusion of yield-increasing technological innovations for beans are mentioned and analyzed. (CIAT)

0704

28001 SILVA, M.C. DA; REIS, A.J. DOS; REIS, R.P.; MORAIS, V.A. 1984. Análise econômica da producao dos pequenos proprietários rurais do município de Nova Resende, Estado de Minas Gerais. (Economic analysis of the produce of small rural farmers in the municipality of Nova Resende, Minas Gerais). Revista de Economia Rural 22(4):417-430. Pt., Sum. Pt., En., 12 Ref., Il. [Empresa Catarinense de Pesquisa Agropecuária, Caixa Postal D-20, 88.0000 Florianópolis-SC, Brasil]

Phaseolus vulgaris. Costs. Labor. Income. Brazil.

Production costs were used to analyze agricultural enterprises in the area of Nova Resende (Minas Gerais, Brazil); the sample comprised 46 landowners

and the selected product was beans. Data covered the 1980-81 crop year. Results were tabulated and the cost function was estimated by regression analysis. The significance test was performed for the difference between 2 sample means. Labor was found to be the main component of production costs. The av. income was lower than the av. total cost; however, it was enough to cover both av. variable costs and operational expenses. The analysis of the cost function confirmed the existence of economies of scale. The break-even point was 11.31 bags of beans/property. Approx. 40 percent of the producers reached that point. (AS)

0705

28995 1985. TECHNICAL MEETING of bean research coordinators in Eastern Africa, Adis Ababa, 1985. Phaseolus Beans Newsletter for Eastern Africa no.5:39-41. En.

Phaseolus vulgaris. Agricultural projects. Ethiopia. Uganda. Somalia. Tanzania.

The main objectives of the meeting of bean research coordinators in Eastern Africa, held at Adis Ababa, Ethiopia, in Dec. 1985, are given. Pulse situation is briefly described, and particularly the bean situation in Ethiopia, Uganda, Somalia, and Tanzania; research priorities of the bean programs of these countries are included. (CIAT)

0706

27502 TORANZOS T., G. 1986. La comercialización de porotos secos. (Dry bean commercialization). Anales de la Sociedad Rural Argentina 120(1-6):33-35. Es.

Phaseolus vulgaris. Trade. Statistical data. USA. Thailand. Argentina.

Data on international dry bean trade are analyzed, and the main exporting countries during 1981-83 are mentioned (USA, Thailand, and Argentina, in decreasing order). Perspectives of the marketing of alubia and black beans for Argentina in 1986 are included. (CIAT)

0707

28823 UNIDAD REGIONAL DE PLANIFICACION AGROPECUARIA. COLOMBIA. 1983. Análisis del cultivo del fríjol. (Analysis of bean cultivation). In _____. Diagnóstico agropecuario del departamento del Huila (Primera parte). Neiva, Convenio OPSA/PNUD/FAO - Proyecto COL/79/001. pp.194-205. Es., Il.

Phaseolus vulgaris. Production. Statistical data. Yields. Costs. Income. Marketing. Colombia.

Data on Huila (Colombia) and national bean cultivated area, production, and productivity during the 1973-83 period are given and analyzed; figures of production costs, production value, profit, income return, financing, and financing percentage (over costs) are included. Furthermore, aspects related to production structure, costs, income, and income return for both traditional and technified systems are briefly analyzed as well as credit, technical assistance, and market structure. (CIAT)

K00 FIELD PLOT TECHNIQUE

0708

28088 ESCOBAR G., J.A.; AMEZQUITA, M.C.; MUÑOZ, J.E.; GARCIA, J.A. 1981. Manual de capacitación en biometría para la experimentación en fríjol. (Biometry training handbook for bean testing). Cali, Colombia, Centro Internacional de Agricultura Tropical. 145p. Es., 30 Ref., Il.

Phaseolus vulgaris. Experiment design. Statistical analysis. Colombia.

Information on bean testing is compiled, with emphasis on exptl. designs. Basic aspects of agricultural testing, expt. planning, and plot technique are explained. The characteristics of completely randomized, randomized complete block, Latin square, split plot, split strip, and lattice designs are given, including examples for each one. The CIAT Bean Program's organization is described. (CIAT) See also 0498

L00 GRAIN STORAGE

0709

28022 ASTIER-DUMAS, M.; GARGOMINY, N.; LAURENT, B. 1985. Evolution de la teneur en vitamine C, en minérauz et en fibres dans des haricots verts appertisés et dans des haricots verts surgelés. (Evolution of vitamin C, mineral and fiber content in canned or deep-frozen green beans). Médicine et Nutrition 21(4):273-276. Fr., Sum. Fr., En., Il. [Centre de Recherches Foch, 45, rue des Saints-Peres, 75006 Paris, France]

Phaseolus vulgaris. Snap beans. Canned beans. Vitamin content. Mineral content. Ca. Mg. Na. K. Zn. Fiber content. Storage. France.

Green beans stored for 9 mo., preserved by freezing or canning, showed a lower level of vitamin C. The stable K content during storage allowed the possible variations in vitamin C content to be distinguished in the subsamples, as opposed to real losses during storage. Fiber content did not vary with the length of the storage. (AS)

0710

28611 SIEVWRIGHT, C.A. 1985. Effects of storage conditions and chemical treatments on firmness, in vitro protein digestibility, condensed tannins, phytic acid and divalent cations of cooked black beans (Phaseolus vulgaris). Ph.D. Thesis. Ithaca, N.Y., Cornell University. 164p. En., 193 Ref., Il.

Phaseolus vulgaris. Storage. Seed. Digestibility. Tannin content. Cooking. USA.

The effects of storage conditions and soaking solution on the firmness, in vitro protein digestibility, condensed tannins, phytic acid, and divalent cations of black beans were studied. Storage for 6 mo. at 30 and 40 degrees Celsius at 80 percent RH resulted in increased firmness and reduced protein digestibility, extractable condensed tannins, and phytic acid. These adverse effects were reduced at 5 degrees Celsius-50 percent RH storage. Under the above mentioned conditions, condensed tannins showed a small increase, while at 30 and 40 degrees Celsius-80 percent RH they increased, reached a plateau, and then declined. Changes in the distribution of the condensed tannin fractions as well as total tannins accompanied changes in in vitro protein digestibility and firmness. Sodium chloride, sodium tripolyphosphate, sodium carbonate, and sodium bicarbonate (the food grade salts used in soaking solutions) will overcome the hard-to-cook phenomenon in black beans. In combination, they appear to have a synergistic effect in producing soft beans by way of cation exchange, solubilization and leaching of protein, and increasing bean porosity. These salts will also partially overcome the problem of poor digestibility of black bean proteins. They released more tannins and phytic acid into the protein diafiltrate during the digestion process. The addition of tannins and polyphenol oxidase to black bean protein isolates reduced digestibility. Polyvinylpyrollidone improved the digestibilities of the mixtures. The reaction mechanism of the protein-tannin complex proceeds via H bonding as well as covalent bonding. H bonding seems to play the more dominant role.

The reaction is enhanced by polyphenol oxidase. Soaking fresh as well as 6-mo.-old beans in salt solutions resulted in greater losses of Mg than Ca. The uptake of Na from salt solutions was unaffected by storage conditions. Combined salt solutions raised the Na content of cooked beans 14-17 times over water-soaked beans. Blanching of black beans prior to storage will retain protein digestibility but enhance the development of firmness. During the course of the study, phytic acid and protein digestibility decreased while bean firmness increased. (Dissertation Abstracts International) See also 0442

L01 Stored Grain Pests

0711

27793 DAVIES, J.C. 1963. In-sack storage of beans using 0.04 percent gamma-BHC dust. Tropical Stored Products Information 6:213-221. En., Sum. En., 2 Ref., Il.

Phaseolus vulgaris. Storage. Cultivars. Seed. Insecticides. Acanthoscelides obtectus. Insect control. Stored grain pests. Uganda.

Three bean var. (Banja, Mutike, and Canadian Wonder) commonly grown in Uganda were stored for 12 mo. in a Bain store. Monthly samples were taken of beans treated with 0.20 kg gamma-BHC/90 kg and of untreated beans. These results indicate that under Uganda conditions the above dosage of insecticide may be expected to give very good control of Acanthoscelides obtectus in all 3 var. for 12 mo. The rise of infestation in the untreated beans was also studied and some evidence was found that Canadian Wonder was more resistant to A. obtectus attack. Mutike appears to be the most readily infested. An economic return from insecticidal measures was demonstrated. (AS) See also 0606 0614

M00 USES, INDUSTRIALIZATION AND PROCESSING

0712

28204 HOSFIELD, G.L.; UEBERSAX, M.A. 1979. Canning quality evaluations of tropical & domestic dry bean germplasm. Michigan Dry Bean Digest 3(4):4-9. En., Il.

Phaseolus vulgaris. Cultivars. Analysis. Canned beans. Processing. Genotypes. Nutritive value. Packaging. USA.

Seeds of 35 bean accessions representing plant introductions, breeding lines, and cv. of both tropical and domestic (Michigan, USA) origin were assayed for proximate chemical composition. Seventeen of these accessions comprising several dry bean commercial class designations were selected for canning. Beans were adjusted to 16 percent moisture prior to soaking and processing. Soaked and processed beans were evaluated for water uptake while processed beans were evaluated further for texture (Kramer Shear Press) and general canning quality. Differences among genotypes were noted for most characters. Textural differences were associated with final MC in only the tropically adapted bean accessions. Tropical beans also showed a greater tendency to clump in the can after cooking than did the domestic genotypes. Evaluation of Kramer Shear Press tracings showed textural differences among genotypes could be broken down into a compression type and a shear type curve. These curve types appeared to be a characteristic of the genotype rather than of seed coat color per se, size of bean, or final MC. These results suggest there is considerable genetic variation available among tropical bean genotypes for nutritional and canning quality factors to justify their use in breeding programs. Specifically, tropical bean germplasm may be of use as parents to transfer stress tolerance and lodging resistance to commercially acceptable genotypes,

while the bean breeder is simultaneously breeding to improve nutritional composition and canning quality. (AS)

0713

28002 SHERMAN, H. 1985. Steam blanching improves canned beans. Agricultural Research 33(5):4. En.

Phaseolus vulgaris. Cultivars. Processing. Canned beans. USA.

Six different dry bean var. were used to compare the quality of steam-blanched and water-blanched beans and to determine quality differences that may occur among var. The steam-blanched beans were plumper and firmer, and had higher drained wt. and better color. For both processes, canning quality varied according to bean var. and amount of blanching. The steam-blanching method also saves time and energy. (CIAT)

0714

28209 STEINBUCH, E.; DECNOP, C. 1978. Processing and flavoring of white beans. Michigan Dry Bean Digest 2(2):8-10,24. En., 11 Ref., Il.

Phaseolus vulgaris. Canned beans. Processing. USA.

Some considerations about the importance of the white bean canning industry are given, and soaking, the 1st step in the processing of dry beans, is briefly explained. The use of tomato sauce as a flavoring of canned beans is highlighted; however, due to the limited availability of tomato pulp, it has been partly replaced by tomato flavors, without any adverse side effects. Finally, the advantages of using herbs and species as flavoring in canned white beans in tomato sauce are indicated. (CIAT)

0715

28634 TAPIA B., H.; HAAR G., J. 1986. Presecador de fríjol en vainas. (Pre-dryer of fresh beans). Managua, Nicaragua, Instituto Superior de Ciencias Agropecuarias. 15p. Es., 4 Ref., Il.

Phaseolus vulgaris. Drying. Pods. Technological package. Nicaragua.

What a bean pre-dryer is, how it is built, and the way it functions are briefly explained; some recommendations on the position of the pre-dryer regarding the direction of the wind are included as well as the dimensions of the framework, the state of bean plants, and its location on the frameworks. (CIAT) See also 0671 0709

ABBREVIATIONS AND ACRONYMS

A	Angstrom(s)
ABA	Abscisic acid
ac	Acre(s)
Af.	Afrikaans
a.i.	Active ingredient
alt.	Altitude
AMV	Alfalfa mosaic virus
approx.	Approximate(ly)
Ar.	Arab
atm.	Atmosphere
ATP	Adenosine 5'-triphosphate
av.	Average
BAP	6-Benzylaminopurine
BBMV	Broad bean mosaic virus
BCMV	Bean common mosaic virus
Bg.	Bulgarian
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
ca.	About (circa)
CAMD	Cassava African mosaic disease
CMV	Cassava African mosaic virus
CBB	Cassava bacterial blight
CBSD	Cassava brown streak disease
CEC	Cation exchange capacity
CER	CO2 exchange rate
CF	Cassava flour
CGR	Crop growth rate
Ch.	Chinese
CLM	Cassava leaf meal
CLV	Cassava latent virus
CM	Cassava meal
cm	Centimeter(s)
COD	Chemical oxigen demand
concn.	Concentration
CP	Crude protein
Cs.	Czech
CSL	Calcium stearyl lactylate
CSW	Cassava starch wastes
C.V.	Coefficient of variation
cv.	Cultivar(s)
2,4-D	2,4-dichlorophenoxyacetic acid
Da.	Danish
De.	German
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
En.	English
EP	Preliminary Trials, CIAT
Es.	Spanish
expt.	Experiment(s)
exptl.	Experimental
Fr.	French
ft-ca	Foot candles (10.76 lux)
FYM	Farmyard manure
g	Gram(s)
G	Giga (109)
GA	Gibberellic acid
gal	Gallon(s)
GE	Gross energy
GERs	Glucose entry rates
GLC	Gas-liquid chromatography
Gr.	Greek
h	Hour(s)
ha	Hectare(s)
HCN	Hydrocyanic acid
HDP	Hydroxypropyl distarch phosphate (modified cassava starch)
He.	Hebrew
Hi.	Hindi
HI	Harvest index
hp	Horsepower
Hu.	Hungarian
IAA	Indoleacetic acid
IBA	Indolebutyric acid
IBYAN	International Bean Yield and Adaptation Nursery, CIAT
Il.	Illustrations
in.	Inches
In.	Indonesian
It.	Italian
IU	International unit
J	Joule
Ja.	Japanese
kat	Katal(amount of enzymatic activity that converts 1 mole of substrate/s)
kcal	Kilocalorie(s)
kg	Kilogram(s)
kJ	Kilojoule

km	Kilometer(s)
KNap	Potassium naphthenate
Ko.	Korean
kR	Kiloroentgen(s)
La.	Latin
LAD	Leaf area duration
LAI	Leaf area index
lat.	Latitude
lb	Pound(s)
LD50	Mean lethal dose
LER	Land efficiency ratio
LPC	Leaf protein concentrate
lx	Lux
M	Mega
m	Meter(s)
Mal.	Malay
max.	Maximum
MC	Moisture content
ME	Metabolizable energy
meq	Milliequivalent(s)
met.	Methionine
mg	Milligram(s)
mho	Reciprocal ohm
min.	Minimum
min	Minute(s)
ml	Milliliter(s)
mm	Millimeter(s)
mo.	Month
mol. wt.	Molecular weight
m.p.	Melting point
NAA	Alpha-naphthalene acetic acid
NAD	Nicotinamide adenine dinucleotide
NADH	Nicotinamide adenine dinucleotide, reduced form
NAR	Net assimilation rate
NCE	Net CO2 exchange
NE	Northeast
NER	Net energy ratio
Nl.	Dutch
nm	Nanometer(s) (10-9 m)
no.	Number(s)
No.	Norwegian
NPFs	Negative production factors
NPR	Net protein ratio
NPU	Net protein utilization
NW	Northwest
OM	Organic matter
oz	Ounce(s)
p.	Page
P	Probability
Pa	Pascal(s)
PAN	Peroxyacetic nitrate
PCNB	Pentachloronitrobenzene
PDA	Potato dextrose agar
PER	Protein efficiency ratio
pH	Hydrogen ion concentration
Pl.	Polish
pp.	Pages
pphm	Parts per hundred million
PPI	Preplanting incorporation
ppm	Parts per million
PSA	Potato sucrose agar
Pt.	Portuguese
pv.	Pathovar
Ref.	Reference
resp.	Respective(ly)
Rf	Retardation factor-chromatography
RGR	Relative growth rate
RH	Relative humidity
RNA	Ribonucleic acid
Ro.	Romanian
rpm	Revolutions per minute
Ru.	Russian
s	Second
SBM	Soybean meal
SCN	Thiocyanate
SCP	Single cell protein
SDS	Sodium dodecyl sulfate
Sk.	Slovak
Sn.	Slovene
sp.	Species
spp.	Species
SSL	Sodium stearyl-2-lactylate
Sum.	Summary
Sv.	Sweddish
t	Ton(s)
TDN	Total digestible nutrients
temp.	Temperature
TIA	Trypsin inhibitor activity
TIBA	2,3,5-Triiodobenzoic acid compound with N-methylmethanamine
TLC	Thin-layer chromatography
TMV	Tobacco mosaic virus
Tr.	Turkish
TSH	Thyroid-stimulating hormone
UDPG	Uridine diphosphate glucose
Uk.	Ukrainian
UMS	Unmodified cassava starch
Ur.	Urdu
UV	Ultraviolet
var.	Variety(ies), varietal
VEF	Bean Team Nursery, CIAT
VFA	Volatile fatty acids
vol.	Volume
VPD	Vapor pressure deficit
vpm	Volume per million
vs.	Versus
W	West, watt
wk.	Week
WP	Wettable powder
wt.	Weight
yr	Year(s)
/	Per

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[*Phaseolus vulgaris* L.]

Centro Internacional de Agricultura Tropical

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

Vol. XII **No. 3** **December, 1987**

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INTRODUCTION

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

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

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

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

COMPONENTS OF AN ABSTRACT

Accession number (for photocpy requests)

Authors

Year of publication

Sequential number in the journal (for use of indices)

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

Original title

Additional notes

Author address

Source

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Language of paper

Language of summary

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

Descriptors

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

Abstract

Abstractor and/or translator

HOW TO USE THE INDEXES

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

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

Author Index

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

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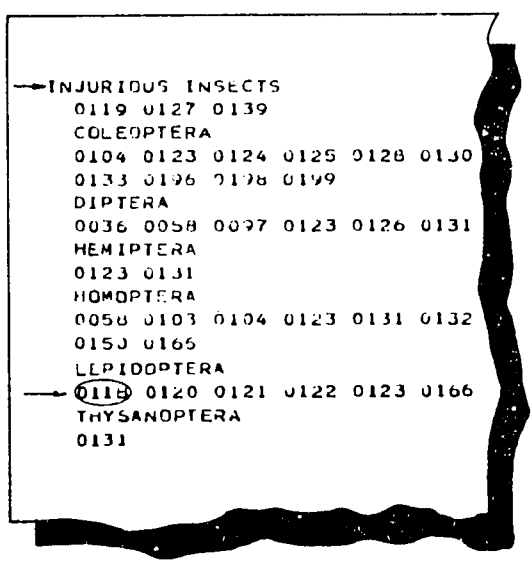
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0716

28295 ADAMS, M.W.; COYNE, D.P.; DAVIS, J.H.C.; GRAHAM, P.H.; FRANCIS, C.A. 1985. Common bean (Phaseolus vulgaris L.). In Summerfield, R.J.; Roberts, E.H., eds. Grain legume crops. London, Collins. pp.433-476. En., 127 Ref., Il.

Phaseolus vulgaris. Production. Cultivation systems. Identification. Nitrogen fixation. Productivity. Fertilizers. Research. Yields. Seed characters. Germplasm. Plant breeding.

The historical trends, the current status of worldwide bean production, and the main cropping systems that involve this legume are discussed. The main botanical characteristics are described, considerations on N fixation are given, and the principal constraints to the productivity of this crop are discussed. Information is included on research activities in beans, fertilizer requirements, yield, grain quality, and germplasm banks; the classes of genetical variability of CIAT bean germplasm are described. On the other hand, aspects related to genetics and bean breeding strategies are presented and perspectives to obtain higher and more stable yields are highlighted. Finally, several communication means that can be established between the bean researchers are listed. (CIAT)

0717

29638 GEPTS, P.; BLISS, F.A. 1985. F1 hybrid weakness in the common bean; differential geographic origin suggests two gene pools in cultivated bean germplasm. Journal of Heredity 76(6):447-450. En., Sum. En., 26 Ref. [Dept. of Horticulture, Univ. of Wisconsin, 1575 Linden Drive, Madison, WI 53706, USA]

Phaseolus vulgaris. Phaseollin. Analysis. Center of origin. Hybrids. Genes. Germplasm. America.

The geographic origin of bean cv. involved in F1 hybrid weakness was established using phaseolin type, as determined by 1-dimensional SDS/polyacrylamide gel electrophoresis. In all cases investigated, F1 weakness arose in crosses between an S phaseolin, small-seeded parent of Middle American origin and a T or a C phaseolin, large-seeded parent of Andean origin. The appearance of F1 hybrid weakness reflects the geographical isolation of common bean cv. of the 2 regions and points to the existence of 2 separate gene pools in cultivated common bean germplasm. (AS)

0718

22618 SUTTIE, J.M. 1969. The butter bean (Phaseolus coccineus L.) in Kenya. East African Agricultural and Forestry Journal 35(2):211-212. En., Sum. En., 6 Ref.

Phaseolus coccineus. Phaseolus lunatus. Cultivars. Agronomic characters. Kenya.

Botanical and agronomic characteristics of Phaseolus lunatus and P. coccineus are briefly described. P. coccineus var. Kenya Butter Bean is white seeded and is commercialy grown in the Kenyan districts of Nakuru and Nyandarua. (CIAT)

0719

28222 VILHORDO, B.W. 1985. Botanica do feijao (Phaseolus vulgaris L.). (Bean botany). Roesslèria 7(1):43-51. Pt., 28 Ref.

Phaseolus vulgaris. Center of origin. Taxonomy. Brazil.

A brief literature review is given on the origin of the Phaseolus genus, plant characteristics of the P. vulgaris species, Phaseolus species and P. vulgaris subspecies and botanic var. as well as the primitive forms of P. vulgaris as source of genetic material to obtain cv. (CIAT) See also 0987

B00 PLANT ANATOMY, MORPHOLOGY AND CYTOLOGY

0720

29677 ALLAVENA, A.; ROSSETTI, L. 1986. Micropropagation of bean (Phaseolus vulgaris L.); effect of genetic, epigenetic and environmental factors. Scientia Horticulturae 30(1-2):37-46. En., Sum. En., 9 Ref., Il. [Experimental Inst. for Vegetable Crops, Via Paullese, 28, 20075 Montanaso Lombardo, Milano, Italy]

Phaseolus vulgaris. Genotypes. Propagation. Tissue culture. Culture media. Methionine. Cysteine. Italy.

Micropropagation was achieved with 4 genotypes of bean on Murashige and Skoog's basal medium plus 5-40 micromolar BAP after 28 days of culture of apical and axillary explants. Elongation in vitro of excised buds was obtained with axillary explants, but not with apical explants of the genotypes Lodino and Bico de Ouro. The highest concn. of BAP strongly reduced the percentage of axillary explants which elongated. L-met. (0.1 mg/liter) and L-cysteine x HCl (0.1 mg/liter), added separately to the medium, decreased the percentage of explants which elongated. A protocol for micropropagation of the genotype Bico de Ouro, suitable for routine utilization, was established. (AS)

0721

29670 BIGOT, J.; BINET, P. 1985. Etude de la sélectivité pariétale Ca(2+)-Mg(2+) par une approche thermodynamique de l'échange sur parois racinaires isolées de Cochlearia anglica (L.) et de Phaseolus vulgaris (L.). (Thermodynamic study of Ca(2+)-Mg(2+) parietal selectivity by root cell walls isolated from Cochlearia anglica and Phaseolus vulgaris). Comptes Rendus de l'Académie des Sciences (Serie 3) 301(10):547-552. Fr., Sum. Fr., En., 14 Ref., Il.

Phaseolus vulgaris. Roots. Nutrient transport. Cell walls. Ca. Mg. Nutrient uptake. France.

Thermodynamic parameters of the Mg(2+)-Ca(2+) exchange in root cell walls of Cochlearia anglica and Phaseolus vulgaris were calculated. Cell walls absorbed Ca(2+) selectively rather than Mg(2+), especially in P. vulgaris. Graphics are presented on the isotherms of this exchange and the relationship between parietal Ca(2+) and the natural logarithm of the cell wall selectivity coefficient. (AS)

0722

29165 BOLWELL, G.P.; ROBBINS, M.P.; DIXON, R.A. 1985. Metabolic changes in elicitor-treated bean cells. Enzymic responses associated with rapid changes in cell wall components. European Journal of Biochemistry 148(3):571-578. En., Sum. En., 55 Ref., Il. [Dept. of Biochemistry, Royal Holloway & Bedford New College, Univ. of London, Egham Hill, Egham, England TW20 OEX]

Phaseolus vulgaris. Colletotrichum lindemuthianum. Biochemistry. Cell walls. Phenol content. Glucose. England.

Treatment of cell suspension cultures of bean cv. Immuna with an elicitor preparation heat-released from the cell walls of the phytopathogenic fungus Colletotrichum lindemuthianum resulted in rapid changes in the composition of the bean cell walls. These consisted of (a) increases in phenolic material bound to the cellulosic and hemicellulosic fractions of the wall, (b) loss of material (mainly glucose) from the hemicellulosic fraction, and (c) an increase in wall-associated hydroxyproline. (AS (extract))

0723

29126 CACHON, D.; GENEVES, L. 1985. Ultrastructure des cellules cotylédonaires, des grains protéiques et des cristaux dans les graines seches de Phaseolus vulgaris L. (Ultrastructure of cotyledonary cells, protein bodies, and crystals in dry bean seeds). Annales des Sciences Naturelles Botanique et Biologie Végétale 7(3):131-148. Fr., Sum. En., Fr., 59 Ref., Il. [Laboratoire de Cytologie Végétale Expérimentale, Univ. Pierre-et-Marie-Curie, 12, rue Cuvier, F 75230, Paris Cedex 05, France]

Phaseolus vulgaris. Cotyledons. Analysis. Proteins. France.

Studies of dry bean Coco blanc précoce cotyledons were made with transmission electron microscope to understand the structure of inclusions of phytic acid. Special techniques were used: (1) ultrathin unpoststained sections, obtained after a single glutaraldehyde fixation, and (2) prints obtained from small pieces of cotyledons that were applied on a copper grid covered with Formwar. Neither water nor fixative were used with this last technique. Several types of small crystalline granules were recognized in the prints, but only 1 type (globular granules, no more than 0.2 micron in diameter) could be observed in ultrathin sections within the protein bodies. They must be a part of the globoids. The structure of protein bodies and other organelles was studied after a glutaraldehyde-OsO_4 fixation. The sections were poststained in $KMnO_4$. The parenchyma cells showed large wall thickenings. Sheets of dense saccules were observed in association with the proplastids. The results obtained from the different techniques are compared with reference to the dry state of tissues. (AS)

0724

28821 CURSO INTENSIVO SOBRE A CULTURA DO FEIJAO EM SANTA CATARINA, 1o., CHAPECO-SC, BRASIL. 1986. Documentos presentados. (Proceedings). Chapecó-SC, Brasil, Empresa Catarinense de Pesquisa Agropecuaria. 147p. Pt., 112 Ref., Il.

Phaseolus vulgaris. Plant anatomy. Taxonomy. Developmental stages. Climatic requirements. Cultivars. Planting. Timing. Spacing. Injurious insects. Insect control. Intercropping. Zea mays. Nitrogen fixation. Soil amendments. Fertilizers. Diseases and pathogens. Disease control. Brazil.

The papers presented at the 1st intensive course on bean production in Santa Catarina, Brazil, are compiled. Aspects covered were taxonomy and plant morphology, plant development stages, climatology, bean cv., planting dates, distances, densities, and depth, insect pest identification and control, soil amendments and fertilization, bean/maize associations and related agronomic aspects, symbiotic N fixation, and bean diseases and their control. (CIAT)

0725

29147 DOUSSET, X.; RENAUDIN, S.; THALOUARN, P. 1986. Sur la présence de phytoferritine dans les chloroplastes des cellules de la paroi de la gousse de Phaseolus vulgaris L. var, Tuf 255. (Phytoferritin presence in the pod

cell wall chloroplasts of Phaseolus vulgaris var. Tuf 255). Beitraege zur Biologie der Pflanzen 61(1):41-48. Fr., Sum. Fr., En., 27 Ref., Il. [Laboratoire de Technologie-Microbiologie Appliquée E.N.I.T.I.A.A. Rue de la Géraudiere 44072-Nantes Cedex, France]

Phaseolus vulgaris. Cell walls. Chloroplasts. Proteins. Pods. Analysis. Plant age. Starch content. France.

Thirty days after flowering of Phaseolus vulgaris, in the cells of the internal parenchyma, the lamellar system of the chloroplasts remains expanded but the starch has often disappeared; however, some dense and heterogenous zones of 0.5-1.0 microns, without thylakoids, appear in the stroma. These zones consist of phytoferritin as shown with an X-ray microprobe analysis. This ferric protein presence could be explained by dehydration of the pod or by cellular metabolism changes due to senescence. (AS)

0726

29135 MIKKONEN, A.; BEGBIE, R.; GRANT, G.; PUSZTAI, A. 1986. Intracellular localisation of some peptidases and alfa-mannosidase in cotyledons of resting kidney bean, Phaseolus vulgaris. Physiologia Plantarum 68(1):75-80. En., Sum. En., 13 Ref., Il. [Dept. of Biology, Univ. of Jyvaskyla, SF-40100 Jyvaskyla, Finland]

Phaseolus vulgaris. Cotyledons. Enzymes. Analysis. Cell walls. Finland.

Cotyledons of resting kidney beans of cv. Processor contain high activities of 2 alkaline peptidases. The intracellular localization of these peptidases and that of alfa-mannosidase was studied by subcellular fractionations in different media. In density gradient centrifugations in non-aqueous glycerol-potassium iodine media the alkaline peptidases remained mainly in the application zone suggesting localization in the cytosol. The carboxypeptidase and alfa-mannosidase activities banded mainly in the protein body zone, but about 15-30 percent of each activity was found in the cell wall zone. Results obtained by short centrifugation in glycerol or high-density sucrose solutions (65/70 percent) and by the isolation of essentially pure cell wall fractions confirmed these assignments. The results are in accordance with previous suggestions that the abundant alkaline peptidases may play a role in the mobilization of reserve proteins in germinated seeds by hydrolyzing peptides which are produced initially within the protein bodies by acid proteinases and carboxypeptidases and which subsequently leak out or are transported from the autolyzing protein bodies to the cytosol. (AS)

0727

29133 NAG, S.; SHARMA, A. 1984. Induction of blastogenesis as a parameter in differentiating cultivated varieties of Phaseolus. Journal of the Indian Botanical Society 63(4):431-436. En., Sum. En., 17 Ref., Il. [Centre for Advanced Study in Cell & Chromosome Research, Dept. of Botany, Univ. of Calcutta, Calcutta, India]

Phaseolus vulgaris. Cultivars. Cytology. Lectins. Analysis. Identification. India.

The properties of agglutination and inducing blastogenesis of human lymphocytes by seed lectins were used to differentiate 6 Phaseolus vulgaris cv. The relative degree of blastogenesis was found to be an effective parameter in their identification, in addition to karyotype analysis. (AS)

0728

29171 RAUHUT, R.; GABIUS, H.J.; CRAMER, F. 1985. Evolutionary aspects of accuracy of phenylalanyl-tRNA synthetase. Accuracy of the cytoplasmic and chloroplastic enzymes of a higher plant (Phaseolus vulgaris). Biochemistry 24(15):4052-4057. En., Sum. En., 32 Ref. [Max-Planck-Inst. fur Experimentelle Medizin, Abteilung Chemie, D-3400 Gottingen, Federal Republic of Germany]

Phaseolus vulgaris. Enzymes. Chloroplasts. Cytogenetics. Leaves. Amino acids. RNA. Genes. Federal Republic of Germany.

The phenylalanyl-tRNA synthetases from cytoplasm and chloroplasts of bean leaves employ different strategies with respect to accuracy. The chloroplastic enzyme that is coded for by the nuclear genome follows the pathway of posttransfer proofreading, also characteristic for enzymes from eubacteria and cytoplasm and mitochondria of lower eukaryotic organisms. In contrast, the cytoplasmic enzyme uses pretransfer proofreading in the case of noncognate natural amino acids, characteristic for higher eukaryotic organisms and archaebacteria. Dependent on the nature of the noncognate amino acid, pretransfer proofreading in this case occurs without tRNA stimulation or with tRNA stimulated with no or little effect of the nonaccepting 3'-OH group of the terminal adenosine. The fundamental mechanistic difference in proofreading between the heterotopic intracellular isoenzymes of the plant cell supports the idea of the origin of the chloroplastic gene by gene transfer from a eubacterial endosymbiont to the nucleus. (AS (extract)) See also 0770 0772 0774 0795

C00 PLANT PHYSIOLOGY

0729

29122 ADAROS, G. 1984. Ventilation for supplying bean and tomato plants with CO2. Acta Horticulturae no.162:237-244. En., Sum. En., 9 Ref., Il. [Inst. of Crop Science, Dept. of Vegetable Production, Technical Univ. of Berlin D-1000 Berlin 33, Germany]

Phaseolus vulgaris. CO2. Illumination. Photosynthesis. Canopy. Production. German Democratic Republic.

To investigate effects of ventilation on plants, a special dewpoint-conditioned chamber for measuring the CO2 gas exchange of a plant stand (1.60 square meters) of beans and tomatoes under natural light conditions was developed. The plants were supplied with a constant air-mass flow rate. From the daily course of photosynthesis, the effect of reduced ventilation could be observed. The CO2 concn. decreased to below 150 ppm. Another effect was that the plants were light-saturated earlier than with more ventilation. A saturating curve, whose course varied with plant age, was formed when the photosynthetic rate was plotted as a function of ventilation. The results obtained were utilized for determining the ventilation requirement in greenhouses. To obtain a 95 percent production capacity in a bean canopy (LAI = 3) as compared with a canopy under natural CO2-conditions, a ventilation rate of 150 cubic meters/square meter/h would be needed. If vents remain closed at times of high photosynthetic activity, this plant stand would only produce 12 percent of the max. production capacity. (AS (extract))

0730

28030 AKOYUNOGLOU, A.; AKOYONOGLOU, G. 1984. Reorganization of thylakoid components in developing chloroplasts of Phaseolus vulgaris leaves after transfer to darkness: mechanism of the process. In Sybesma, C., ed.

Advances in photosynthesis research. The Hague, Netherlands, Martinus Nijhoff; W. Junk Publishers. v.4, pp.649-652. En., 6 Ref., Il. [Biology Dept., Nuclear Research Center Demokritos, Athens, Greece]

Phaseolus vulgaris. Leaves. Chloroplasts. Light. Chlorophyll. Photosynthesis. Metabolism.

Six-day etiolated bean leaves were used to study the reorganization of thylakoid components in developing chloroplasts of bean leaves after transfer to darkness. Results suggest that in leaves exposed to continuous light for 24 h, after a short preexposure to intermittent light (14 light-dark cycles), a reorganization occurs after transfer to darkness. On the contrary, in leaves exposed to continuous light for 24 h, after a prolonged preexposure to intermittent light (42 light-dark cycles), no reorganization occurs. It was concluded that the reorganization of thylakoid components, when greening leaves are transferred to darkness, takes place only in thylakoids with reduced amount of photosystem I and II units. (CIAT)

0731

28940 AWASTHI, M.D.; ANAND, L. 1985. Studies on persistence pattern and safety evaluation of synthetic pyrethroids on French bean. Indian Journal of Agricultural Chemistry 18(1):56-62. En., Sum. En., 10 Ref. [Pesticide Residue Laboratory, Indian Inst. of Horticultural Research, Bangalore 560 080, India]

Phaseolus vulgaris. Snap beans. Insecticides. Plant physiological processes. India.

The persistence pattern of a synthetic pyrethroid, fenvalerate, was compared with that of the commonly used insecticide endosulfan on French bean pods during the rainy season at the Indian Institute of Horticultural Research in Hessaraghatta. Endosulfan residues dissipated at a faster rate as compared with fenvalerate following their resp. half-life values of 2.50 and 2.75 days at recommended doses. Residue degradation, however, within the resp. tolerance limits, suggests waiting periods of 1 day for endosulfan vs. 7 days for fenvalerate. (AS)

0732

27771 BOLLINI, R.; ALLAVENA, A.; VITALE, A. 1985. Genomic analysis of phytohemagglutinin-deficient Phaseolus vulgaris cultivars. Bean Improvement Cooperative. Annual report 28:82. En. [Istituto Biosentesi Vegetali, Consiglio Nazionale delle Ricerche, Via Bassini 15, 20133 Milano, Italy]

Phaseolus vulgaris. Phytohemagglutinins. Cultivars. Genes. DNA. Mutation. Hybridizing. Italy.

A total of 160 bean cv. of the collection maintained at the Centro Ricerche Orticole in Minoprio, Italy, were screened for lack of phytohemagglutinin. Eight of them (Degli Ortolani, Heidi, S. Fiacre verde, 3067, 3628, 103221, 103249, and 107181) resulted deficient in phytohemagglutinin. Tests of allellism among these cv. were made. The presence of phytohemagglutinin genes on the DNA of these mutants was investigated using cDNA probes for the 2 phytohemagglutinin subunits. Positive hybridization was obtained for all cv., ruling out the possibility of major deletions of the phytohemagglutinin genes. (CIAT)

0733

28899 ELLENSON, J.L. 1985. Phytoluminographic detection of dynamic variations in leaf gaseous conductivity. Plant Physiology 78(4):904-908.

En., Sum. En., 14 Ref., Il. [Boyce Thompson Inst. for Plant Research at Cornell Univ., Ithaca, NY 14853, USA]

Phaseolus vulgaris. Leaves. SO2. Illumination. Plant assimilation. Stomata. Photosynthesis. Transpiration. USA.

Gas exchange and plant luminescence (delayed light emission) of a single red kidney bean leaf undergoing synchronous oscillations in gas exchange were recorded and analyzed. Introduction of 1.1 microliter/liter SO2 during these oscillations produced increases in plant luminescence that, when averaged over a portion of the leaf, oscillated in phase with the gas exchange oscillations. Examination of a video record of the plant luminescence, however, showed not only that luminescence intensities tended to be localized within discrete areas of the leaf, but that the time-dependence of luminescence intensities within these regions varied considerably from the period, amplitude, and often phase of the overall gas exchange oscillations. The video recording also showed that changes in luminescence intensities appeared to migrate across the leaf in wave-like patterns. These data are interpreted in terms of localized fluctuations in gaseous conductances of the leaf. (AS)

0734

29666 GARLAND, J.A.; COX, L.C. 1984. The uptake of elemental iodine vapour by bean leaves. Atmospheric Environment 18(1):199-204. En., Sum. En., 12 Ref., Il.

Phaseolus vulgaris. Snap beans. Air pollution. Leaves. Relative humidity. Temperature. Illumination. Transpiration Stomata. England.

Deposition of I vapor to Phaseolus vulgaris leaves was measured over a range of conditions of humidity, temp., and illumination. Transpiration measurements were used to deduce stomatal opening. The results showed that stomatal resistance controlled I absorption at RH below 40 percent, but that the rate of absorption of I increased by an order of magnitude when the RH was raised to 80 percent, presumably due to cuticular absorption. After exposure to I at high humidity, a substantial fraction of the I could be washed from the leaves. In Britain, cuticular uptake would probably dominate stomatal uptake of I on most occasions. (AS)

0735

29175 KAPUYA, J.A. 1985. Comparative water economy in three local agronomic varieties of Phaseolus vulgaris of Tanzania. Biología Africana 2(1):1-7. En., Sum. En., Fr., 23 Ref., Il. [Dept. of Botany, Univ. of Dar es Salaam, P.O. Box 35060, Dar es Salaam, Tanzania]

Phaseolus vulgaris. Cultivars. Water requirements. Resistance. Drought. Stomata. Transpiration. Water stress. Tanzania.

The water relations of 3 Phaseolus vulgaris var., Kigoma Njano Ndefu, Bukoba Goroli Kahawia y Ulyankulu Kitenge Nyeusi' were compared. Var. Bukoba Goroli Kahawia was the best adapted to drought stress, reflected by its high stomatal resistance, low transpiration rate, low water saturation deficit. and significant reduction in the no. of open stomata/unit of leaf area. These var. differences may have a biochemical basis as the accumulation of proline in var. Bukoba Goroli Kahawia was higher than in the other 2 var. (AS)

0736

28905 SCHMIDT, A.; KUNERT, K.J. 1986. Lipid peroxidation in higher plants. The role of glutathione reductase. Plant Physiology 82(3):700-702. En.,

Sum. En., 26 Ref., Il. [Lehrstuhl fur Physiologie und Biochemie der Pflanzen, Universitat Konstanz, D-7750 Konstanz, West Germany]

Phaseolus vulgaris. Leaves. Herbicides. Enzymes.

To study the role of glutathione reductase in lipid peroxidation, leaves of bean cv. Fori were treated with the herbicide acifluorfen-sodium. Acifluorfen is a potent inducer of lipid peroxidation. In beans, decreases of acid-soluble SH-compounds and lipid peroxidation, measured as ethane evolution, were the toxic events after treatment of leaves with acifluorfen. As a primary response to peroxidation, increased production of antioxidants, such as vitamin C and glutathione, was found. This was followed by elevation of glutathione reductase activity. Enhanced activity of the enzyme prevented both further decline of acid-soluble SH-compounds and lipid peroxidation. Increased production of antioxidants and elevated activity of antioxidative enzymes, like glutathione reductase, seem to be a general strategy to limit toxic peroxidation in plants. (AS)

0737

28892 SOLAROVA, J.; POSPISILOVA, J. 1986. Acclimation of primary bean leaves to different irradiances. Epidermal conductances and their sensitivity to water stress. Photosynthetica 20(1):35-42. En., Sum. En., 40 Ref., Il. [Inst. of Experimental Botany, Czechoslovak Academy of Sciences, Flemingovo n. 2, CS-160 00 Praha 6, Czechoslovakia]

Phaseolus vulgaris. Leaves. Irradiation. Growth. Water requirements. Transpiration. Stomata. Osmotic potential. Photosynthesis.

Adaxial and abaxial epidermal conductances to water vapor transfer (gd, gb) and their responses to decreasing leaf water potential were measured in primary leaves of Phaseolus vulgaris cv. Harzgruss during their ontogeny under irradiances of 300 (I3) or 100 (I1) micromol/square meter/s. Conductances were higher in leaves grown under saturating irradiance (1200 micromol/square meter/s) than those grown under I3 and I1 and gd was more affected than gb. The differences between leaves grown at I3 and I1 decreased with leaf age as the decline in both gd and gb was more rapid under I3. Acclimatization of leaves to different irradiances significantly affected the responses of epidermal conductance to decreasing leaf water potential. Under I1 and I3 the sensitivity of stomata to water stress increased during leaf ontogeny. A decrease in gd and gb was induced by lower negative values of leaf water potential in old than in young leaves. These ontogenetic changes were less marked in leaves acclimatized to I1 as they aged more slowly. (AS)

0738

28903 TAYLOR JUNIOR, G.E.; GUNDERSON, C.A. 1986. The response of foliar gas exchange to exogenously applied ethylene. Plant Physiology 82(3):653-657. En., Sum. En., 34 Ref., Il. [Environmental Sciences Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA]

Phaseolus vulgaris. Photosynthesis. Stomata. Ethylene reduction. Irradiation. CO_2. Relative humidity. USA.

The responsiveness to ethylene of net photosynthesis and stomatal conductance to water vapor in intact plants was investigated in 13 herbaceous species representing 7 plant families, among them Phaseolus vulgaris. Exposures were conducted in an open, whole-plant exposure system providing controlled levels of irradiance, air temp., CO_2, RH, and ethylene concn. Net photosynthesis and stomatal conductance to water vapor in units of moles/square meter/s were measured on recently expanded leaves in control and ethylene-treated plants using a remotely operated

single-leaf cuvette. The ethylene concn. was either 0 or 210 micromoles/cubic meter and was maintained for 4 h. Species varied substantially in the response of their foliar gas exchange to ethylene, P. vulgaris with -18.4 percent. This species also had one of the most marked and statistically significant responses of stomatal conductance (-38.6 percent). It is concluded that foliar gas exchange is responsive to exogenously applied ethylene in many plant species. The sensitivity of foliar gas exchange to ethylene may play a role in general plant response to environmental stress in which 1 of the physiological sites of action for endogenously produced stress ethylene in the leaf is the plant's photosynthetic capacity and/or stomatal conductance to water vapor. (AS (extract))

0739

28898 WONG, S.C.; COWAN, I.R.; FARQUHAR, G.D. 1985. Leaf conductance in relation to rate of CO2 assimilation. 3. Influences of water stress and photoinhibition. Plant Physiology 78(4):830-834. En., Sum. En., 16 Ref., Il. [Dept. of Environmental Biology, Research School of Biological Sciences, Australian National Univ., G.P.O. Box 475, Canberra City, ACT 2601, Australia]

Phaseolus vulgaris. Leaves. Irradiation. Plant assimilation. CO2. Australia.

Leaves of Phaseolus vulgaris and Eucalyptus pauciflora were exposed to high irradiance in an atm. of CO2-free N2 with 10 millibars O2; rates of assimilation and leaf conductances measured in standard conditions decreased in similar proportions, so that intercellular partial pressure of CO2 remained almost unchanged. As the conductance of each epidermis that had not been directly irradiated had declined as much as that in the opposite, irradiated surface it was hypothesized that conductance may have been influenced by photoinhibition within the mesophyll tissue. (AS (extract)) See also 0814 0933

C01 Plant Nutrition

0740

28807 ATMOWIDJOJO, S.; OZBUN, J.L.; LUDFORD, P.M. 1982. Effects of low potassium nutrition on the photosynthetic rate of mature and immature leaves of bean (Phaseolus vulgaris L.). Annales Bogoriensis 7(4):153-165. En., Sum. En., In., 20 Ref.

Phaseolus vulgaris. Plant nutrition. K. Photosynthesis. Nutrient solution. Cultivars. Na. Transpiration. Chlorophyll. Leaves. Leaf area. USA.

The response of 1st and 2nd trifoliolate leaves of bean to K stress in terms of photosynthetic rate and other related characteristics was compared using 2 var., P.I. 136691 and P.I. 177760, in the absence or presence of Na (2.0 millimolar) in the low K (0.3 millimolar) nutrient solution. The control plants were grown on a medium level (2.3 millimolar) of K nutrition. Upon reaching full expansion of the 1st trifoliolate leaves, the mean K contents of the 1st and 2nd trifoliolate leaves of the control plants ranged from 1.59 to 1.90 and dry wt. from 2.07 to 2.41 percent, resp. The transpiration rates were also higher in the 2nd trifoliolate leaves, but the reverse was true for the chlorophyll contents, photosynthetic rates, and leaf areas. Under low K nutrition, the mean K contents of the 1st and 2nd trifoliolate leaves ranged from 0.39 to 0.45 and 0.76 to 0.98 percent, resp. All other measurements were also lower than those of the control plants, except the area and chlorophyll content

of the 2nd trifoliolate leaves in P.I. 136691, which were similar under both conditions. The depressing effects of K stress on leaf area, chlorophyll content, photosynthetic rate, and transpiration rate were smaller in the 2nd than in the 1st trifoliolate leaves. Addition of Na to the low K nutrient solution increased slightly the photosynthetic and transpiration rate of the 1st trifoliolate leaf of P.I. 177760, but not in all other measurements. Leaf Na contents were relatively low (0.013 percent). (AS (extract))

0741

28806 ATMOWIDJOJO, S.; OZBUN, J.L.; LUDFORD, P.M. 1982. Effects of partial substitution of sodium or ammonium for potassium in the nutrient solution on the chlorophyll content and photosynthetic rate of bean (Phaseolus vulgaris L.). Annales Bogorienses 7(4):137-151. En., Sum. En., In., 30 Ref.

Phaseolus vulgaris. Cultivars. Mineral deficiencies. K. Na. Nutrient solution. Mineral content. Leaves. Chlorophyll. Photosynthesis. Transpiration. Leaf area. Dry matter. Plant nutrition. USA.

The response of 4 bean var. (P.I. 136691, P.I. 177760, P.I. 180761, and P.I. 203958) to K stress in terms of photosynthetic rate and other related characteristics was compared in the absence or presence of Na or ammonium (2.0 millimolar) in the low K (0.3 millimolar) nutrient solution. Control plants were grown with a medium level (2.3 millimolar) of K nutrition. The mean K contents of the 1st trifoliolate leaves of the control plants ranged from 0.95 to 1.31 percent dry wt., and these were about half of those observed under high K (5.0 millimolar) nutrition in a previous study. No visible deficiency symptoms were observed on the control plants, and all other measurements taken were similar to those obtained under high K nutrition. Leaf K contents under low K nutrition ranged from 0.28 to 0.36 percent with all other measurements lower than those of the control plants. The depressing effects of K stress on leaf chlorophyll content, photosynthetic rate, and transpiration rate were smaller in P.I. 177760 than in the other var., and that on leaf area were smaller in P.I. 203958; no significant differences were found among the 4 var. regarding DM production. Na addition increased leaf chlorophyll content in P.I. 180761 and the photosynthetic rate in P.I. 177760, while ammonium addition increased the transpiration rate in P.I. 180761 and P.I. 203958. No significant effect was observed in the other cases. Leaf Na contents were relatively low (0.008-0.025 percent dry wt.). (AS (extract))

0742

29174 ROSSI, C.; CROCOMO, O.J.; GUTIERREZ, L.E. 1984. Assimilacao do nitrogenio nítrico e amoniacal em raízes de feijoeiro (Phaseolus vulgaris, L. cv. Carioca). (Assimilation of N-nitrate and ammonia by roots of bean cv. Carioca). Arquivos de Biologia e Tecnologia 27(1):21-26. Pt., Sum. En., 25 Ref., Il. [Depto. de Bioquímica, Inst. Básico de Biologia Médica e Agricola da UNESP, Caixa Postal 502, 18.610 Botucatu-SP, Brasil]

Phaseolus vulgaris. Roots. Enzymes. Nutrient solution. N. Plant assimilation. Brazil.

Glutamate synthase activity was demonstrated in Phaseolus vulgaris roots. The enzyme activity of bean roots changed in response to 2 N sources supplied to the culture solution. The activity of glutamate synthase decreased about 0.3 times while the levels of ammoniacal N in the growth solution increased. (AS)

0743

29185 SAWHNEY, B.L.; HANKIN, L. 1984. Plant contamination by PCBs from amended soils. Journal of Food Protection 47(3):232-236. En., Sum. En., 20

Ref., Il. [Dept. of Soil & Water & Biochemistry & Genetics, The Connecticut Agricultural Experiment Station, Box 1106, New Haven, CT 06504, USA]

Phaseolus vulgaris. Plant assimilation. Insecticides. Translocation. Leaves. Pods. Stems. Seeds. Soil amendments. Mineral content. USA.

Plants accumulated polychlorinated biphenyls (Aroclors) from soil amended with lake sediment contaminated with Aroclors 1248, 1254, and 1260. Uptake into different parts of vegetable plants was investigated in the field by growing beets, turnips, and beans. In beans, leaves and pods contained higher concn. than the stems, while only low concn. were detected in the seeds. Bioaccumulation of Aroclors by plants was in the following order: Aroclor 1248 more than 1254 more than 1260. Relative to their concn. in the soil, the lower chlorinated polychlorinated biphenyls isomers, which are more soluble in water and more volatile, were more abundant in plants than the higher chlorinated isomers. (AS)

0744

28996 SIJMONS, P.C.; BIENFAIT, H.F. 1986. Development of Fe(3+) reduction activity and H(+) extrusion during growth of iron-deficient bean plants in a Rhizostat. Biochemie und Physiologie der Pflanzen 181(5):283-299. En., Sum. En., 31 Ref., Il. [Dept. of Plant Physiology, Univ. of Amsterdam, Kruislaan 318, 1098 SM Amsterdam, The Netherlands]

Phaseolus vulgaris. Nutrient uptake. Fe. Laboratory experiments. Rhizosphere. Netherlands.

The development of adaptive responses of Fe-deficient plants of bean cv. Prélude to increase Fe uptake by the roots was studied. This consisted in the acidification of the rhizosphere through active proton extrusion and the enhancement of Fe(3+) reduction activity at the root surface. A Rhizostat, a specially designed apparatus, allowed continuous monitoring of both the pH of the nutrient solution and the Fe(3+) reduction activity of the entire root system for several weeks, without interfering with the Fe status of the plant. During growth of Fe-deficient plants in the Rhizostat, a linear increase in Fe(3+) reduction activity and a more or less continuous proton extrusion were observed. These response became manifest 3 days before chlorosis appeared in the leaves. They could be maintained as long as root growth (with high metabolic activity) was maintained. With Fe-deficient plants, a linear correlation was found between proton excretion and the Fe(3+) reduction activity. During periods of rhizosphere acidification, a 20 percent increase in root respiration was recorded. Trace amounts of Zn and Mn were necessary for proton extrusion. Fe resupply resulted in 1 final burst of proton extrusion and an increase in reduction activity during the 1st 24 h after Fe addition, which then decreased slowly (3-4 days) to control levels. Citrate content in the roots also increased during the 1st day after Fe addition, followed by a slow decrease, thus showing a positive correlation with the Fe(3+) reduction activity. It is concluded that the high Fe(3+) reduction activity is caused by (1) an increased formation of citrate and (2) an increased catalytic capacity of membrane-bound electron transfer systems. (AS)

0745

28976 VOORMAN, R.; PENNER, D. 1986. Plant uptake of MBOCA (4,4'-methylene-bis (2-chloroaniline)). Archives of Environmental Contamination and Toxicology 15(5):589-593. En., Sum. En., 11 Ref., Il. [Pesticide Research Center, Dept. of Crop & Soil Sciences, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Nutrient uptake. Radiation. C. Translocation. USA.

((14)C)-MBOCA (4,4'-methylene-bis(2-chloroaniline)) was absorbed by cabbage, bean, and sugar beet leaves, but did not move beyond the absorption point. Radio autographs of bean, sorghum, Dactylis glomerata, and carrot plants exposed to ((14)C)-MBOCA via hydroponic culture showed considerable radioactivity associated with the roots with only limited translocation of ((14)C) into upper plant parts. Bean and cucumber plants grown in ((14)C)-MBOCA amended soil translocated virtually no ((14)C) into aerial parts, but again considerable radioactivity was found on roots. Radioactivity could not be rinsed off roots with water or acetone, and a small amount of radioactivity was observed in the xylem-phloem layer of the carrot root. (AS)

0746

29160 YANAGI, S.O.; MATSUKURA, U.; GALEAZZI, M.A.M.; KITO, M. 1984. Ultracentrifugal and electrophoretical studies on common bean (Phaseolus vulgaris) protein. Agricultural and Biological Chemistry 48(10):2457-2462. En., Sum. En., 14 Ref., Il. [National Food Research Inst., Ministry of Agriculture, Forestry & Fisheries, Kannondai, Yatabe-machi, Tsukuba-gun, Ibaraki 305, Japan]

Phaseolus vulgaris. Seeds. Proteins. Analysis. Biochemistry. Japan.

Phaseolus vulgaris seed protein was extracted with 85-95 percent efficiency, mildly without precipitation or low ionic treatment. No distinct 11-12S, 28S, nor 33S (which were reported before) was observed by ultracentrifuge analyses of 11 var. The main components, 7S and 18-19S in acidic solutions, were separated with Sepharose 6B chromatography into peak 2 (P2) and peak 1 (P1), resp. P1 seemed to correspond to G1 (one of P. vulgaris main proteins). Following DEAE-Sepharose chromatography eliminated a part of the minor components from P1. Sedimentation coefficients, dissociation-association behavior, and mol. wt. of P1 were studied. (AS) See also 0721 0813 0996

C02 Plant Development

0747

29177 ASARE-BOAMAH, N.K.; HOFSTRA, G.; FLETCHER, R.A.; DUMBROFF, E.B. 1986. Triadimefon protects bean plants from water stress through its effects on abscisic acid. Plant and Cell Physiology 27(3):383-390. En., Sum. En., 25 Ref., Il. [Dept. of Environmental Biology, Univ. of Guelph, Ontario N1G 2W1, Canada]

Phaseolus vulgaris. Fungicides. Plant growth substances. Drought. Water stress. Chlorophyll. Leaf area. Shoots. Roots. Transpiration. Stomata. Osmotic potential. Canada.

In beans triadimefon significantly reduced shoot wt., shoot length, and leaf area, and roots appeared whiter and thicker in the treated plants. Chlorophyll and carotenoid levels were increased in the leaves, but triadimefon did not affect protein levels in either leaves or roots. Triadimefon reduced transpiration and protected the plants from drought. It increased leaf diffusive resistance indicating partial closure of the stomates, and treated plants maintained their water potentials while those of the controls declined. Osmotic potentials of both treated and control leaves fell, but values in the controls were significantly lower than those from the treated plants. Three days after treatment with triadimefon in both water-stressed and non-stressed plants the ABA levels in the leaves of the treated plants were more than twice the levels of the controls. It

appears therefore that the protection conveyed by triadimefon during water stress is mediated at least partially, via its effects on ABA levels in treated tissue. (AS)

0748

29138 BARTHE, P.; BOULON, B.; GENDRAUD, M.; LE PAGE-DEGIVRY, M.T. 1986. Intracellular pH and catabolism: two factors determining the level of abscisic acid in embryos of Phaseolus vulgaris during maturation. Physiologie Végétale 24(4):453-461. En., Sum. En., Fr., 28 Ref., Il. [Laboratoire de Physiologie Végétale, Faculté des Sciences et des Techniques, 28 avenue Valrose, 06034 Nice Cedex, France]

Phaseolus vulgaris. Embryo. Developmental stages. Plant growth substances. Cotyledons. Metabolism. Laboratory experiments. France.

Embryos of Phaseolus vulgaris, isolated at different times after anthesis, were cultivated in vitro on a medium containing (2-(14)C) ABA. The uptake and the accumulation of the nonmetabolized ABA varied with the age of the embryos; these processes increased to a max. during the 1st stages of development, then decreased when maturation took place. The results obtained with this model suggest that ABA levels during embryo maturation are regulated both by the intracellular pH of the cotyledons and by the oxidative metabolism of ABA. (AS)

0749

29108 BRIDGLALL, S.S.; VAN STADEN, J. 1985. Effect of auxin on rooting and endogenous cytokinin levels in leaf cuttings of Phaseolus vulgaris L. Journal of Plant Physiology 117(4):287-292. En., Sum. En., 30 Ref., Il. [Plant Development Research Unit, Dept. of Botany, Univ. of Natal, Pietermaritzburg 3200, South Africa]

Phaseolus vulgaris. Auxins. Rooting. Cytokinins. Petioles. South Africa.

Treatment of the petioles of leaf explants of Phaseolus vulgaris with IBA stimulated root initiation and root development on the petioles. Best results were obtained with a concn. of 20 mg/liter of the auxin. Immediately after the auxin treatment the levels of endogenous cytokinins in the treated explants were higher than in the untreated material. Most of this detected cytokinin was found in the leaf lamina. Auxin treatment apparently resulted not only in increased levels of nonpolar cytokinins in the explants but apparently also brought about a redistribution of these hormones. This resulted in low levels of these hormones in the treated petioles, a condition which is well documented to be favorable for the rooting process. (AS)

0750

28895 CARMI, A. 1986. Effects of cytokinins and root pruning on photosynthesis and growth. Photosynthetica 20(1):1-8. En., Sum. En., 17 Ref., Il. [Inst. of Soils & Water, The Volcani Center, P.O. Box 6, Bet Dagan, Israel]

Phaseolus vulgaris. Cytokinins. Photosynthesis. Stomata. Pruning. Growth. Roots. Dry matter. Leaf area.

A considerable decrease in net photosynthetic rate (Pn), NAR, and ribulose bisphosphate carboxylase activity, and an increase in leaf stomatal resistance, were caused by root pruning of Phaseolus vulgaris plants. Excision of approx. half of the root system strongly reduced the quantitative ratio of root:leaf (m:m) and the Pn increase induced by decapitation and partial defoliation. Accelerated restoration of the root:leaf ratio was accompanied by recovery of Pn. The quantitative

root:shoot ratio of intact plants was changed by both root excision and exogenous supply of the cytokinin benzyladenine to the primary leaves. Whereas in root-pruned plants the reduction in root:shoot ratio was accompanied by a decrease in Pn, in intact unpruned plants such a reduction did not prevent considerable enhancement of Pn in response to the benzyladenine application. The change in root:shoot ratio in benzyladenine-treated plants resulted from the suppression of root growth and preferential allocation of assimilates to the primary leaves. (AS)

0751

29132 CREPY, L.; BARROS, L.M.G.; VALENTE, V.R.N. 1986. Callus production from leaf protoplasts of various cultivars of bean (Phaseolus vulgaris L). Plant Cell Reports 5(2):124-126. En., Sum. En., 22 Ref., Il. [CENARGEN, EMBRAPA, Caixa Postal 10.2372, 70.770 Brasilia-DF, Brasil]

Phaseolus vulgaris. Tissue culture. Leaves. Laboratory experiments. Brazil.

High yields of viable protoplasts were obtained by enzymatic treatment from cotyledonary leaves of various greenhouse-grown Phaseolus vulgaris cv. The protoplasts divided and formed cell clusters in a liquid medium. Early transfer before 10 days in the same medium was necessary for the development of cell colonies. When transferred to solid medium, the colonies gave rise to proliferating green calli. Deep green patches developed on these calli but failed to form shoots. (AS)

0752

29137 EL-WAHAISHI, F.A.S.; SEVERSON JUNIOR, J.G. 1985. Stimulation and inhibition of bean plant vegetative growth by unsubstituted and substituted cyclohexylcarboxylic acids. Phyton (Argentina) 45(2):103-113. En., Sum. En., 14 Ref.

Phaseolus vulgaris. Growth. Soil fertility. Plant growth substances. USA.

An aqueous solution with 5 different ring substituted cyclohexyl (CH) monocarboxylic acids was applied to the foliage of 14-day-old plants of bush bean cv. Top Crop. Fresh and dry wt. of leaf blades, stems plus petioles, and total shoot of plants grown in either fertile or nutrient-deficient soil were determined following treatment. Cyclohexanecarboxylic acid (CHCA), and especially cyclohexylphenylacetic acid (CHOAc), with unsubstituted CH rings significantly ($P = 0.05$) increased vegetative growth, and reduced soil fertility seemed to enhance the biological activity of these 2 acids. Conversely, the 3 methylated CH compounds were responsible for significant ($P = 0.05$) growth reductions when plants were grown on nutrient-deficient soil exhibited significant increases in fresh wt. of leaf blades and total shoot. tert-Butylcyclohexanecarboxylic acid (BuCHCA) treatment had no significant effect on growth. Significant increases in vegetative growth of CHCA- and CHOAc-treated plants supports the observation that biological activity of low mol. wt. CH monocarboxylic acids is related to the presence of a H-saturated CH ring system reported by other investigators. Substitution of the CH ring with methyl, phenyl, or t-butyl groups compromised the growth stimulatory potential of these CH acids. While a reduced level of soil fertility seemed to enhance the biological activity of CHOAc and CHCA, the opposite seemed to be true for the 3 methylated CH compounds. (AS)

0753

28959 EVANS, L.S.; TRAMONTANO, W.A. 1984. Trigonelline and promotion of cell arrest in G2 of various legumes. Phytochemistry 23(9):1837-1840. En., Sum. En., 20 Ref. [Laboratory of Plant Morphogenesis, Manhattan College, The Bronx, NY 10471, USA]

Phaseolus vulgaris. Plant growth substances. Growth. Morphogenesis. Seedling. Roots. Cell division. Shoots. USA.

Trigonelline, present in dry seeds of Pisum sativum, is transported to enlarging roots and shoots during early seedling ontogeny and promotes cell arrest in G2 in 40 percent of all root cells. In the absence of trigonelline, this cell population arrests in G1. Results presented show that trigonelline also promotes cell arrest in G2 in roots of Glycine max and Phaseolus vulgaris. (AS (extract))

0754

28283 KERMODE, A.R.; BEWLEY, J.D.; DASGUPTA, J.; MISRA, S. 1986. The transition from seed development to germination: a key role for desiccation?. HortScience 21(5):1113-1118. En., Sum. En., 38 Refs., Il. [Dept. of Botany, Univ. of Guelph, Guelph, Ontario, N1G 2W1, Canada]

Phaseolus vulgaris. Germination. Seeds. Drying. Plant growth substances. Canada.

Work on Phaseolus vulgaris and Ricinus communis, as well as some other studies, indicate that premature drying not only redirects metabolism from a developmental to a germination program, but does so permanently, thus effecting an irreversible switch. This switch cannot be brought about at all stages of development, however, for the seed must 1st develop a competence to withstand the drying treatment. This competence is thought to be achieved simultaneously by the genome. It is possible that ABA synthesized within the embryo itself or in the surrounding maternal tissue is important (with high or increasing amounts of ABA inhibiting germination) by permitting developmental or maturation events to proceed. Drying may affect the hormonal balance of the seed. Rather than having an effect upon the hormone level itself, drying could decrease the sensitivity of the seed to ABA, resulting in a loss of competence to respond to this hormone (perhaps because of a change in receptor levels or conformation). (AS (extract))

0755

28885 LEONARD, M.F. 1985. Embryo culture of Phaseolus vulgaris L. and Phaseolus vulgaris L. x Phaseolus lunatus L. interspecific hybrids. M.Sc. Thesis. Ames, Iowa State University. 42p. En., Sum. En., 52 Ref., Il.

Phaseolus vulgaris. Cultivars. Embryo. Cytokinins. Gibberellins. Growth. Phaseolus lunatus. Hybridizing. Hybrids. Crossbreeding. USA.

The effects of 5 concn. of kinetin (0, 0.01, 0.10, 1.00, and 5.00 mg/liter) and 4 concn. of GA (0, 0.01, 0.10, and 1.00 mg/liter) on in vitro growth of immature embryos from 5 Phaseolus vulgaris cv. (Great Northern, 76 Spartan Arrow, Royal Burgundy, Rustproof Golden, and Moon Gold) were studied. Embryos from each cv. were excised 10 days after self-pollination, measured, and placed on a growth regulator treatment. After 4 wk. of culture the embryo lengths were again measured and the growth change in culture was calculated. The kinetin effect on embryo growth in culture was significant at the 5 percent level for all cv. tested, except Great Northern and Royal Burgundy. Regression analysis indicated that kinetin had a beneficial effect on 76 Spartan Arrow embryos, with the concn. for optimum growth estimated to be 0.064 mg/liter. Kinetin had an inhibitory effect on Moon Gold and Rustproof Golden embryos at all concn. There was no significant effect of GA on embryo growth in culture for any cv. tested. Certain P. vulgaris x P. lunatus crosses were performed to determine the effect of parental heterozygosity and genotype on development and growth of the interspecific hybrid embryos. Inbred P. vulgaris parents were Great Northern and 76 Spartan Arrow. P. vulgaris parents of higher

heterozygosity were obtained by collecting hybrid seed from Great Northern x 76 Spartan Arrow crosses. Reciprocal hybrids and both inbreds were used as a different parental genotype to give 4 P. vulgaris maternal genotypes and these were crossed in a partial diallel with paternal P. lunatus genotypes P.I. 358288, P.I. 360715, P.I. 214170, and Speckled. The maternal effect on embryo size 15 days after cross pollination was significant at the 5 percent level while the paternal effect was not. Partitioning the maternal genotype sums of squares resulted in significance between inbred maternal parents but not between hybrid maternal parents or between inbred vs. hybrid maternal parents. Initial embryo size was closely correlated with subsequent growth in culture suggesting that genotypes that produce a larger excisable embryo have a better chance of producing a usable interspecific plant. (AS)

0756

29168 MISRA, S.; BEWLEY, J.D. 1986. Desiccation of Phaseolus vulgaris seeds during and following germination, and its effect upon the translatable mRNA population of the seed axes. Journal of Experimental Botany 37(176):364-374. En., Sum. En., 28 Ref., Il. [Dept. of Botany, Univ. of Guelph, Guelph, Ontario, Canada N1G 2W1]

Phaseolus vulgaris. Germination. Water absorption. RNA. Proteins. Seeds. Canada.

After imbibition and germination, seeds of Phaseolus vulgaris pass from a stage where they are insensitive to desiccation to a stage where they are sensitive. Desiccation of seeds during the sensitive stage results in an almost total impairment of protein synthesis upon subsequent rehydration. Seeds desiccated during the desiccation-tolerant stage, however, resume protein synthesis at almost control levels. The protein patterns obtained following in vitro translation of bulk RNA from fresh imbibed, desiccated, and desiccated-rehydrated seed axes were qualitatively similar at 5 h after imbibition (the desiccation-tolerant stage). The drying treatment resulted in increased intensity of extant proteins at 5 and 12 h after imbibition. At 12 h after imbibition (the transition stage between the desiccation-tolerant and desiccation-intolerant phases) desiccation and subsequent rehydration triggered synthesis of a unique set of proteins -- the rehydration proteins. At 20 h after imbibition (the desiccation-intolerant stage) desiccation resulted in an overall decline in the intensity of proteins synthesized in vitro. Also, the rehydration proteins were not synthesized in response to a drying and rehydration treatment at this time. (AS)

0757

29191 STOPINSKA, J. 1986. Studies on the interaction of growth regulators with potassium ions in some physiological processes in the bean (Phaseolus vulgaris L.) 1. The effect of growth regulators on the growth of leaves and on the potassium level in leaves and roots. Acta Societatis Botanicorum Poloniae 55(2):199-207. En., Sum. En., Pl., 28 Ref., Il. [Dept. of Plant Physiology, Inst. of Biology, Copernicus Univ., Gagarina 9, 87-100 Torun, Poland]

Phaseolus vulgaris. Plant growth substances. K. Nutrient uptake. Nutrient transport. Leaves. Roots. Growth. Mineral content. Nutrient solution. Laboratory experiments. Poland.

Bean plants were cultured on Hoagland's water solution for 1 or 8 days. Growth regulators kinetin (10(-7) molar), GA3 (10(-6) molar), IAA (10(-6) molar), or ABA (5 x 10(-5) molar) were introduced into solutions for 24 h. The regulators were found to have a different effect on the K level in leaves and roots depending on whether it was assessed 1 or 8 days after

treatment. The mechanism by which growth regulators affect the processes of ion uptake and transport and their relation to growth are discussed. (AS) See also 0724 0758 0767 0781 0799 0801 0817 0951

C03 Chemical Composition, Methodology and Analyses

0758

29105 ANDERSON, J.M. 1985. Simultaneous determination of abscisic acid and jasmonic acid in plant extracts using high-performance liquid chromatography. Journal of Chromatography 330(2):347-355. En., Sum. En., 22 Ref., Il. [United States Dept. of Agriculture, Depts. of Crop Science & Botany, 3127 Ligon Street, North Carolina State Univ., Raleigh, NC 27607, USA]

Phaseolus vulgaris. Snap beans. Analysis. Laboratory experiments. Plant growth substances. USA.

A high-performance liquid chromatographic assay for the simultaneous determination of ABA and jasmonic acid from extracts of soybean, snap beans, lima beans, and broccoli is described. The presence of ABA and jasmonic acid in tissue extracts was also supported by chromatographic identification of corresponding methyl and ethyl esters following esterification. (AS (extract))

0759

29102 APPAIAH, K.M.; NAG, U.C.; PURANAIK, J.; NAGARAJA, K.V.; KAPUR, O.P. 1984. A new thin-layer chromatographic method of detection of carbaryl, carbofuran and baygon from vegetables. Indian Food Packer 38(4):28-31. En., Sum. En., 16 Ref., Il. [Analytical Quality Control Laboratory, Central Food Technological Research Inst., Mysore-570 013, India]

Phaseolus vulgaris. Analysis. Laboratory experiments. Insecticides. Translocation. India.

A new TLC method for the detection of carbaryl, carbofuran, and baygon from vegetables (beans, cabbage, and okra) was developed using 4:4-diaminodiphenyl sulphone as a chromogenic reagent and benzene-acetone as developing solvent. The Rf values in this system were 0.25, 0.23, and 0.20 for carbaryl, carbofuran, and baygon, resp. The method is sensitive up to 0.05 micrograms of carbaryl, carbofuran, and baygon and enables as low as 0.02 ppm of these insecticide residues to be detected in vegetables. (AS)

0760

29157 ARTZ, W.E.; SWANSON, B.G.; SENDZICKI, B.J.; RASYID, A.; BIRCH, R.E.W. 1986. Protein-procyanidin interaction and nutritional quality of dry beans. American Chemical Society Symposium Series 312:126-137. En., Sum. En., 38 Ref., Il. [Food Science, Univ. of Illinois, Urbana, IL 61801, USA]

Phaseolus vulgaris. Proteins. Nutritive value. Laboratory experiments. Digestibility. Fermentation. USA.

Research data that delineates the relationship of dry bean proteins to dry bean procyanidins is presented; the constraint protein-procyanidin interaction places on nutritional quality of beans is also discussed. Procyanidin intubation was found to restrict rat growth and damage intestinal villi. Procyanidins intubated with food or as dry beans were not as inhibitory as procyanidins intubated alone. Digestibility and PER of tempeh (an Indonesian food prepared from soybeans) prepared with red beans and maize were less than the digestibility and PER of soybean tempeh.

Tempeh, fermented by Rhizopus oligosporus, did not improve digestibility or nutritional quality of dry black beans. (CIAT)

0761

28933 ASQUITH, T.N.; BUTLER, L.G. 1986. Interactions of condensed tannins with selected proteins. Phytochemistry 25(7):1591-1593. En., Sum. En., 22 Ref. [Procter & Gamble Beverage Division, Winton Hill Technical Center, 6250 Center Hill Road, Cincinnati, OH 45224, USA]

Phaseolus vulgaris. Tannin content. Proteins. Trypsin. Analysis. USA.

The relative affinities of condensed tannins purified from sorghum, pinto bean, Shinopsis lorentzii, and Acacia mearnsii for 6 dissimilar proteins were determined by a competitive binding assay. Pinto bean tannins were found to be procyanidins and have shorter chain lengths and precipitate less bovine serum albumin than sorghum tannin. Pinto bean had higher affinity than the others for soybean trypsin inhibitor. The results indicate that tannin/protein interactions may be specific for different tannins as well as for different proteins. The highly specific interactions suggest that the differences in affinity are functionally significant. (AS)

0762

28999 BECK, J.L.; McCONACHIE, L.A.; SUMMORS, A.C.; ARNOLD, W.N.; DE JERSEY, J.; ZERNER, B. 1985. Properties of a purple phosphatase from red kidney bean: a zinc-iron metalloenzyme. Biochimica et Biophysica Acta 869(1):61-68. En., Sum. En., 35 Ref., Il. [Dept. of Biochemistry, Univ. of Queensland, St. Lucia, Qld. 4067, Australia]

Phaseolus vulgaris. Enzymes. Analysis. Amino acids. Fe. Zn. Mn. Biochemistry. ATP. Australia.

A purple phosphatase from red kidney bean was purified to homogeneity and characterized. It resembled sweet potato purple acid phosphatase in being a dimer of approx. 130 kDa and in its amino acid composition and visible absorption spectrum. The red kidney bean enzyme contained 1 atom of Fe and 1 atom of Zn/subunit, whereas the sweet potato enzyme is reported to contain Mn. The visible absorption spectrum shows a lambda max. at 560 nm with epsilon 560 (per Fe) = 3360/M/cm, and is destroyed by dithionite treatment. Red kidney bean phosphatase showed a marked preference for ATP as substrate over p-nitrophenyl phosphate and adenosine diphosphate. Stable esters such as adenosine 5'-monophosphate and beta-glycerophosphate are very poor substrates. The enzyme was compared with other purple phosphatases from plant and animal sources. (AS)

0763

27257 BIALEK, K.; COHEN, J.D. 1986. Isolation and partial characterization of the major amide-linked conjugate of indole-3-acetic acid from Phaseolus vulgaris L. Plant Physiology 80(1):99-104. En., Sum. En., 28 Ref., Il. [United States Dept. of Agriculture, Plant Hormone Laboratory, Beltsville Agricultural Research Center-West, Beltsville, MD 20705, USA]

Phaseolus vulgaris. Seeds. Indoleacetic acid. Analysis. Isolation. USA.

A major IAA conjugate from Phaseolus vulgaris seed has been isolated and partially characterized. It is a 3 kilodalton peptide with apparently 2 indole-3-acetyl moieties in amide linkage/peptide. The IAA component was identified by gas chromatography-mass spectrometry and the peptide characterized by polyacrylamide gel electrophoresis, by amino acid analysis using dabsyl derivatives, and by its Fourier transform-infrared spectrum.

This is the 1st higher mol. wt. amide-linked IAA conjugate to be characterized from higher plants. (AS)

0764

29689 BLANCO, A.; NAVARRETE, D.A.; BRESSANI, R.; BRAHAM, J.E.; GOMEZ-BRENES, R.; ELIAS, L.G. 1986. Composición química y evaluación de la calidad de la proteína del frijol en humanos adultos por el método de balance nitrogenado de corto tiempo. (Evaluation of the chemical composition and quality of bean protein in human adult by the short-term nitrogen balance method). Archivos Latinoamericanos de Nutrición 36(1):79-97. Es., Sum. Es., En., 25 Ref., Il. [Inst. de Nutrición de Centro América y Panamá, Guatemala, Guatemala]

Phaseolus vulgaris. Cultivars. Proteins. Analysis. Water content. Mineral content. N. Inhibitors. Tannin content. Phytohemagglutinins. Fiber content. Antinutritional factors. Diets. Nutritive value. Guatemala.

Three common bean var. were chemically analyzed and their protein quality was evaluated in 12 human male adult subjects by the short-term N balance method. Chemical analyses were performed for both raw and cooked grains. Cooking reduced the trypsin inhibitors by 28-73 percent, hemagglutinins 100 percent, tannins as acid tannic equivalents 9-72 percent and as catechin equivalents 55-75 percent, and alkali-soluble N 65 percent. Red and black beans contained more residual trypsin inhibitors and tannins than white beans, while the latter contained more alkali-soluble N. Although cooked colored beans had more antinutritional factors that affect protein digestibility, their protein quality was similar to that of white beans. This could be explained by the fact that the amino acid composition and/or balance of absorbed N in red and black beans is better than that of white beans, so that the final nutritional value will be determined by the sum of interactions between all factors. Each of the 3 var. studied presented at least 1 protein quality depressor in higher concn. than the other 2 var. Therefore, the overall differences found between treatments (bean var.) and residual effect (days to adaptation) were small or nonexistent, while significant differences (P greater than 0.05) were found between subjects and N balance periods. A level of 0.65 g bean protein/kg/day was not enough to maintain N balance in subjects fed a diet with beans as the only protein source. According to calculations, 0.9-1.0 g bean protein/kg/day are necessary for N balance in male adults, and 1.2-1.3 g bean protein are recommended. (AS)

0765

28981 BOLWELL, G.P.; SAP, J.; CRAMER, C.L.; LAMB, C.J.; SCHUCH, W.; DIXON, R.A. 1986. L-phenylalanine ammonia-lyase from Phaseolus vulgaris: partial degradation of enzyme subunits in vitro and in vivo. Biochimica et Biophysica Acta 881(2):210-221. En., Sum. En., 25 Ref., Il. [Dept. of Biochemistry, Royal Holloway College, Univ. of London, Egham Hill, Egham Surrey, TW20 0EX, England]

Phaseolus vulgaris. Snap beans. Enzymes. Colletotrichum lindemuthianum. Analysis. Laboratory experiments. England.

L-Phenylalanine ammonia-lyase was purified from suspension cultured cells of French bean which had been exposed to polysaccharide elicitor preparations from the cell walls of the phytopathogenic fungus Colletotrichum lindemuthianum. After preliminary purification by ammonium sulphate fractionation and gel filtration, the enzyme was further purified by (a) ion-exchange chromatography followed by chromatofocussing, (b) chromatography on rabbit anti-(phenylalanine ammonia-lyase) Immunoglobuline G, or (c) affinity chromatography on L-aminooxy(p-hydroxypheryl)propionic acid (or L-tyrosine) linked to epoxyactivated Sepharose 6B via the phenolic

hydroxyl group. The purified enzyme preparations exhibited subunit Mr values of 77 000, 70 000, and 53 000, the relative proportions of these depending upon the enzyme source, length of time taken for purification, and inclusion of freeze-thaw steps. Four forms of the enzyme, differing in pI value, were resolved by chromatofocussing, although all forms from the same preparation consisted of similar proportions of the different subunit Mr forms. Peptide mapping and freeze-thaw studies indicate that the Mr 77 000 native phenylalanine ammonia-lyase subunit is inherently unstable in vitro and breaks down to yield the lower Mr partial degradation products. Such products could also be observed following in vitro translation of phenylalanine ammonia-lyase mRNA. Pulse-chase expt. indicated that the 77 000 to 70 000 to 53 000 subunit interconversion also occurs in vivo. (AS)

0766

29673 BOUFASSA, C.; LAFONT, J.; ROUANET, J.M.; BESANCON, P. 1986. Thermal inactivation of lectins (PHA) isolated from Phaseolus vulgaris. Food Chemistry 20(4):295-304. En., Sum. En., 22 Ref., Il. [Laboratoire de Physiologie de la Nutrition, Université des Sciences et Techniques du Languedoc, 34060 Montpellier Cedex, France]

Phaseolus vulgaris. Seeds. Phytohemagglutinins. Heat treatment. Analysis.

The influence of the thermal process on the loss of ability to bind a carbohydrate target was studied on lectins (phytohemagglutinin) purified from Phaseolus vulgaris seeds. Thermal inactivation of aqueous solutions of pure phytohemagglutinin occurred according to a biphasic 1st-order mechanism. The 1st-order rate constants appeared to be dependent on pH (minimal around 7) and divalent cations. All different subunits constituting the whole phytohemagglutinin were inactivated at the same rate. The biphasic nature of this process is independent of the presence of 10 millimolar CA(++) or Mg(++) and appeared to indicate a discrete aggregation of phytohemagglutinin molecules. (AS (extract))

0767

29694 BOYER, R.F.; VANDERPLOEG, J.R. 1986. Iron metabolism in higher plants. The influence of nutrient iron on bean leaf lipoxygenase. Journal of Plant Nutrition 9(12):1585-1600. En., Sum. En., 30 Ref., Il. [Dept. of Chemistry, Hope College, Holland, MI 49423, USA]

Phaseolus vulgaris. Metabolism. Fe. Analysis. Enzymes. Plant nutrition. Chlorophyll. USA.

Bean plants were cultured in nutrient solutions containing 3 concn. of Fe (0.1, 1.0, and 2.5 mg). The leaves of plants grown with a limiting supply of Fe contained reduced levels of protein, chlorophyll, and the Fe-containing enzyme, lipoxygenase. Measurements of lipoxygenase made on leaf crude extracts did not correlate with Fe supply; however, upon purification of the enzyme by affinity chromatography, a direct correlation was observed. The lack of correlation was partly due to the presence of chlorophyll, an inhibitor of lipoxygenase, in the crude extract. Lipoxygenase levels changed with plant age, but rose to a max. at days 14-16. A comparison of leaf lipoxygenases grown with different Fe supply showed that they were identical with the same pH profile, chlorophyll inhibition, reaction products, and electrophoretic mobility. It is suggested that lipoxygenase may be used as a probe to evaluate Fe availability and to investigate Fe metabolism in higher plants. (AS)

0768

28920 BRADBEAR, N.; BOULTER, D. 1984. The use of enzymic hydrolisis in vitro to study the digestibility of some Phaseolus seed proteins. Qualitas Plantarum Plant Foods for Human Nutrition 34(1):3-13. En., Sum. En., 27

Ref., Il. [Univ. of Durham, Dept. of Botany, Science Laboratories, South Road, Durham DH1 3LE, England]

Phaseolus vulgaris. Phaseollin. Proteins. Digestibility. Laboratory experiments. Seeds. England.

In vitro proteolysis was used to study the digestibility of the major seed protein, phaseolin, and the trypsin inhibitor, purified from Phaseolus vulgaris seeds. Whereas denatured phaseolin was fully digested by the in vitro enzymic method used, its native form was only partially digested. Trypsin inhibitor, both native and after heat treatment, was poorly digested. It was also found that native trypsin had some resistance to digestion conferred upon it by the presence of the inhibitor. (AS)

0769

28966 CHAMP, M.; BRILLOUET, J.M.; ROUAU, X. 1986. Nonstarchy polysaccharides of Phaseolus vulgaris, Lens esculenta, and Cicer arietinum seeds. Journal of Agricultural and Food Chemistry 34(2):326-329. En., Sum. En., 19 Ref., Il. [Laboratoire de Technologie des Aliments des Animaux, 44072 Nantes Cedex, France]

Phaseolus vulgaris. Seeds. Sugar content. Cotyledons. Seed coat. France.

Nonstarchy polysaccharides of 3 legume seeds (kidney bean, lentil, chickpea) have been isolated and analyzed. Trichloroacetic acid-soluble materials represent, resp., 7.1, 0.8, and 2.1 percent of kidney bean, lentil, and chickpea whole dry seeds. Arabinose is the major sugar of the 3 extracts. Their arabinose:galactose ratios are, resp., 1:0.35, 1:0.77, and 1:0.57. Cotyledon cell walls were defatted and then treated with pronase and alpha-amylase. DM percentages were 7.5, 10.7, and 13.7 for lentil, kidney bean, and chickpea, resp. Cell walls from kidney bean, lentil, and chickpea contained, resp., 67, 73, and 42 percent pectic polysaccharides associated with 16, 12, and 10 percent cellulose. Arabinose was the major pectic sugar of the 3 walls. Hulls were mainly composed of cellulose (29-41 percent) associated with hemicellulosic and pectic polymers. They had low lignin contents (1.2-1.7 percent). Kidney bean hulls contained the greatest percentage of the (xylose + glucose) pair. (AS)

0770

29169 COETZEE, J.; VAN DER MERWE, C.F. 1986. The influence of processing protocol on the ultra-structure of bean leaf cells. South African Journal of Botany 52(2):95-99. En., Sum. En., Af., 15 Ref., Il. [Electron Microscopy Unit, Univ. of Pretoria, Pretoria, 0002, Republic of South Africa]

Phaseolus vulgaris. Leaves. Analysis. Laboratory experiments. Cytology. Processing. South Africa.

Bean leaf cells exhibit ultrastructural damage when glutaraldehyde fixatives or buffer washes are applied for prolonged periods. The max. times in these processing steps are influenced by the choice of buffer. Prolonged periods in low concn. of acetone also cause damage. This damage is progressively less obvious in higher concn. Extended holding times in anhydrous acetone are possible, especially if phosphate or cacodylate buffers are employed during fixation. (AS)

0771

29675 CSOMA, C.; POLGAR, L. 1984. Proteinase from germinating bean cotyledons. Evidence for involvement of a thiol group in catalysis. Biochemical Jorunal 222(3):769-776. En., Sum. En., 19 Ref., Il. [Inst. of

Enzymology, Biological Research Center, Hungarian Academy of Sciences, Budapest, P.O. Box 7, Hungary H-1502]

Phaseolus vulgaris. Seeds. Proteins. Enzymes. Cotyledons. Analysis. Biochemistry. Hungary.

To degrade storage proteins, germinating seeds synthesize proteinases de novo that can be inhibited by thiol-blocking reagents. A procedure for isolation of such a proteinase from the cotyledons of Phaseolus vulgaris was elaborated. The purification procedure involved fractionation of the cotyledon homogenate with acetone and with $(NH_4)_2SO_4$ and successive chromatographies on DEAE-cellulose, activated thiol-Sepharose, and Sephacryl S-200. The purified enzyme has an Mr of 23 400, proved to be highly specific for the asparagine side chain, and blocking of its thiol group resulted in loss of the catalytic activity. The chemical properties of the thiol group of the bean enzyme were investigated by acylation with t-butyloxycarbonyl-L-asparagine p-nitro-phenyl ester and by alkylations with iodoacetamide and iodoacetate. Deviations from normal pH-rate profile were observed, which indicated that the thiol group is not a simple functional group, but constitutes a part of an interactive system at the active site. The pKa value for acylation and the magnitude of the rate constant for alkylation with iodoacetate revealed that the bean proteinase possesses some properties not shared by papain and the other cysteine proteinases studied to date. (AS)

0772

29124 DESHPANDE, S.S.; CHERYAN, M. 1986. Microstructure and water uptake of Phaseolus and winged beans. Journal of Food Science 51(5):1218-1223. En., Sum. En., 16 Ref., Il. [Dept. of Food Science, Smith Hall, Purdue Univ., W. Lafayette, IN 47907, USA]

Phaseolus vulgaris. Water absorption. Seed coat. Cell structure. USA.

The role of seed microstructure in initial water uptake during the soaking of Phaseolus vulgaris (cv. Small White, Black Beauty, and Viva Pink) and Psophocarpus tetragonolobus seeds was investigated. Considering their relatively small area, hilum and micropyle seemed to be the most important structural features influencing the initial water uptake. Seed coat played a dominant role only after its initial resistance to water uptake was overcome. Var. with high initial water uptake also had relatively thin seed coats, a loosely arranged cell structure on the raphe-side of the hilum, a deeply grooved hilar fissure, and a narrow tracheid bar. Water absorption in legumes appeared to be a complex process with the seed coat, hilum, and micropyle together constituting an integrated water absorption system. (AS)

0773

29197 DESHPANDE, S.S.; SATHE, S.K.; SALUNKHE, D.K. 1984. Interrelationships between certain physical and chemical properties of dry bean (Phaseolus vulgaris L.). Qualitas Plantarum Plant Foods for Human Nutrition 34(1):53-65. En., Sum. En., 40 Ref., Il. [Dept of Food Science, Univ. of Illinois, 104 Dairy Mfg.Bldg., 1302 W. Penn. Ave, Urbana, IL 61801, USA]

Phaseolus vulgaris. Cultivars. Analysis. Composition. Water uptake. Laboratory experiments. USA.

The interrelationships among certain physical and chemical properties of 10 dry bean cv. were investigated. The length/breadth ratio was similar (1.51-1.65), except for kidney beans (over 2.0) and sanilac (1.37) cv. The breadth/thickness ratio ranged from 1.17 to 1.65. The 100-bean wt.

indicated a wide variation of 15.03-50.33 g. The density, bulk density, and porosity characteristics were within a narrow range of 1.18-1.36 g/cc, 68-75 g/100 cc, and 40.7-48.5 percent, resp. Water uptake rates during the 1st 6 h of soaking at room temp. (21 degrees Celsius) were characteristic of the cv. At the end of 24-h soaking, however, all cv. had absorbed similar amounts of water (approx. 1 g/g bean). Leaching losses (g solids leached/100 g beans) had characteristic trends and ranged from 0.54 for cranberry to 3.46 for sanilac cv. after 24-h soaking. Most correlations between selected chemical constituents and physical characteristics of the dry bean were relatively low. (AS)

0774

28964 DOYLE, J.J.; SCHULER, M.A.; GODETTE, W.D.; ZENGER, V.; BEACHY, R.N.; SLIGHTON, J.L. 1986. The glycosylated seed storage proteins of Glycine max and Phaseolus vulgaris. Structural homologies of genes and proteins. Journal of Biological Chemistry 261(20):9228-9238. En., Sum. En., 61 Ref., Il. [L.H. Bailey Hortorium, 467 Mann Library Bldg., Cornell Univ., Ithaca, NY 14853, USA]

Phaseolus vulgaris. Seeds. Proteins. Phaseollin. Analysis. Biochemistry. USA.

Considerable information is now available concerning the 7 S seed storage proteins of legumes and the genes that encode them. The gene encoding a beta-type subunit of phaseolin (Pvu beta), the 7 S protein of common bean, was compared with the gene encoding an alpha'-subunit of beta-conglycinin (Gma alpha'), the 7 S protein of soybean. The comparison involves 2880 base pairs of Pvu beta and 3636 base pairs of Gma alpha' and includes approx. 1 kilobase pair of 5'-flanking sequences, and 5' and 3' untranslated sequences, as well as the 6 exons and 5 introns that are found to occur in similar positions in both genes. Conserved sequences in the 5'-flanking regions of these genes are discussed in light of their potential regulatory role. (AS (extract))

0775

28649 DZYUBENKO, V.S. 1985. Relationship between the charge of membrane proteins and optical properties of chloroplasts. Soviet Plant Physiology 32(1,pt.1):15-23. En., Sum. En., 28 Ref., Il.

Phaseolus vulgaris. Chloroplasts. Light. Protein content. Amino acids. Analysis. Proteins.

Research on isolated bean chloroplasts by the methods of potentiometric titration and differential spectrophotometry indicated that ionogenic groups of proteins make the main contribution to the total electrostatic charge of chloroplast membranes. In the pH interval of 4.5-8.0. the degree of flattening of the optical density spectrum of a chloroplast suspension exhibits a linear dependence on the quantity of dissociated H(+)-acceptor groups fixed on the membranes. The index of flattening of the optical density spectrum reflected the state of the diffuse electrical layer near the membrane surface and can be used to determine the electrostatic parameters of membranes. (AS)

0776

29114 FAYE, L.; STURM, A.; BOLLINI, R.; VITALE, A.; CHRISPEELS, M.J. 1986. The position of the oligosaccharide side-chains of phytohemagglutinin and their accessibility to glycosidases determines their subsequent processing in the Colgi. European Journal of Biochemistry 158(3):655-661. En., Sum. En., 28 Ref., Il. [Dept. of Biology, Univ. of California, San Diego, La Jolla, USA]

Phaseolus vulgaris. Phytohemagglutinins. Analysis. Enzymes.

Phytohemagglutinin (PHA), the glycoprotein lectin of Phaseolus vulgaris, has 2 types of asparagine-linked oligosaccharides/polypeptide: a high-mannose chain with the formula (Man)8-9(GlcNAc)2 on Asn(12) and a modified chain with fewer mannose residues and additional fucose and xylose residues on Asn(60). Glycosylation of PHA is a cotranslational process, which occurs in the endoplasmic reticulum, and newly synthesized PHA has 2 high-mannose chains. Transport of PHA to the protein bodies via the Golgi complex is accompanied by the modification of 1 of the 2 high-mannose chains. By determining the effect of digestion with various glycosidases (alfa-mannosidase, endo-beta-N-acetylglucosaminidase H, and endo-beta-N-acetylglucosaminidase F) on native and denatured PHA, evidence was obtained that was consistent with the interpretation that the accessibility of oligosaccharide chains to modifying enzymes is of major importance in determining whether a high-mannose chain becomes modified or not. The high-mannose chain of mature undenatured PHA is only partially accessible to glycosidases, while PHA obtained from the endoplasmic reticulum has 1 high-mannose chain, which is readily accessible to alfa-mannosidase and endoglycosidases H and F. This readily accessible chain was in the same position on the polypeptide (Asn(60)) as the modified oligosaccharide on mature PHA. Thus, accessibility of the oligosaccharide side-chains to processing enzymes in the Golgi determines whether a particular oligosaccharide side-chain is processed or not. (AS)

0777

28960 FERNANDEZ, R.; ELIAS, L.G.; BRAHAM, J.E.; BRESSANI, R. 1982. Trypsin inhibitors and hemagglutinins in beans (Phaseolus vulgaris) and their relationship with the content of tannins and associated polyphenols. Journal of Agricultural and Food Chemistry 30(4):734-739. En., Sum. En., 25 Ref., Il. [School of Chemical & Biological Sciences, Univ. of San Carlos de Guatemala, Guatemala]

Phaseolus vulgaris. Trypsin. Phytohemagglutinins. Tannin content. Seeds. Analysis. Guatemala.

For differentiation of true trypsin inhibitor (TI) from inhibition caused by polyphenolics, water extracts at pH 7.6 from whole seeds, cotyledons, and seed coats of 3 common bean var. (black, white, and red) were treated as follows: (1) raw extract, untreated; (2) raw extract treated with poly(vinylpyrrolidone); (3) cooked extract (115 degrees Celsius and 15 psi, 20 min); and (4) cooked extract plus 1 percent poly(vinylpyrrolidone). Trypsin inhibitor was determined by the BAPA (N-benzoyl-DL-nitroanilide hydrochloride) method. Group 1 would show total inhibition (TI + polyphenolics, A), group 2, inhibition due only to TI(B), group 3, polyphenolics inhibition plus possible remanent TI(C), and group 4, the inhibition due only to possible remanent TI(D). Their algebraic relationship is expressed by the equation A = B + (C - D), where A = calculated value and B + (C - D) = analytical value. There were no differences between calculated and analytical values. A highly significant correlation (r = 0.93) indicated that with this methodology, trypsin inhibition due to TI and polyphenolics can be separated with a good degree of reliability. (AS)

0778

28942 FRELS, J.M.; RUPNOW, J.H. 1984. Purification and partial characterization of two alpha-amylase inhibitors from black bean (Phaseolus vulgaris). Journal of Food Biochemistry 8(4):281-301. En., Sum. En., 54 Ref., Il. [Dept. of Food Science & Technology, Inst. of Agriculture & Natural Resources, Univ. of Nebraska-Lincoln, Lincoln, NE 68583-0919, USA]

Phaseolus vulgaris. Enzymes. Analysis. Amino acids. Biochemistry. Human nutrition. Animal nutrition. USA.

Two alpha-amylase inhibitors from black bean were purified to homogeneity using ammonium sulfate fractionation, DEAE-Sephadex chromatography, phenyl-Sepharose hydrophobic interaction chromatography, and gel filtration with Sephadex G-100. The inhibitors were designated I-1 and I-2 based on their order of elution from the phenyl-Sepharose column. Both inhibitors are mannose containing glycoproteins, composed of subunits; active against porcine pancreatic, human salivary, and insect alpha-amylases and inactive against bacterial, mold, and plant alpha-amylases. The inhibitors I-1 and I-2 have mol. wt. of 49,000 and 47,000 and isoelectric points 4.93 and 4.86, resp. Both inhibitors have similar amino acid compositions and are rich in aspartic acid, serine, glutamic acid, valine, and threonine and are low in S-containing amino acids. I-2 is more resistant to heat denaturation than I-1. (AS)

0779

27378 HERNANDEZ U., H.Y.; ORTEGA D., M.L. 1985. Trypsin activity on globulins and albumins from common bean seeds (Phaseolus vulgaris L.). Bean Improvement Cooperative. Annual Report 28:30. En., 4 Ref. [Colegio de Postgraduados, Chapingo 56230, Mexico]

Phaseolus vulgaris. Trypsin. Seeds. Proteins. Temperature. Laboratory experiments. Analysis. Cultivars. Inhibitors. Mexico.

The localization of trypsin inhibitors in the protein fractions of seeds of 4 dry bean var. (Negro Mecentral, Flor de Mayo, Canario 107, and Negro Tropical) and the effect of heat denaturation were studied. Tryptic activity (200 micrograms/ml) was assayed during 10 min on 1 percent casein (pH 7.6) as a substrate. The same amount of trypsin was tested on the casein substrate, with the addition of 500 micrograms of globulinic and albuminic fractions, native and heat denatured (93 degrees Celsius) for 20 and 40 min. The antitryptic activity was located in the albumin fraction. By heat treatment of the albumin fractions, the trypsin inhibitor was partially inactivated; however, the addition of the heat-denatured globulin fraction yielded a higher trypsin proteolytic activity. (CIAT)

0780

29603 HUSSAIN, A.; RAMIREZ, H.; BUSHUK, W.; ROCA, W. 1986. Field bean (Phaseolus vulgaris L.) cultivar identification by electrophoregrams of cotyledon storage proteins. Euphytica 35:729-732. En., Sum. En., 11 Ref., Il. [Dept. of Plant Science, Univ. of Manitoba, Winnipeg, Manitoba R3T 2N2, Canada]

Phaseolus vulgaris. Cultivars. Analysis. Seeds. Proteins. Identification. Canada.

Electrophoretic procedures were developed for seed proteins which can discriminate cv. of field beans. Proteins were extracted from 7 var. (Aurora, Kentwood, GN-1140, Midnight, R-275, Loop, and Swedish Brown) and the extracts were analyzed using acid and SDS-polyacrylamide gel electrophoresis. Electrophoregrams are presented to illustrate the results than can be obtained with the methods described. Results indicate that sufficient variation is present among the 7 var. examined to afford unambiguous discrimination and identification of the cv. Banding patterns were stable for each genotype. (AS)

0781

29193 JACOB, J.S.; MILLER, K.R. 1986. The effects of galactolipid depletion on the structure of a photosynthetic membrane. Journal of Cell Biology

103(4):1337-1347. En., Sum. En., 42 Ref., Il. [Division of Biology and Medicine, Brown Univ., Providence, RI 02912, USA]

Phaseolus vulgaris. Enzymes. Chloroplasts. Analysis. Biochemistry. Laboratory experiments. Proteins. USA.

A lipase was isolated from the chloroplasts of Phaseolus vulgaris, which is highly specific for the galactolipids monogalactosyldiglyceride and digalactosyldiglyceride. This galactolipase promotes the hydrolysis of these galactolipids, in the process liberating 2 free fatty acids into the membrane bilayer, leaving the residual galactosyl glyceride group to diffuse into the aqueous bulk phase. Isolated spinach photosynthetic membranes were treated with this enzyme preparation and changes in membrane composition were studied with TLC (for lipids), gel electrophoresis (proteins), and freeze-etching (membrane structure). After 30 min of lipolysis, nearly 100 percent of the galactolipids had been converted into membrane-associated fatty acids and water-soluble galactosyl glycerides. SDS-polyacrylamide gel electrophoresis showed that 2 proteins, 1 of which is possibly associated with the reaction center of photosystem II, were removed by the treatment. (AS (extract))

0782

27761 KALDY, M.S. 1985. Starch structure and matting of the small white (navy) bean. Bean Improvement Cooperative. Annual Report 28:118-119. En. [Agriculture Canada Research Station, Lethbridge, Alberta T1J 4B1, Canada]

Phaseolus vulgaris. Bean starch. Cultivars. Laboratory experiments. Canada.

An electron microscope investigation of beans grown in Alberta and Ontario (Canada) showed a net-like formation of the starch fractions around the starch granules of Alberta-grown beans. In contrast, little or no starch fractions were present on the starch granules of the Ontario-grown beans. Other studies showed that Alberta-grown small white beans have less alcohol-insoluble solids (starch, protein, cellulose, and hemicellulose) compared with those grown in Ontario. (CIAT)

0783

29195 KERMASHA, S.; METCHE, M. 1986. Characterization of seed lipoxygenase of Phaseolus vulgaris cv, haricot. Journal of Food Science 51(5):1224-1227. En., Sum. En., 24 Ref., Il. [Dept. of Food Science & Agricultural Chemistry, Macdonald College of McGill Univ., 21111 Lakeshore Road, St. Anne de Bellevue, Quebec, Canada H9X 1C0]

Phaseolus vulgaris. Seeds. Enzymes. Analysis. Ammonium sulphate. pH. Canada.

Phaseolus vulgaris cv. haricot seed lipoxygenase was extracted and partially purified. The precipitation of an active lipoxygenase fraction with solid ammonium sulfate (at 20-50 percent of saturation) increased its activity by a factor of 3. The pH for optimum activity was 7.3. The addition of 40 millimolar potassium cyanide resulted in a doubling of the enzyme activity. Enzyme activity was completely lost on storage at 4 degrees Celsius for 48 h. The activity of haricot lipoxygenase extract was considerably greater on linoleic acid than on its esters, and decreased in the order: mono- more than di- more than tri-linolein. The haricot lipoxygenase shares many of the characteristics of the corresponding enzyme found in several seed sources. (AS)

0784

28246 KNUDSEN, I.M. 1986. High-performance liquid chromatographic determination of oligosaccharides in leguminous seeds. Journal of the

Science of Food and Agriculture 37(6):560-566. En., Sum. En., 21 Ref., Il. [Novo Industri A/S, Novo Allé, 2880 Bagsvaerd, Denmark]

Phaseolus vulgaris. Seeds. Analysis. Sucrose. Denmark.

A simple and reliable high-performance liquid chromatographic method was developed to determine sucrose, raffinose, and stachyose in leguminous seeds (among them red kidney beans). A LiChrosorb NH2 column (Merck) and an acetonitrile + water solvent (65:35, by vol.) at a flow rate of 1 ml/min were used for the separation. An interference type refractive index detector (Tecator) was used for the detection. With this detector the smallest amount of oligosaccharide detectable was 10 ng. With a traditional deflection type refractive index detector the smallest amount of oligosaccharide detectable was 240 micrograms. The oligosaccharides were extracted by placing the whole, dry seeds in boiling water for 30 min, blending the seeds and water, placing the whole suspension in a shaking bath at 60 degrees Celsius for 60 min, and removing the solid material by centrifuging. The extract was deproteinated by adding 65 parts of acetonitrile to 35 parts of extract (by vol.), placing the mixture at 5 degrees Celsius for 60 min, and filtering off the resulting proteinaceous precipitate before injection into the chromatograph. The entire procedure has been successfully applied to soybeans, chick peas, garden peas, and red kidney beans with recoveries of added raffinose in the range 97-102 percent. (AS)

0785

29113 LAJOLO, F.M.; FIVARDI FILHO, F. 1984. Purificacao do inibidor de alpha-amilase do feijao preto (Phaseolus vulgaris) var. Rico-23. (Purification of alpha-amylase inhibitor of kidney bean var. Rico-23). Ciencia e Tecnologia de Alimentos 4(1):1-11. Pt., Sum. Pt., En., 16 Ref., Il. [Depto. de Alimentos e Nutricao Experimental da Faculdade de Ciencias Farmaceuticas, Univ. de Sao Paulo, Caixa Postal 30786, 01051 Sao Paulo-SP, Brasil]

Phaseolus vulgaris. Enzymes. Laboratory experiments. Analysis. Trypsin. Proteins. Brazil.

Black bean var. Rico-23 was found to contain 0.4 percent of an amylase inhibitor. It is a glycoprotein that can be purified to homogeneity by aqueous extraction, ethanol precipitation, DEAE-cellulose and Sephadex G-100 chromatography. The treatment with celite-bentonite facilitates elimination of the trypsin inhibitor. The procedure allowed an 18-fold purification of the inhibitor with a yield of 32 percent. (AS)

0786

29623 LECOCK, F.E., BUFFEL, K.A. 1986. Phytochrome mediated permeability to tritiated water. Biochemie und Physiologie der Pflanzen 181(7):459-465. En., Sum. En., 14 Ref., Il. [K.U. Leuven, Laboratorium voor Plantenfysiologie, Kard, Mercierlaan 92, B-3030 Heverlee, Leuven, Belgium]

Phaseolus vulgaris. Seedling. Water absorption. Irradiation. Analysis. Laboratory experiments. Belgium.

Using a ((3)H)HO diffusion technique, the water permeability responses of etiolated Avena sativa and Phaseolus vulgaris seedlings were determined. In both cases red light of 1.16 x 10(-4) W/square centimeter increased the water permeability. In Phaseolus a 1 decade lower fluence rate induced a decrease. All effects were far-red reversible pointing to phytochrome action. Far-red itself in some cases also induced permeability changes. Reciprocity held for all but the 1st response in Phaseolus. (AS)

0787

28944 MENDEZ, M.H.M.; DERIVI, S.C.N.; RODRIGUES, M.C.R.; FERNANDES, M.L.; MACHADO, R.L.D. 1985. Metodo da fibra detergente neutro modificado para amostras ricas em amido. (Method for determination of neutral detergent fiber, modified for samples rich in starch). Ciencia e Tecnologia de Alimentos 5(2):123-131. Pt., Sum. Pt., En., 11 Ref. [Depto. de Farmacia da Univ. Federal Fluminense, Rua Dr. Mario Viana, 523, 24.000 Niteroi-RJ, Brasil]

Phaseolus vulgaris. Cultivars. Analysis. Fiber content. Starch content. Brazil.

A proper methodology for the determination of neutral detergent fiber in starch-rich foods was studied using samples of bean cv. Rio Tibagi and Moruna. The following procedure was applied: gelatinization of starch hydrolyses with amyloglucosidase in 0.2 molar acetate buffer at pH 4.8 and determination of neutral detergent fiber by the conventional method. Results showed that the treatment with 5 ml enzyme solution and an incubation of 2 h was sufficient to remove the starch in the neutral detergent fiber residue. Advantages over alternative procedures are briefly considered. (AS)

0788

29136 MIKKONEN, A.; MIKOLA, J. 1986. Separation and partial characterization of two alkaline peptidases from cotyledons of resting kidney beans, Phaseolus vulgaris. Physiologia Plantarum 68(1):81-85. En., Sum. En., 9 Ref., Il. [Dept. of Biology, Univ. of Jyvaskyla, Vapaudenk, 4, SF-40100 Jyvaskyla, Finland]

Phaseolus vulgaris. Cotyledons. Enzymes. Analysis. Finland.

Extracts prepared from cotyledons of resting kidney beans (cv. Processor) rapidly hydrolyzed 2 dipeptides (Leu-Tyr and Ala-Gly). On ion exchange chromatography on DEAE-Sephacel the 2 activities eluted as separate peaks, showing that they were due to 2 different peptidases. The extracts also hydrolyzed Leu-beta-naphthylamide optimally at pH 6.4; this activity eluted as a 3rd peak between the other peaks. The activity peak acting on Leu-Tyr rapidly hydrolyzed 2 tripeptides, showing that it was an aminopeptidase, whereas the Ala-Gly hydrolyzing peak acted only on dipeptides. The activities against Leu-Tyr and Ala-Gly were also separated by gel chromatography on Sephacryl S-300 with elution positions corresponding to Mr values of about 360,000 and 105,000. The aminopeptidase was inhibited by bestatin, and the dipeptidase was inhibited by p-hydroxymercuribenzoate. Both enzymes were inhibited by o-phenanthroline. In most of their properties the 2 kidney bean enzymes resembled the alkaline aminopeptidase and the dipeptidase earlier characterized from barley grains. (AS)

0789

29718 PURANIK, R.M.; SRIVASTAVA, H.S. 1986. Sensitivity of DTNB of NADH-glutamate dehydrogenase from the leaves of bean seedlings. Phytochemistry 25(4):803-805. En., Sum. En., 7 Ref., Il. [Dept. of Biochemistry, Holkar Science College, Indore 452001, India]

Phaseolus vulgaris. Leaves. Seedling. Enzymes. Light. Shading. India.

Supply of 5,5'-dithio-bis-2-nitrobenzoic acid (DTNB) to excised bean leaves or to enzyme preparations inhibited NADH-glutamate dehydrogenase activity. The inhibition was more pronounced for enzyme from light-grown leaves than from dark-grown leaves. Further, the inhibition increased with increase in

NADH concn. in the assay mixture and was little affected by enzyme concn. The enzyme from light-grown leaves is more sensitive to inhibition by DTNB than the enzyme from dark-grown leaves. (AS)

0790

28945 PUSZTAI, A. 1972. Metabolism of trypsin-inhibitory proteins in the germinating seeds of kidney bean (Phaseolus vulgaris). Planta 107(2):121-129. En., Sum. En., 38 Ref., Il.

Phaseolus vulgaris. Seeds. Proteins. Trypsin. Germination. Metabolism. Analysis. Laboratory experiments. England.

Several proteins with TIA were separated by isoelectric focusing and their amounts measured in the extracts of kidney bean seeds at various stages of germination up to 16 days. The total trypsin inhibitor content of the dormant seed was 2.2 mg/g bean, rose to about 3.6 mg by the 7th day, and declined slowly after the 10th day of germination. The individual trypsin inhibitors, however, appeared to change independently of each other and some components disappeared almost completely with the progress of germination. The emergence of an inhibitor not found in the dormant seed was also observed. Some of the inhibitor proteins attained a max. concn. by the 7th-8th day of germination, coinciding with a similar max. in the general protein and proteolytic enzyme content of the germinating bean seeds. The results suggested that the main function during germination of these protein components might not be related to their TIA. (AS)

0791

29145 RIPPLE, W.J. 1986. Spectral reflectance relationships to leaf water stress. Photogrammetric Engineering and Remote Sensing 52(10):1669-1675. En., Sum. En., 25 Ref., Il.

Phaseolus vulgaris. Snap beans. Radiation. Leaves. Canopy. Water content. Water stress. Analysis. Laboratory experiments. USA

Spectral reflectance data were collected from detached snap bean leaves in the lab. with a multiband radiometer. Four expt. were designed to study the spectral response resulting from changes in leaf cover, relative water content of leaves, and leaf water potential. Spectral regions included in the analysis were red (band 3, 0.63-0.69 microns), near infrared (band 4, 0.76-0.90 microns), and middle infrared (band 7, 2.08-2.35 microns). Results indicated that the red and middle infrared bands showed sensitivity to changes in both leaf cover and relative water content of leaves. The near infrared was only highly sensitive to changes in leaf cover. Results provided evidence that middle infrared reflectance was governed primarily by leaf MC, although soil reflectance was an important factor when leaf cover was less than 100 percent. High correlations between leaf water potentials and reflectance were attributed to covariances with relative water content of leaves and leaf cover. (AS)

0792

29181 SWANSON, B.G.; HUGHES, J.S.; RASMUSSEN, H.P. 1985. Seed microstructure: review of water imbibition in legumes. Food Microstructure 4(1):115-124. En., Sum. En., 137 Ref., Il. [Dept. of Food Science & Human Nutrition, Washington State Univ., Pullman, WA 99164-6330, USA]

Phaseolus vulgaris. Seed coat. Seed hardening. Water content. USA.

Scanning electron microscopy observation of the microstructural changes occurring in legumes during water imbibition offers a better understanding

of differences that exist between hard and normal beans. Structural changes during imbibition typical of those found in legumes were observed in 3 dry bean cv. (Sanilao, Nep-2, and San Fernando). (AS (extract))

0793

29153 TANIZAKI, M.M.; LAJOLO, F.M. 1985. Kinetics of the interaction of pancreatic alpha-amylase with a kidney bean (Phaseolus vulgaris)-amylase inhibitor. Journal of Food Biochemistry 9(2):71-90. En., Sum. En., 26 Ref., Il. [Depto. de Alimentos e Nutricao Experimental da Faculdade de Ciencias Farmaceuticas da Univ. de Sao Paulo, Caixa Postal 30786, 01.051 Sao Paulo-SP, Brasil]

Phaseolus vulgaris. Enzymes. Analysis. Inhibitors. pH. Brazil.

An amylase inhibitor isolated from black beans completely inhibited porcine pancreatic alpha-amylase, forming a 1:1 stoichiometric complex. The kinetic pattern of complex formation was pH dependent. At pH 5.5 it followed a 1st-order reaction with rate constant of 0.029/min and 0.017/min at 37 degrees Celsius and equimolar inhibitor and enzyme concn., resp., of 10(-8) and 10(-9) molar. At pH 6.9 it was a 2nd-order reaction, with a rate constant of 0.25 x 10(6) molar/min at 37 degrees Celsius, with 4 x 10(-8) molar concn. of enzyme and inhibitor. The dissociation constants of the enzyme-inhibitor complex were 1.7 x 10(-10) molar at pH 5.5 and 4.4 x 10(-9) molar at pH 6.9, at 37 degrees Celsius. The kinetic data obtained at pH 5.5 suggested the formation of an initial reversible complex followed by a conformational change step. The complex can be dissociated either in acid pH (4.3) or at pH values higher than 6.5 with partial recovery of the amylase activity. (AS)

0794

29645 WHITAKER, J.R.; SGARBIERI, V.C. 1981. Purification and composition of the trypsin-chymotrypsin inhibitors of Phaseolus vulgaris L. var. Rosinha G2. Journal of Food Biochemistry 5(3):197-213. En., Sum. En., 38 Ref., Il.

Phaseolus vulgaris. Trypsin. Analysis. Biochemistry. Amino acids. Carbohydrate content. Brazil.

Three trypsin-chymotrypsin inhibitors were purified to homogeneity from Phaseolus vulgaris var. Rosinha G2 (Brazilian pink beans). At least 1 more trypsin-chymotrypsin inhibitor was present. Purification was achieved by fractionation into albumin and globulin fractions based on differential salt/water solubilities, affinity chromatography on trypsin-Sepharose, DEAE-cellulose chromatography, and CM-cellulose chromatography. Purity of the inhibitors was determined by rechromatography, combining ratios with trypsin, and by disc gel electrophoresis. The isolated inhibitors were very similar, although distinguishable, by amino acid analysis. They had no tryptophan and valine, one residue of met., low glycine, alanine, leucine, and tyrosine contents, and high levels of serine, threonine, proline, and half-cystine (18.5 to 21.0 residues/mol. wt. of 20,000). They also contained a low amount of carbohydrate (one equivalent of mannose/20,000 g protein). (AS)

0795

29141 ZIRWER, D.; GAST, K.; PLIETZ, P.; SCHLESIER, B.; SCHWENKE, K.D. 1986. Dynamic light scattering studies of globulins from plant seeds. Nahrung 30(3-4):251-255. En., Sum. En., De., Ru., 17 Ref. [Central Inst. of Molecular Biology, DDR-1115 Berlin-Buch, Robert-Rossle-Str, 10, Germany]

Phaseolus vulgaris. Proteins. Analysis. Biochemistry. German Democratic Republic.

Dynamic light scattering studies were performed on the 11S globulins from Helianthus annuus, Brassica napus, and Vicia faba, as well as on the 7S globulin from Phaseolus vulgaris. The results for the translational diffusion coefficients, the hydrodynamic Stokes' radii, shape parameters, and the solvation of these protein molecules are discussed. It is shown that realistic values can be obtained for the solvation of the protein molecules by combining data from dynamic light scattering and small-angle X-ray scattering. (AS)

0796

29130 ZONNEVELD, H.; KLOP, W.; GORIN, N. 1984. Analysis of unboiled and boiled beans for chlorophylls and pheophytins by thin-layer chromatography and fluorimetry comparison with spectrometry. Zeitschrift fur Lebensmittel-Untersuchung und-Forschung 178(1):20-23. En., Sum. De., En., 11 Ref. [Sprenger Inst., P.O. Box 17, 6700 AA Wageningen, The Netherlands]

Phaseolus vulgaris. Snap beans. Chlorophyll. Analysis. Netherlands.

A method is described that permits estimation of chlorophylls a and b and pheophytins a and b in green beans. Pigments were extracted with acetone and subjected to TLC on commercially prepared plates. The separated pigments were measured by irradiation at wavelength 360 nm and fluorescence above 630 nm on the plate. Data were compared with those obtained by a spectrophotometric method of pigment extract without purification. Concn. of pheophytin b obtained by 2 equations with the spectrophotometric method conflicted with one another and with the new method. Extrapolation of retained chlorophyll b to zero time of boiling gave a more appropriate result with the results from this new method. (AS) See also 0722 0723 0725 0726 0728 0741 0743 0756 0757 0797 0862 0920 0959 0966 0970 0976 0980 0986 0996 1054

D00 AGRONOMY

D01 Soil, Water, Climate and Fertilization

0797

29198 ANDERSON, W.H.; GELLERMAN, J.L.; SCHLENK, H. 1984. Effect of drought on phytyl wax esters in Phaseolus leaves. Phytochemistry 23(11):2695-2696. En., Sum. En., 10 Ref. [The Hormel Inst., Univ. of Minnesota, 801 16th Avenue NE, Austin, MN 55912, USA]

Phaseolus vulgaris. Leaves. Irrigation. Resistance. Drought. Phaseolus acutifolius. Composition.

The small amount of phytol which is bound as wax ester in mature bean leaves is increased 10-20 fold by drought. Watering the plants before permanent wilt reverses this trend. Max. amounts of phytyl wax esters in plants still viable are higher in drought-resistant Phaseolus acutifolius than in the less resistant P. vulgaris. (AS)

0798

28699 BOARETTO, A.E.; DAGHLIAN, C.; MURAOKA, T.; CRUZ, A. DE P. 1985. Adubacao foliar do feijoeiro: fontes de nitrogenio, concentracao da solucao e horário de sua aplicacao. (Foliar fertilization of bean plants: nitrogen sources, solution concentrate, and time of application). Revista de Agricultura (Brasil) 60(2):117-123. Pt., Sum. Pt., En., 2 Ref., Il. [Facultade de Ciencias Agronómicas, Univ. Estadual de Sao Paulo, Botucatu, Brasil]

Phaseolus vulgaris. Fertilizers. N. Ammonium nitrate. Ammonium sulphate. Leaves. Timing. Brazil.

The effects of several levels of N fertilizers and time of application on common bean leaves were determined. The results, based on visual observations, were scored from 0 to 5. Ammonium nitrate, ammonium sulphate, urea, monoammonium phosphate, and diammonium phosphate did not cause any injurious effect up to 4 percent when the spraying was done early in the morning or late in the afternoon; however, all N sources (2 and 4 percent) caused leaf scalding when the spraying took place at 10 a.m. This was probably due to the lower air RH (approx. 30 percent) and higher temp. (30-40 degrees Celsius). (AS)

0799

29143 BRERETON, J.C.; DAWKINS, T.C.K. 1986. Crop response to compaction. Arable Farming 13(5):18-21. En., Il.

Phaseolus vulgaris. Soil compaction. Yields. Growth. Yield components. United Kingdom.

Differential sensitivity of sugar beet, field beans, and barley to soil compaction was evaluated. In terms of crop growth and yield, compaction reduced DM production in sugar beet and beans, with little effect on barley. Consequently the yield of sugar beet roots was reduced by 60 percent and that of beans by 26 percent. The bean yield reduction was caused by a reduction in pod nodes/plant, pod no./plant, and seeds/plant. (CIAT)

0800

29764 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Improvement of individual characters. Drought tolerance. In_____. Bean Program. Annual Report 1986. Cali, Colombia Working Document no.21. pp.140-144. En.

Phaseolus vulgaris. Germplasm. Resistance. Drought. Yields. Phaseolus acutifolius. Adaptation. Colombia.

During 1986 emphasis was given to testing promising bean germplasm for yields and the 1st materials bred at CIAT specifically for drought tolerance. Preliminary screening was performed under mild stress in the 1st semester, while exceptionally dry weather permitted evaluation under high levels of stress in the 2nd semester. Phaseolus acutifolius lines L172, L174, and L169 gave the highest yields in Palmira and Quilichao, showing their drought tolerance. Given the importance of local adaptation in determining levels of drought tolerance, increased importance has been given to aiding national programs in research of tolerance mechanisms. Basic patterns of response of leaf water potential, stomatal conductance, and canopy temp. in Brazil were similar to those seen at CIAT stations. Results are included in table form. (CIAT)

0801

29763; CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL 1987. Genetic improvement and related activities. Improvement of individual characters. Photoperiod-temperature adaptation. In_____ Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.136-139. En.

Phaseolus vulgaris. Photoperiod. Flowering. Germplasm. Phaseolus acutifolius. Phaseolus coccineus. Phaseolus lunatus. Cultivars. Colombia.

Evaluation of photoperiod bean response in flowering screening continued at CIAT-Palmira, using artificial 18 h daylengths to delay flowering. Approx.

600 germplasm accessions were evaluated in 1986 as a part of continuing efforts to characterize responses of germplasm in different bean production regions. To introduce desirable characteristics into Phaseolus vulgaris, 70 accessions of 3 other Phaseolus species (P. acutifolius, P. coccineus, and P. lunatus) were also evaluated. P. acutifolius and P. coccineus were notable for their high levels of sensitivity. Results are included in table form. (CIAT)

0802

29765 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Improvement of individual characters. Tolerance to acid soils. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.145-152. En.

Phaseolus vulgaris. Germplasm. Selection. P. Mineral deficiencies. Resistance. Al. Plant habit. Yields. Colombia.

During 1986 screening of advanced bean lines for efficiency at low levels of P and for tolerance to high levels of Al saturation continued. A review of data from 8 yr. of screening indicated that the genetic variability of beans for these 2 characteristics is low. Furthermore, the data suggest that efficiency and tolerance are determined by separate mechanisms. The principal group screened was comprised of small black- and red-seeded materials of growth habit types II and III, adapted to Central America and the Caribbean. Mean yields of lines of growth habits II and III showing outstanding performance at low P levels and high Al saturation are included. (CIAT)

0803

28884 EMPRESA DE PESQUISA AGROPECUARIA DE SANTA CATARINA. 1984. Programa feijao. (Bean program). In_____. Relatorio Tecnico Anual EMPASC 1982. Florianópolis-SC, Brasil. pp.60-62. Pt.

Phaseolus vulgaris. Cultivars. Research. Germplasm. Plant introductions. Fertilizers. Diseases and pathogens. Yields. Plant breeding. Brazil.

Results of research on germplasm introduction, evaluation, and use, fertilization, and bean seed pathology, carried out at the Empresa de Pesquisa Agropecuaria de Santa Catarina, Brazil, are briefly described. A table is included with the yields obtained by 20 lines or cv. evaluated in the localities of Chapecó and Campos Novos. (CIAT)

0804

29637 EVANS, L.S.; CANADA, D.C.; SANTUCCI, K.A. 1986. Foliar uptake of (15)N from rain. Environmental and Experimental Botany 26(2):143-146. En., Sum. En., 15 Ref. [Laboratory of Plant Morphogenesis, Manhattan College, The Bronx, NY 10471, USA]

Phaseolus vulgaris. Simulation models. Rainfall. N. Leaves. Nutrient uptake. Analysis. Productivity. USA.

Research was conducted to determine if N in simulated rainfalls, equivalent to the highest known N concn. found in acidic precipitation, can significantly increase the N concn. of foliage of a herbaceous crop by a foliar uptake mechanism. Although N inputs were greater in leaves of Phaseolus vulgaris exposed to simulated rainfalls of high acidity, the relationship between N content in rain and N content in leaves as determined by (15)N/(14)N mass spectrometric analyses was relatively insignificant to plant productivity. Three simulated rainfalls of pH 4.0, which provided 1.38 cm of water, contributed from 4.6 to 47.0 micrograms N while such rainfalls at pH 3.4 provided 17-34 micrograms N/leaflet. These

amounts are relatively insignificant compared with 45-55 mg N/g tissue present in bean leaves. These results coupled with results of other expt. support the conclusion that ambient N deposition rates do not significantly affect yields of agricultural crops. (AS)

0805

24802 FOSTER, H.L. 1971. Permanent fertilizer trials (1959-1967); (1968-1971). In Uganda. Kawanda Research Station. Chemistry Section. Annual Report part.2, 1970-1971. Uganda. pp.1-9. En., Sum. En..

Phaseolus vulgaris. Fertilizers. N. P. K. Mg. Agricultural lime. Green manure. Rotational crops. Ca. Yields. Uganda.

The summaries of 4 publications dealing with permanent fertilizer trials between 1959-67 and 1968-71 at 9 exptl. stations in Uganda are presented. The effects of applying fertilizers, manure, lime, and trace elements were determined and the changes in yields and fertilizer responses in continuous cropping rotations in southern and western Uganda were measured. On frequently cropped, strongly ferralitic soils, beans and maize were the most responsive to N. Cotton, sweet potato, and beans did not respond to lime in 23 trials where soil pH was above 5.25, but significant responses were observed in 8 of 18 trials with soil Ca levels below 6 meq/100 g and a pH less than 5.25. Av. yields for beans for years 1-4 and 5-8 at the 9 stations, including percentage response to N, P, K, Mg, lime, and manure, are given. Av. yields across stations for years 1-4 and 5-8 were 589 and 572 kg/ha, resp., while percentage responses to N, P, K, Mg, and manure were 11, 7, 2, 0, and 15 percent, resp., for years 1-4, and 19, 11, 8, 14, and 11 for N, P, K, lime, and manure, resp., for years 5-8. Results of permanent fertilizer trials with beans during 1969 are given. (CIAT)

0806

29690 GONZALEZ, A.; GUZMAN, J. DE J.; MARRERO, V.; RODRIGUEZ, O. 1985. Influencia de la fertilización N, P2O5, K2O sobre los rendimientos del frijol (Phaseolus vulgaris) var. ICA-Pijao, en un suelo aluvial de textura arenosa. (Influence of N, P, and K fertilizer applications on yield of bean var. ICA-Pijao on a sandy alluvial soil). Ciencia y Técnica en la Agricultura. Suelos y Agroquímica 8(2):15-24. Es., Sum. Es., En., 10 Ref., Il.

Phaseolus vulgaris. Fertilizers. N. P. K. Yields. Soils. Cuba.

An expt. was carried out on a sandy alluvial soil in Pinar del Río (Habana, Cuba) during 2 consecutive yr (1980-81 and 1981-82) to determine the effect of different levels of NPK on yields on bean cv. ICA-Pijao. Six levels of N (0, 40, 80, 120, 160, and 200 kg/na), 4 levels of P (0, 30, 60, and 90 kg/ha), and 4 levels of K (0, 45, 90, and 135 kg/ha) were used in a random block design with 4 replications. The level of N affected bean yields and P application gave significant increases in production. P, however, had a negative effect on yields. Best results were obtained with 90-110, 90, and 45 kg of N, P, and K/ha, resp. (AS)

0807

29684 JAYANTHAMMA, B.P.N.; MADALAGERI, B.B. 1985. Response of French bean genotypes to phosphorus levels. Current Research 14(7-9):55-57. En., 2 Ref. [Horticultural Research Station, G.K.V.K. Bangalore-560 065, India]

Phaseolus vulgaris. Snap beans. Cultivars. Fertilizers. P. Adaptation. Yields. India.

During 1983-84, 23 French bean var. were grown at 3 P levels (50, 100, and 150 kg/ha) at the Horticultural Research Station, Bangalore, India. Data on

genotype x environment interaction for pod yield are presented. In general, var. Wade could be considered as of good adaptation. Var. Prevato, VL-1, Fran Tocato, and VL-2 had higher regression values (over 8), and a high mean value greater than the general mean and therefore are better adapted to favorable environments. (CIAT)

0808

28609 MORERA V., J.L.; ARAYA V., R.; CHAVES F., C.A. 1986. Evaluación de intervalos de riego en frijol (Phaseolus vulgaris L. cv. Talamanca), en la Estación Experimental Fabio Baudrit M. Boletín Técnico de la Estación Experimental Fabio Baudrit 19(3):23-32. Es., Sum. En., Es., 17 Ref.

Phaseolus vulgaris. Irrigation. Yields. Yield components. Water requirements. Costa Rica.

At the Fabio Baudrit expt. station (Alajuela, Costa Rica), bean cv. Talamanca was assessed with irrigation intervals of 7, 14, and 21 days in plots consisting of 22 ridges 90.0 m long and spaced at 0.60 m, with an initial population of 333,000 plants/ha. The plots were surface irrigated during 5 h. Data on variables were obtained by sampling at random the area of 3 plots, 25 times/treatment, using a frame of 1 square meter. The data were analyzed based on an irrestricted randomized design. As the irrigation interval increased, the grain yield and the coefficient value of the crop decreased. The crop demanded the largest amounts of water during flowering and initial pod fill (from 30 to 50 days after planting). Plant height was reduced by 41 percent when irrigated every 21 days. The last irrigation was conducted 26 days after flowering, but the largest wt. gain of the seeds (physiological maturity of the pods) was detected 18 days later. (AS)

0809

28881 NJOROGE, J.M.; MWAKHA, E. 1986. Results of field experiments, Ruiru. 3. Effects of N, P and K fertilizers on Coffea arabica L yields, quality and their residual effects on dry bean (Phaseolus vulgaris L.) yields in Kenya. Kenya Coffee 51(592):29-34. En., Sum. En., 21 Ref., Il. [Coffee Research Station, P.O. Box 4, Ruiru, Kenya]

Phaseolus vulgaris. Intercropping. Coffea arabica. Fertilizers. N. P. K. Yields. Kenya.

Application of N, P, and potash fertilizers were tested on Arabica coffee yield and quality in Ruiru, Kenya. Their interaction and residual effects on dry bean yield were also assessed. A highly significant response to the residual P fertilizer on dry bean yields was recorded. The implications of the results are discussed. (AS)

0810

29723 PRIMAVESI, O.; MELLO, F.A.F. DE; MU[illegible], T. 1984. Comportamento diferencial de dois cultivares de feijoeiro (Phaseolus vulgaris L.) no acúmulo de matéria seca, nutrientes, alumínio e eficiencia nutricional. (Differential behavior of two common bean cultivars in the accumulation of dry matter, nutrients, and aluminum, and in nutritional efficiency). Anais da Escola Superior de Agricultura Luiz de Queiroz 41(1):433-447. Pt., Sum. Pt., En., 7 Ref.

Phaseolus vulgaris. Cultivars. Soils. Soil fertility. P. Al. Soil compaction. Plant development. Roots. Shoots. K. Mg. Zn. Fe. Ca. Dry matter. Brazil.

Two common bean cv., Rico Pardo 896 and Aroana 80, were grown in 3.8-liter pots filled with samples of Oxisol and Alfisol soils, with and without

fertilization and submitted to 3 levels of compaction. The differential behavior of the cv., 1 considered to be tolerant and the other as sensitive to Al and low available P in the soil, was observed. Data indicated that the tolerant cv. (Rico Pardo 896) had a greater root and a smaller shoot development in terms of wt., tending to accumulate preferably P, K, Mg, Zn, and Fe in the roots and Ca and Mg in aerial parts, regardless of soil type, fertility, and level of compaction. A greater sensitivity to compaction occurred on a more fertile substrate when shoot DM accumulation was considered. (AS)

0811

29724 PRIMAVESI, O.; MELLO, F.A.F. DE; LIBARDI, P.L. 1984. Selecao preliminar de parametros físicos mais adequados para estudiar o efeito da compactacao de amostras de solo sobre a producao de matéria seca vegetal de feijoeiro (Phaseolus vulgaris L.). (Preliminary screening of physical parameters more suitable to the study of the effect of soil compaction on dry matter production of common bean). Anais da Escola Superior de Agrioultura Luiz de Queiroz 41(1):449-463. Pt., Sum. Pt., En., 33 Ref.

Phaseolus vulgaris. Soils. Soil compaction. Soil moisture. Laboratory experiments. Dry matter. Brazil.

Soil samples of horizons A and B2 of an Oxisol and Alfisol were subjected to compaction to offer resistance to cone penetrometer penetration of 0-8.8-17.6 kg/square centimeter. Common bean cv. Rico Pardo 896 was grown during 67 days in 3.8-liter pots under greenhouse conditions. Soil MC ranged between 100-300 mbars. DM production seems to correlate better with the effective aeration porosity and seems to be a better indicator of plant DM production in different soils, with different degrees of compaction. The parameters soil bulk density, saturated hydraulic conductivity, and mechanical resistance to penetrometer were not good indicators. (AS)

0812

28926 RASMUSSEN, W.W.; BERG, R.D. 1986. Within-row irrigation saves water on croplands. Agricultural Water Management 11(1):31-37. En., Sum. En., 2 Ref., Il. [Snake River Conservation Research Center, Agricultural Research Service, United States Dept. of Agriculture, Kimberly, ID 83341, USA]

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

A 3-yr study was conducted in southern Idaho, USA, to evaluate the effects of controlled within-row irrigation on seasonal water use and dry bean yields. Preplanting irrigation and planting within the seed-row, and continuing within-row irrigation trials were tested on Portneuf silt loam soil. Results showed that planting beans in the bottom of preirrigated furrows without soaking completely between the furrows reduced preplanting water application by 60 percent. The continuing within-row treatments reduced irrigation water use by 42 percent compared with conventional irrigation practices. Total bean yields on the preplanting, within-row treatments were not significantly different from the conventional treatments. In developing countries that have limited irrigation water and a shortage of agricultural land, the within-row irrigation practice could be very beneficial. (CIAT)

0813

28003 SCHETTINI, T.M.; GABELMAN, W.H.; GERLOFF, C.C. 1984. Phosphorus efficiency of inbred-backcross lines of common bean (Phaseolus vulgaris L.) grown in the field and in the growth room under phosphorus stress. Bean Improvement Cooperative. Annual report 27:23-24. En., 7 Ref. [Dept. of Horticulture, Univ. of Wisconsin, Madison, WI 53706, USA]

Phaseolus vulgaris. Cultivars. Nutrient solution. Field experiments. Growth chamber experiments. P. Seed production. Mineral deficiencies. Genetics. Backcrossing. USA.

Fifty-three BC2S3 lines were evaluated to determine if the trait for P efficiency has been transferred into the genetic background of the recurrent parent and determine if measurements of P efficiency in nutrient solution culture are correlated with biomass and seed production in the field. All of the inbred-backcross lines resembled Sanilac for leaf morphology, node no., stem length, and time of flowering in the growth room. Most of the inbred-backcross lines resembled Sanilac in the field for growth habit and morphology. Low correlations were observed between biomass production in the field and seed yield, and between P content of the tops at R1 and seed yield. Lines that produced more biomass/unit of tissue P tended to produce more seed under P stress. The P efficiency trait has been transferred into the Sanilac background, and the performance of these lines in nutrient solution culture is related to their performance in the field under low P conditions. (CIAT)

0814

28897 SHEN, X.Y.; WEBSTER, B.D. 1986. Effects of water stress on pollen of Phaseolus vulgaris L. Journal of the American Society for Horticultural Science 111(5):807-810. En., Sum. En., 20 Ref., Il. [Dept. of Agronomy, Shenyang Agricultural Univ., Shenyang, People's Republic of China]

Phaseolus vulgaris. Water stress. Pollen. Plant physiology. USA.

Pollen of plants of Phaseolus vulgaris Red Mexican was affected adversely by water stress. The critical stress period occurred 10-13 days after emergence, during the transition from the vegetative to the reproductive phase of development. The transition phase was characterized by the presence of tiny green buds (less than 0.5-2.0 mm in length), bearing anthers that contained tetrads or free microspores. Pollen abortion of plants stressed during the transition phase was significantly higher than that of pollen from nonstressed plants or from those stressed during later phases of reproductive development. The percentage of pollen germination and total pollen production also were reduced in transition phase-stressed plants. Exine development was abnormal. This abnormal development was particularly interesting because the exine is regarded as so genetically stable that it is regularly used for species identification. Results of these expt. raise questions about the infallibility of identifications, since an environmental stress (such as water) imposed at a critical time of gametophytic development can markedly alter exine patterning. (AS)

0815

28934 SILVA, E.M.R. DA; ALMEIDA, D.L. DE; FRANCO, A.A.; DOBEREINER, J. 1985. Adubacao verde no aproveitamento de fosfato em solo ácido. (Effect of green manure on the availability of phosphate in acid soil). Revista Brasileira de Ciencia do Solo 9(1):85-88. Pt., Sum. Pt., En., 6 Ref. [Empresa Brasileira de Pesquisa Agropecuária, Programa Nacional de Pesquisa em Biologia do Solo, Km. 47, 23.460, Itaguaí-RJ, Brasil]

Phaseolus vulgaris. Green manures. P. pH. Brazil.

The effect of Mucuna aterrima and Crotalaria juncea used as green manure on the availability of P from rock phosphate, superphosphate, and thermophosphate on the growth of oats and beans, grown on a Latosol with a pH of 3.9, was investigated. The residual effects evaluated on bean indicated higher grain yields in treatments using green manure. (AS (extract))

0816

28241 SMUCKER, A.J.M. 1980. Dry bean responses to soil compaction. Michigan Dry Bean Digest 4(4):10. En., Il.

Phaseolus vulgaris. Soil compaction. Tillage. Planting. Rooting. Yields. USA.

To emphasize the importance of minimizing soil compaction during field operations at planting time, 6 classes of dry beans were planted on 3 types of soil (loam, clay loam, and clay) in Michigan, USA. Two levels of tillage were applied (min. and excessive). Av. yields of the 6 classes of beans were reduced 25 percent (764.16 kg/ha) by excessive compaction tillage. Yields of all dry bean classes were 2631 kg/ha on the min. tilled fields and 1967 kg/ha on the excessively tilled compacted fields. Generally, yields of the small white seed type were reduced the most by soil compaction and yields of the pinto type were reduced the least. (CIAT)

0817

28221 SMUCKER, A.J.M. 1977. Seafarer bean roots and soil oxygen stress. Michigan Dry Bean Digest 2(1):3. En., Il.

Phaseolus vulgaris. Soil compaction. O. Rooting. Nutrient solution. Zn. Laboratory experiments. USA.

Lab. expt. were carried out to study the effect of O stress on Seafarer navy bean plant roots. Plants of this var. were grown in nutrient solution containing high (3.0 ppm) and low (0.1 ppm) concn. of Zn. At the flowering stage, the O was removed from the nutrient solution for periods of 6, 12, 24, and 48 h. Navy bean plants having a low Zn content survived the O stress with little apparent damage; however, the roots of those with high levels of Zn began to die after 6 h of O stress. Plants containing high Zn also produced more ethanol which is very toxic to cells; this could be the reason for the death of plant root cells within 6 h, thus emphasizing the importance of good soil drainage and reduced soil compaction. (CIAT)

0818

28076 VARNER, G.V. 1980. Research report. Michigan Dry Bean Digest 4(4):22-23. En., Il.

Phaseolus vulgaris. Irrigation. Nematodes. Whetzelinia sclerotiorum. Disease control. Fungicides. USA.

Results from many investigations carried out in Michigan, USA, during 1979 are reported. These dealt with irrigation of dry beans, sampling bean fields for nematodes, and checkout for white mold infection. Bean growers reported different timing schemes for applying water using either center pivot or traveller systems and every type of water sources. On the other hand, samples for nematode detection should not be taken until 60 days after the initiation of annual root growth and not after the 1st frost. Finally, the fungicide benomyl was found to reduce white mold infection on beans. (CIAT)

0819

29654 WADE, L.J. 1985. Zinc deficiency in navy beans in the Dawson-Callide. 1. Diagnosis of the disorder. Queensland Journal of Agricultural and Animal Services 42(2):57-62. En., Sum. En., 18 Ref. [Agric. Branch, Queensland Dept. Primary Indust., Emerald, Qld. 4720, Australia]

Phaseolus vulgaris. Cultivars. Zn. Soil analysis. Mineral deficiencies. Plant physiological disorders. Australia.

A disorder suspected to be Zn deficiency was observed in crops of cotton, linseed, and navy beans in the Dawson and Callide districts (Queensland, Australia). The problem was studied at Biloela Research Station, using soil analyses, the observation of visual symptoms, and a nutrient omission pot trial with the navy bean var. Gallaroy and Selection 46. Soil analyses revealed light textured Callide alluvium hao a pH of 6.28 and contained 0.94 ppm EDTA-ammonium carbonate extractable Zn. Symptoms of Zn deficiency obtained in solution culture were consistent with those obtained in the minus Zn treatment in the pot trial. The reduction in plant height and DM production in the minus Zn treatment was more pronounced in Gallaroy than in Selection 46. The diagnosis of Zn deficiency was confirmed. (AS)

0820

29655 WADE, L.J.; BATH, S.J. 1985. Zinc deficiency in navy beans in the Dawson-Callide. 2. Response to zinc application in the field. Queensland Journal of Agricultural and Animal Sciences 42(2):63-69. En., Sum. En., 25 Ref. [Agric. Branch, Queensland Dept. Primary Indust., Emerald, Qld. 4720, Australia]

Phaseolus vulgaris. Cultivars. Fertilizers. Zn. Yields. Leaves. Nutrient uptake. Australia.

The response to Zn application in the field was studied in 2 navy bean var. (Gallaroy and Selection 46) on light and heavy textured Callide alluvium at Biloela Research Station (Queensland, Australia). The heavy textured site was nonresponsive. On the light soil, Zn application (10 kg/ha) increased yield in Selection 46 from 633 to 813 kg/ha, and increased Zn concn. of youngest fully expanded laminae from 9.4 to 19.8 ppm. For var. Gallaroy, Zn application increased yield from 53 to 120 kg/ha, failed to eliminate deficiency symptoms, and failed to increase Zn concn. of youngest fully expanded laminae above 13.5 ppm. It was concluded that the relative insensitivity to Zn deficiency in Selection 46 was of practical significance, and that selection for this character may be a worthwhile breeding objective. (AS) See also 0716 0724 0735 0743 0747 0791 0822 0835 0906 0928 0933 0946 0951 0963 0992 1000 1003

D02 Cultivation Practices: Planting, Weed Control and Harvesting

0821

28647 ARAYA V., R.; GONZALEZ M., W. 1987. El frijol bajo el sistema tapado en Costa Rica. (Beans under the covered system in Costa Rica). San José, Universidad de Costa Rica. 280p. Es., Sum. Es., 36 Ref., Il. [Programa Leguminosas de Grano, Estación Experimental Fabio Baudrit M., Apartado 183-4050, Alajuela, Costa Rica]

Phaseolus vulgaris. Cultivars. Covered beans. Spacing. Planting. Yields. Costa Rica.

The covered bean system used in 3 regions of Costa Rica (Northern Huetar, Central, and Brunca) is described. Three expt. were carried out: 2 of them with local and improved cv. regarding planting densities, and the 3rd on the effect of pelleted P and inoculation with Rhizobium phaseoli on bean production. Improved cv. performed better than local cv. regarding yields and disease tolerance. The covered system was similar in all the localities evaluated, predominating in subsistance plots. Of the farmers, 28.13 percent got returns equal to or lower than 0. A lineal relationship was found between the stand at harvest and yield. A methodological recommendation on the exptl. management and research lines regarding this system is included. (AS-CIAT)

0822

28880 AVILES C., M. 1986. Efecto de la fecha de siembra sobre el rendimiento y sus componentes del frijol Phaseolus vulgaris L. en Iguala Gro. (Effect of planting date on bean yields and yield components in Iguala Guerrero). Tesis Ing.Agr. Fitotecnista. Cocula, Guerrero, México, Colegio Superior Agropecuario del Estado de Guerrero. Centro de Estudios Profesionales. 75p. Es., Sum. En., 59 Ref., Il.

Phaseolus vulgaris. Cultivars. Planting. Timing. Yields. Yield components. Rainfall. Temperature. Mexico.

An expt. was carried out in Iguala (Guerrero, Mexico) to study the effect of 3 planting dates (June 28, July 12 and 26) on the yields and yield components of bean var. Canario 107 and Michoacán 12-A-3. Results showed that with later planting dates the plant growth cycle and the flowering period were shorter, and the values of yield and no. of normal seeds and pods were lower. This crop response was associated with less rainfall and accumulation of heat units. Regarding water use efficiency for the production of biomass and seed, bean var. Michoacán 12-A-3 performed better than Canario 107. (AS (extract)-CIAT)

0823

29176 BADILLO-FELICIANO, J.; REYES-SOTO, I.; BEAVER, J.S. 1985. A comparison of yields of common beans at physiological and harvest maturity. Journal of Agriculture of the University of Puerto Rico 69(1):19-24. En., Sum. En., Es., 7 Ref., Il. [Agricultural Experiment Station, Univ. of Puerto Rico, Río Piedras, Puerto Rico]

Phaseolus vulgaris. Snap beans. Harvesting. Cultivars. Timing. Yields. Yield components. Puerto Rico.

Results of field expt. carried out at the research and development centers of Isabela and Fortuna, in Puerto Rico, are given. Two harvesting stages of snap bean cv. Bonita and Naranjito, white- and striped-seeded, resp., were compared. Both cv. were harvested (1) when physiologically mature and (2) when dry. Results showed that the yields of cv. Bonita were higher and this cv. had more pods/plant and more seeds/pod. Furthermore, the yield of physiologically mature snap beans was 70 percent higher than when harvested dry. When unhulled snap beans are sold, the yield is about 75 percent over that of dry beans. (AS-CIAT)

0824

28822 FLESCH, R.D. 1986. Aspectos importantes a serem observados na implantacao de uma lavoura de feijao: cultivares, épocas de semeadura, espacamento e densidade, quantidade de sementes e profundidade de semeadura. (Important aspects that should be taken into account when planting beans: cultivars, planting dates, spacings, and densities, amount of seed, and planting depth). In Curso Intensivo sobre a Cultura do Feijao em Santa Catarina, 1o., Chapecó-SC, Brasil, 1986. Documentos presentados. Chapecó-SC, Brasil, Empresa Catarinense de Pesquisa Agropecuária. pp.49-61. Pt., 6 Ref., Il.

Phaseolus vulgaris. Cultivars. Planting. Spacing. Timing. Brazil.

The most important aspects that should be taken into account when planting beans in Santa Catarina, Brazil, are discussed, with specific recommendations for the state. Bean cv. recommended for different regions within the state include EMPASC 201, Ric Tibagi, Turrialba 4, and Iguacu (red-seeded) and Carioca, Carioca 80, and Paraná 1 (colored grain). Preferential planting dates are given for the 5 regions in which the state is divided. Recommendations are to sow 200,000 plants/ha at distances of

0.40, 0.50, and 0.60 m between rows with 10, 12, and 14 seeds/m, resp., for a final stand of 8, 10, and 12 plants/m, resp. The calculations required to estimate the amount of seed to plant 1 ha of the different recommended bean cv. are presented. Planting depths of 3-4 cm for heavy soils and 5-6 cm for lighter soils are recommended. (CIAT)

0825

29125 RODRIGUES, B.N.; VICTORIA FILHO, R. 1983. Efeito de misturas de bentazon e paraquat nas plantas daninhas e na cultura do feijao (Phaseolus vulgaris L.). (Effects of bentazon and paraquat mixtures on weeds and on dry beans). Anais da Escola Superior de Agricultura Luiz de Queiroz 40(2):1247-1270. Pt., Sum. Pt., En., 18 Ref.

Phaseolus vulgaris. Cultivars. Weeding. Herbicides. Yields. Brazil.

At the Escola Superior de Agricultura Luiz de Queiroz in Piracicaba, (Sao Paulo, Brazil) in 1981, the performance of the herbicides bentazon (0.48 and 0.96 kg/ha) and paraquat (0.05 and 0.10 kg/ha), applied separately or in all possible mixtures, was studied in bean cv. Carioca and Moruna and in some weeds. The percentage of injury on the bean cv. and on the weeds was quantified. The mixtures induced evident antagonistic effects on the studied cv. The treatments had no influence on cv. Carioca and Moruna yields. (AS (extract))

0826

28633 TAPIA B., H. 1986. Control integrado para la producción agrícola. (Integrated control for agricultural production). Managua, Nicaragua, Instituto Superior de Ciencias Agropecuarias. 26p. Es., Sum. Es., 2 Ref.

Phaseolus vulgaris. Disease control. Pest control. Integrated control. Tillage. Rotational crops. Intercropping. Nicaragua.

Aspects on the utilization of integrated control for agricultural production in Nicaragua are discussed. The use of zero tillage in beans is highlighted. Intercropping and rotational crops are other cultural practices analyzed. The advantages of integrated control are described in general terms. (CIAT)

0827

29118 VALVERDE, I.R.; ARAYA, R. 1986. Tolerancia a la competencia de las malezas en seis cultivares de Phaseolus vulgaris L. (Tolerance to weed competition in six common bean cultivars). Turrialba 36(1):59-64. Es., Sum. En., Es., 10 Ref., Il.

Phaseolus vulgaris. Weeds. Weeding. Yield components. Cultivars. Costa Rica.

The competitive ability of 6 bean cv. with weeds was evaluated at the Fabio Baudrit M. Exptl. Station (Alajuela, Costa Rica). The variation of yield components for these legumes was determined under 4 weeding treatments: (1) unweeded during the whole vegetative cycle, (2) left unweeded as of 20 days after sowing, (3) left unweeded as of 40 days after sowing, and (4) weeded during the whole cycle. A great stability for the yield components of bean cv. ICA Pijao, BAT 202, and Rev 79 was observed as well as a positive and significant correlation between yield and the no. of pods/plant and between yield and mean grain wt. These results were interpreted as evidence of competitive ability. Bean cv. Brunca, Porrillo Sintético, and Pavamor showed instability for yield components (reductions in the less inheritable components), indicating they were strongly affected by weeds. (AS-CIAT)

0828

29621 VAN RENSBURG, E.; VAN DYK, L.P. 1986. The persistence in soil and phytotoxicity on dry beans of alachlor and metolachlor as affected by climatic factors. South African Journal of Plant and Soil 3(3):95-98. En., Sum. En., Af., 17 Ref., Il. [Plant Protection Research Inst., Private Bag X134, Pretoria 0001, Republic of South Africa]

Phaseolus vulgaris. Herbicides. Temperature. Relative humidity. Toxicity. South Africa.

The persistence of alachlor and metolachlor in soil was determined over an 80-day period at temp. ranging from 5 to 50 degrees C .sius. Soils were maintained at either 50 or 100 percent of field capacity. The herbicides were less persistent at high temp., but the greater the soil MC, the slower the overall degradation rate. The effect of temp. on the phytotoxicity of these 2 soil-applied herbicides was also determined. The phytotoxic effect of alachlor and metolachlor on bean cv. Kamberg was greatest at 40 degrees Celsius. Beans were not injured at 30 degrees Celsius when treated with metolachlor at 1.5 liters/ha and alachlor at 4.0 liters/ha. At higher dosage rates of 3.0-7.5 liters metolachlor/ha and 8.0-20.0 liters alachlor/ha, beans showed evidence of injury. At temp. of 35 and 40 degrees Celsius, all the dosage rates had adverse effects on the beans. (AS) See also 0716 0724 0816 0837 0838 0841 0906 0928 1003

D03 Cultivation Systems: Intercropping, Rotational Crops

0829

28947 CANDAL NETO, J.F.; VIEIRA, C.; CARDOSO, A.A.; GALVAO. J.D.; DESSAUNE FILHO, N. 1986. Efeitos de variedades de milho e de suas densidades populacionais sobre o consórcio com algumas variedades de feijao, no Estado do Espírito Santo. (Effects of maize varieties and maize population densities on some bean varieties in associated cropping systems in the state of Espírito Santo). Revista Ceres 33(185):51-67. Pt., Sum. Pt., En., 23 Ref. [Empresa Capixaba de Pesquisa Agropecuária, Caixa Postal 391, 29.000 Vitória-ES, Brasil]

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

To verify the effects of maize var. with different heights and different population densities on the associated cropping with common bean, expt. were carried out in Viana and Conceicao do Castelo (Espírito Santo, Brazil). Maize var. Cargill 111 and Piranao, the latter with shorter plants, were planted in rows 1.0 m apart and at densities of 40,000, 30,000, and 20,000 plants/ha. Bean var. Manteigao Fosco 11, Rio Tibagi, and Costa Rica were planted within the maize rows in the rainy season, and again in 2 rows between maize rows in the dry season. The highest maize yield was obtained at the greatest population density, but was reduced by the competition with beans, mainly with var. Manteigao Fosco 11 and Costa Rica. Maize var. Piranao was more favorable to associated cropping. In the dry season, the highest maize population density can benefit the bean yield. Associated cropping was efficient, allowing a greater total grain production/unit area. (AS)

0830

29179 CHINGAIPE, T.M. 1985. Early growth of Eucalyptus camaldulensis under agroforestry conditions at Mafiga, Morogoro, Tanzania. Forest Ecology and Management 11(4):241-244. En., Sum. En., 3 Ref. [Dept. of Forestry & Wood Science, U.C.N.W., Bangor, Gwynedd LL57 2UW, United Kingdom]

Phaseolus vulgaris. Intercropping. Eucalyptus camaldulensis. Zea mays. Yields. Spacing. Tanzania.

The growth of Eucalyptus camaldulensis clean-weeded, spot-weeded, and intercropped with maize and beans was studied. At 4 x 4 m and 5 x 5 m spacings, trees were significantly shorter after 15 mo. under a conventional spot weeding regime than with clean weeding or intercropping with beans. A satisfactory maize yield (683 kg/ha) was recorded from plots with trees spaced at 5 x 5 m. No significant effects on bean yield (av. of 83.7 kg/ha) were detected. Plots where trees were spaced at 4 x 4 m and 3 x 3 m gave significantly lower yields (444 and 283 kg/ha, resp.). (AS)

0831

29692 CHOAIRY, S.A.; OLIVEIRA, E.F. DE; SANTOS, E.S. DOS; FERNANDES, P.D. 1986. Estudos de consórcio na cultura do abacaxi. (Intercropping studies in pineapple). Pesquisa Agropecuaria Brasileira 21(8):873-878. Pt., Sum. Pt., En., 7 Ref., Il. [EMBRAPA/EMEPA, Caixa Postal 275, 58.000 Joao Pessoa-PB, Brasil]

Phaseolus vulgaris. Intercropping. Ananas comosus. Vigna unguiculata. Arachis hypogaea. Spacing. Production. Income. Brazil.

An expt. was conducted in Sapé (Paraíba, Brazil) in a red-yellow podzol soil to study the intercropping of cowpea, bean, and groundnut with pineapple at 2 different spacings (0.90 x 0.30 m and 0.80 x 0.30 m). As a control, these crops were cultivated separately in exptl. plots. The intercropping was done in the 1st year of the pineapple planting. The secondary crops were planted 2 mo. after the principal one. Intercropping did not affect the production of pineapple. At the spacing of 0.90 x 0.30 m, the production of pineapple increased with intercropping, irrespective of the crop, although the best results were obtained with beans. In the case of 0.80 x 0.30 m spacing, the max. pineapple production was obtained with cowpea as an intercrop. All the systems were economically viable, with max. returns (2.05) being achieved in the case of pineapple (0.90 x 0.30 m)/groundnut combination. (AS)

0832

28805 CLARK, E.A.; SHIBLES, R. 1979. Corn and bean interactions in mixed culture: final report. Ames, Iowa State University. 361p. En., Sum. En., 195 Ref., Il.

Phaseolus vulgaris. Intercropping. Zea mays. Plant habit. Timing. Spacing. Yields. Leaf area. USA. Colombia.

Bean/maize intercrops were planted in 4 expt. at CIAT-Palmira to test the hypothesis that resource competition in time, as well as in space, accounted for the depressive effect of maize on bean yield, and to relate differences in the yield response of bush and climbing bean cv. to differences in their life cycles. Spatial and temporal differences in the life cycles of indeterminate bush and climbing beans affected yield in monoculture and in association. Highest intercrop system yields were associated with the interactions between clearly dominant and suppressed crop components. When competition was enhanced by separating and supporting the climbing bean canopy in the furrow between the maize rows, total system yield declined. The LAD in the bush and climbing bean intercrops exceeded that of the monocrop maize by 35 and 74 percent, resp., at the end of the bean life cycle. It is proposed that a conservative bean reproductive strategy is best suited to high bean yield when intercropped under optimal growing conditions. Cv. selection in monoculture for performance in association is justified in the bush but not in the climbing growth habit. (AS (extract))

0833

28949 FONTES, L.A.N.; TOMAS, J.C.; GALVAO, J.D. 1986. Comportamento de tres sistemas de cultivos asociados milho-feijao em diferentes densidades de plantio do milho. (Performance of three associated cropping systems of maize and beans with different maize densities). Revista Ceres 33(185):1-22. Pt., Sum. Pt., En., 18 Ref., Il. [Depto. de Fitotecnia, Univ. Federal de Vicosa, 36.570 Vicosa-MG, Brasil]

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

The performance of maize and dry beans in 3 multiple cropping systems at 5 maize plant densities was evaluated under field conditions in Vicosa (Minas Gerais, Brazil). The 3 systems were (1) strip cropping consisting of 2 rows of maize alternated with 4 of beans; (2) row cropping formed by double rows of beans between the rows of maize; and (3) row-mixed cropping with beans randomly scattered between the rows of maize. In the 1st 2 systems the beans were planted during both wet and dry seasons, whereas in the 3rd system, beans were planted only during the dry season. The association of maize and beans sometimes affected bean production but did not affect maize production. System 1 was superior to system 2 during the wet season; however, no difference was noted during the dry season. Increased maize plant density decreased bean production during the wet season, but no difference was noted during the dry season. Maize and beans were more efficient in grain production in system 1. System 2 produced more grain (maize + bean) than did system 3, which in turn was better than system 1. Values of LER indicated that associated cropping is superior in land utilization to monocropping systems. Optimal maize plant density for maize and for total grain production was the same for all 3 cropping systems. (AS)

0834

28608 GONZALEZ M., W.; GUTIERREZ C., R.; ARAYA V., R. 1986. Análisis económico de la asociación cafeto (Coffea arabica L.) frijol (Phaseolus vulgaris L.) en cafetales con poda sistemática. (Economic analysis of beans intercropped with coffee in systematically pruned coffee plantations). Boletín Técnico de la Estación Experimental Fabio Baudrit 19(3):1-9. Es., Sum. En., Es., 10 Ref.

Phaseolus vulgaris. Intercropping. Coffea arabica. Economics. Costs. Income. Production. Costa Rica.

The economic return of beans grown in association with coffee was determined in 6 coffee plantations in Heredia, Costa Rica. The plantations of coffee cv. Caturra were 10 yr old, grown unshaded, and pruned by the Hawaiian system on a 5-yr cycle. Bean cv. Huetar and Talamanca were planted at a density of 50,000 plants/ha, on both sides of the pruned row of coffee trees. There were no significant differences in yield among the bean cv. The association was profitable when fixed labor was used (105.81 percent gross return over added expense), but not so with hired labor (9.80 percent before deducting interests and depreciation). There was a negative lineal correlation of the yield and expense of materials with the planted area. (AS)

0835

29725 HEINZMANN, F.X. 1985. Residuos culturais de inverno e assimilacao de nitrogenio por culturas de verao. (Winter crop residues and nitrogen assimilation by summer crops). Pesquisa Agropecuaria Brasileira 20(9):1021-1030. Pt., Sum. Pt., En., 11 Ref., Il. [Fundacao Inst. Agronomico do Paraná, Sociedade Alema de Cooperacao Técnica (GTZ), Caixa Postal 1331, 86.100 Londrina-PR, Brasil]

Phaseolus vulgaris. Rotational crops. Soil fertility. N. Nutrient uptake. Brazil.

The effect of winter cover crops (Lupinus albus, Vicia villosa, Avena strigosa, and Raphanus sativus), wheat, and fallow on the nitrate content of the soil and N assimilation in subsequent crops of beans, soybeans, and maize was studied on an Oxisol in Londrina (Paraná, Brazil). Eight wk. after cutting the winter cover crops, NO3(-)-N content of the soil varied from 18 to 149 kg/ha for the fallow and R. sativus treatments, resp. Under trial conditions nitrate movement to a depth of 60-90 cm was observed. The relationship between the nitrate content of the soil and the total N in harvested crops was only significant for maize. Results showed that if other agronomic factors permit so, maize, beans, or soybeans should be planted as soon as possible after cutting the winter cover crops. A C/N ratio of winter cover crops residues of about 23-24 was shown to be adequate for maize, resulting in a uniform mineralization of N. For leguminous crops, the C/N ratio should be greater than 25 in order to produce a stable mulch cover and favorable conditions for nodule formation and performance. (AS)

0836

28069 MOTA, J. DE S.; BARBOSA, J.T. 1984. Consórcio feijao x cana-de-acúcar na Zona da Mata Mineira. (Beans x sugarcane association in the Mata Mineira zone). Informe Agropecuario 10(118):41-42. Pt., Sum. Pt., 5 Ref., Il. [Programa Nacional de Melhoramento da Cana de Acúcar, 35.430, Ponte Nova-MG, Brasil]

Phaseolus vulgaris. Intercropping. Saccharum officinarum. Cultivars. Yields. Economics. Brazil.

An expt. was carried out in the municipality of Sao Domingos do Prata (Minas Gerais, Brazil) to evaluate 2 bean cv. (Rico 23 and Ricobaio) in monoculture and intercropped with sugarcane. Yields of Rico 23 and Ricobaio were 960 and 1159 kg/ha when monocropped, and 934 and 1026 kg/ha when intercropped with sugarcane, indicating that this cropping system is feasible. (CIAT)

0837

28601 SAMPAIO, G.V.; COSTA, J.A.; ENDRES, V.C. 1986. Arranjos e populacoes no consórcio milho x feijao no oeste baiano. (Spatial arrangements and plant densities in maize x beans associated cropping in western Bahía). Salvador-BA, Brasil, Empresa de Pesquisa Agropecuaria da Bahia. Comunicado Técnico no.12. 9p. Pt., 3 Ref. [Empresa de Pesquisa Agropecuaria da Bahia/Univ. Estadual Paulista, S. Francisco, Caixa Postal 24, 47.800 Barreiras-BA, Brasil]

Phaseolus vulgaris. Intercropping. Zea mays. Planting. Spacing. Yields. Income. Brazil.

Bean cv. IPA 74-19 was associated with maize cv. Centralmex J-IX (tall) and Piramao (short) during 2 cropping seasons (1981-82 and 1982-83) in Angical (Bahía, Brazil). The effects of the spatial arrangement (1:2 and 1:3), planting method (addition or substitution), and plant density (166,670 x 27,780 or 41,665, 125,000 x 20,835, and 111,110 x 27,780 bean plants x maize plants/ha, resp.) on bean yields when intercropped with maize and on overall crop economics were studied. The av. bean yield in pure stands was 630 kg/ha compared with the av. of 420 kg/ha obtained in the association, without significant differences when either maize var. was used. The results indicated that the effects of maize height are not sufficient to affect the photosynthetic efficiency and the yield of beans in association. The LER's of the associations were always higher than those of

monocultures, as were also the gross returns. The planting method had no significantly different effects on bean yields, but the substitution method provided improved agronomic and economic conditions. (CIAT)

0838

28900 WOOLLEY, J.N.; SMITH, M.E. 1986. Maize plant types suitable for present and possible bean relay systems in Central America. Field Crops Research 15(1):3-16. En., Sum. En., 7 Ref., Il. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Intercropping. Zea mays. Plant habit. Relay crops. Rainfall. Yields. Prices. Nicaragua. Costa Rica.

The effect of maize plant type on yields of bush and semiclimbing beans planted at maize physiological maturity was studied and the way rainfall and pests determine the variants of this relay system used by farmers in Central America are described. The possibility of avoiding end-of-season drought in bean relay crops by advancing their planting date relative to maize was also investigated. Two trials of maize cv. x bean planting date x bean cv. in relay cropping were planted under exptl. station conditions in Costa Rica. Two complementary trials were planted on farmers' fields in Nicaragua. There were no interactions of maize cv. x bean cv., indicating that within the relay system, genetic improvement of maize and bush or semiclimbing beans may proceed separately, rather than simultaneously. When beans were planted at maize physiological maturity, differences in bean yield in relay with different maize cv. were not significant. The mean advantage over sole cropping was 18 percent. When, however, beans were planted 20 days before maize physiological maturity, less-leafy maize cv. depressed bean yield by 7 percent, while more-leafy cv. depressed bean yield by 32 percent. Although the less-leafy maize cv. used were earlier and yielded less, there was an economic advantage in using these, provided that the bean:maize price ratio was above 2.45. In order to plant beans before maize physiological maturity, attention should be paid to breeding less-leafy maize cv. which are not earlier maturing and thus yield the same as present cv., while competing less with beans. (AS) See also 0724 0805 0809 0821 0937 0947 1003

D04 Seed Production

See 0935 0942

D05 Varietal Trials

0839

27358 BAERT, T.; NZIMENYA, I.; BANYIRERERA, C. 1984. Groupe des légumineuses: haricot. (Legume group: common bean). In Institut des Sciences Agronomiques du Burundi. Rapport Annuel 1984 (Septembre 1983-Aout 1984). Bujumbura. v.1, pp.87-124. Fr., Il.

Phaseolus vulgaris. Germplasm. Plant introduction. Adaptation. Technological package. Selection. Cultivars. Burundi.
The objectives, methodology, and results are given on the different research works on beans carried out by the Institut des Sciences Agronomiques du Burundi in collaboration with CIAT, during the period Sept. 1983-Aug. 1984. Introductions of new materials, var. trials, phytotechnic trials, germplasm collection, and multiplication of var. were performed. The introductions of new materials originated from field inspections,

international trials, regional trials, CIAT var. introductions for selection, and intensification of pedigree selection. (CIAT)

0840

29769 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Evaluation in uniform nurseries. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.171-183. En.

Phaseolus vulgaris. Germplasm. Adaptation. Plant introductions. Cultivars. Seed characters. Plant habit. Yields. Dwarf beans. Climbing beans. Seed color. Resistance. Uromyces phaseoli. Colletotrichum lindemuthianum. Isariopsis griseola. Xanthomonas phaseoli. Bean common mosaic virus. Colombia.

The 3-stage progeny evaluation program at CIAT tested 1902 materials (67.4 percent new entries) in 1986, distributed as follows: 1st stage (bean evaluation nursery-VEF), 1282 entries; 2nd stage (preliminary trials-EP), 435 entries; and 3rd stage (IBYAN), 185 entries. The following data are included in table form for these 3 uniform nurseries: no. of sets of international nurseries (VEF-EP-IBYAN) dispatched during 1986 to different countries; no. of bean entries in the 1986 VEF with resistant and intermediate reaction to rust, anthracnose, angular leaf spot, common bacterial blight, and a necrotic and mottled reaction to BCMV; no. of bean entries in the 1986 VEF within each group according to growth habit and maturity; yield and main characteristics of some outstanding lines in the 1986 VEF; av. yield of the bush lines tested in Palmira and Popayan, Colombia (1986 EP); av. yield of the climbing large-seeded lines for cool climates tested in Rio Negro, Colombia (1986 EP); yield of the most outstanding bush lines in the 1986 IBYAN evaluated in Palmira and Popayan. (CIAT)

0841

28237 EMPRESA BRASILEIRA DE PESQUISA AGROPECUARIA. 1986. Resultados de pesquisa com a cultura do feijao em 1984. (Bean research results in 1984). Dourados-MS, Brasil, Unidade de Execucao de Pesquisa de Ambito Estadual de Dourados. Documentos, 19. 33p. Pt., Il. [Empresa Brasileira de Pesquisa Agropecuária, Unidade de Execucao de Pesquisa de Ambito Estadual de Dourados, Caixa Postal 661, 79.800 Dourados-MS, Brasil]

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Resistance. Uromyces phaseoli. Colletotrichum lindemuthianum. Isariopsis griseola. Bean common mosaic virus. Planting. Timing. Brazil.

The results obtained in 1984 regarding bean research in Dourados (Mato Grosso do Sul, Brazil) are presented. Fifteen bean cv. and lines were compared for yield performance with the local check Carioca, and evaluated for reaction to Uromyces phaseoli, Colletotrichum lindemuthianum, Isariopsis griseola, and BGMV. Outstanding materials were ICA Coll 10103 Rio Ivaí, and Milionário 1732 with yields of 792, 791, and 706 kg/ha, resp.; cv. Carioca yielded 475 kg/ha. A total of 100 black bean cv. and lines were evaluated for yield performance compared with the local check Carioca; 10 materials outyielded Carioca (2293 kg/ha). Forty-nine red and pink cv. and lines were evaluated for yield performance against the local check CNF 0010; 12 materials outyielded CNF 0010 (1660 kg/ha). In 1984, 6 bean planting dates (March 8, April 2 and 24, May 22, June 13, and July 9) were tested using 4 different bean cv. and lines. The highest av. yield (1193 kg/ha) was obtained with the 2nd planting date, followed by the 3rd and 1st planting dates (818 and 728 kg/ha, resp.); no yield was obtained from the rest of the planting dates. The effects of planting date, cv., and planting date x cv. interaction were significant. (CIAT)

0842

28915 LOZADA R., C.; ORTEGA Y., S.; SANCHEZ R., N. 1983. Comportamiento de 12 lineas de caraota (Phaseolus vulgaris L.) en Cubiro, Edo. Lara. (Performance of 12 bean lines in Cubiro, Lara State). Agronomía Tropical 33(1-6):71-81. Es., Sum. Es., En., 5 Ref. [Univ. Centro Occidental Lisandro Alvarado, Escuela de Agronomía, Apartado 400, Barquisimeto, Venezuela]

Phaseolus vulgaris. Cultivars. Adaptation. Yields. Venezuela.

Yields of 18 black bean var. and selected lines were compared in 1980 and 1981 in Cubiro (Lara, Venezuela). Selected lines F7-2-M-M-M and F1006-CB-CM-M outyielded var. Cubagua (local control) by 43 and 37 percent, resp., averaged over 2 yr. Nevertheless, as the 2 outstanding lines failed to yield more than commercial var. Tacarigua, their release to farmers will be delayed until regional trials clearly show the superiority of these new exptl. lines over the mentioned commercial var. (AS)

0843

29630 WRIGHT, A.L.; WAHAB, A.H.; MURRAY, H.; LUGO-LOPEZ, M.A. 1985. Preliminary trials of six red bean (Phaseolus vulgaris L.) cultivars on an Ultisol in Jamaica. Journal of Agriculture of the University of Puerto Rico 69(3):239-243. En., Sum. En., Es., 9 Ref.

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

Field trials were conducted to evaluate the performance of 6 red bean cv. (Miss Kelly, Tom Red, ICA Duva, ICA Guali, California Light Red, and 27-R) on a newly terraced Ultisol in Jamaica. Seed yields varied from 1182 kg/ha for Miss Kelly to 528 kg/ha for ICA Guali. The most productive cv., Miss Kelly, Tom Red, and ICA Duva, produced yields of 1182, 1023, and 934 kg/ha, resp. Miss Kelly and Tom Red performed significantly better than California Light Red, 27-R, and ICA Guali. Cv. 27-R had significantly more pods/plant, whereas Miss Kelly had significantly more seeds/pod than all other cv. Nodulation scores did not differ significantly among cv. (AS)
See 0932 0936 1058

E00 PLANT PATHOLOGY

See 0724

E02 Bacterioses

0844

28812 BALARDIN, R.S. 1986. Controle das doencas do feijao no Estado de Santa Catarina. (Control of bean diseases in the state of Santa Catarina). Florianópolis-SC, Brasil, Empresa Catarinense de Pesquisa Agropecuária. Comunicado Técnico no.107. 13p. Pt., 11 Ref.

Phaseolus vulgaris. Colletotrichum lindemuthianum. Uromyces phaseoli. Isariopsis griseola. Xanthomonas campestris pv. phaseoli. Disease control. Integrated control. Cultivars. Resistance. Fungicides. Brazil.

Recommendations are given on the integrated control of major bean diseases (anthracnose, rust, angular leaf spot, bacterial blight, and root rots) in the state of Santa Catarina, Brazil. Two annexes are included, the 1st one with the disease reaction of 7 bean cv. recommended for the region, and the

2nd one with some characteristics of the recommended fungicides, such as a.i., chemical group, mode of action, incompatibility with other substances, physical properties, toxicity category, median lethal dose, application frequency, and residuality. (CIAT)

0845

28965 BOELEMA, B.H. 1985. A glasshouse test for screening green bean cultivars for resistance to halo blight caused by Pseudomonas syringae pv. phaseolicola. Phytophylactica 17(2):99-100. En., Sum. En., Af., 5 Ref. [Horticultural Research Inst., Private Bag X293, Pretoria, 0001, South Africa]

Phaseolus vulgaris. Snap beans. Pseudomonas syringae pv. phaseolicola. Cultivars. Resistance. Laboratory experiments. South Africa.

A method was developed for testing green bean cv. for resistance to halo blight caused by Pseudomonas syringae pv. phaseolicola. The method was based on infectivity titrations. Leaves and pods were pricked with a microsyringe and at the same time a dose of low titer of the pathogen, averaging between 6-7 cells/prick, was applied. (AS)

0846

28998 GRAJEDA T., D.E. 1987. Evaluación de 176 líneas de frijol (Phaseolus vulgaris L.), obtenidas de padres resistentes al virus del mosaico dorado del frijol (BGMV) y al añublo bacteriano común (Xanthomonas campestris pv. phaseoli (Burk) Starr y Burk). (Evaluation of 176 bean lines obtained from parents resistant to the bean golden mosaic virus and to common bacterial blight (Xanthomonas campestris pv. phaseoli)). Tesis Ing.Agr. Guatemala, Universidad de San Carlos de Guatemala. 78p. Es., Sum. Es., 24 Ref., Il.

Phaseolus vulgaris. Bean golden mosaic virus. Xanthomonas campestris pv. phaseoli. Cultivars. Resistance. Yields. Yield components. Guatemala.

The performance of 176 bean lines was evaluated to determine their yielding potential and resistance to the BGMV and common bacterial blight, and to determine a new methodology to analyze genetic stability and disease incidence. Expt. were located in Jutiapa, Asunción Mita, and Monjas (Jalapa, Guatemala). Bean line 1862 significantly outyielded bean var. Quetzal and Tamazulapa. Correlation between yields and its components (pods/plant, seeds/pod, and mean seed wt.) was high. Six of the 176 lines evaluated, 1862, 1811, 1865, 1831, 1859, and 1826, showed a higher tolerance to BGMV than bean var. Quetzal and Tamazulapa. It is believed that the low incidence and severity of BGMV and bacterioses is linked to the low temp. and the lack of rain during the field phase. At the end of the study, 4 exptl. lines (1862, 1811, 1792, and 1826) were selected for their high yielding potential, adaptation, genetic stability, and general disease tolerance. (AS (extract)-CIAT)

0847

28973 MOORE, R.E.; NIEMCZURA, W.P. 1984. Inhibitors of ornithine carbamoyltransferase from Pseudomonas syringae pv. phaseolicola. Revised structure of phaseolotoxin. Tetrahedron Letters 25(36):3931-3934. En., Sum. En., 12 Ref. [Dept. of Chemistry, Univ. of Hawaii, Honolulu, HI 96822, USA]

Phaseolus vulgaris. Pseudomonas syringae pv. phaseolicola. Phaseollin. USA.

The structure of phaseolotoxin, a toxin produced by cultured Pseudomonas syringae pv. phaseolicola, the causal agent of halo blight in bean plants, is revised to toxin 3. The structure of octicidin, isolated from leaves of bean plants infected with pv. phaseolicola, has been determined to be identical to toxin 4. (AS)

0848

28619 MORRIS, C.E. 1985. Diversity of epiphytic bacteria on snap bean leaflets based on nutrient utilization abilities: biological and statistical considerations. Ph.D. Thesis. Madison, University of Wisconsin. 222p. En., Sum. En., 152 Ref., Il.

Phaseolus vulgaris. Snap beans. Pseudomonas syringae pv. syringae. Laboratory experiments. Isolation. Nutrient uptake. C. N. USA.

A study was conducted to (1) describe the bacteria on snap bean leaves based on their ability to use nutrients in bean leaf leachate, (2) examine the effect of nutrients on populations of these bacteria, and (3) examine statistical aspects of indices of bacterial diversity. About 2000 bacterial isolates were recovered from dilution plates of homogenates of 4 bean leaflets. Isolates were tested for ability to use 26 single C and 11 single N sources. A video camera-microcomputer system was developed to measure no. of doublings of bacteria. Isolates were categorized, with cluster analysis, into 199 groups based on their nutrient utilization patterns. The group with the largest no. of isolates had gram negative and positive aerobes and facultative anaerobes and did not grow on any nutrient. Two more versatile groups contained Pseudomonas syringae pv. syringae and Enterobacter spp., and used 16-17 C and 8-9 N sources. About 50 percent of the major groups had isolates resembling Pseudomonas mesophilica and used 2-7 C sources. Ability to use a specific nutrient is not obviously advantageous for growth on bean leaf surfaces. Several compounds were applied to field-grown bean plants based on results of nutrient utilization studies. These applications did not result in consistent changes in the population sizes of total bacteria, P. syringae pv. syringae, or bacteria using the single C source applied. Several measures of diversity of epiphytic bacteria were examined. Diversity of bacteria on single leaflets based on the Shannon index was estimated and compared statistically for 10-250 isolates/leaflet. Estimates of the total no. of groups on each leaflet or descriptions of the frequency distribution of groups with 1, 2, 3,...r isolates require much larger sample sizes. Studies of diversity and interactions of epiphytic bacteria should consider the nature of the leaf surface habitat. Methods are needed for testing resource limitation in situ. The concepts of community and diversity of epiphytic microorganisms need to be reconsidered to account for leaf to leaf variability in the organisms present. (AS)

0849

28256 PEET, R.C.; LINDGREN, P.B.; WILLIS, D.K.; PANOPOULOS, N.J. 1986. Identification and cloning of genes involved in phaseolotoxin production by Pseudomonas syringae pv. "phaseolicola". Journal of Bacteriology 166(3):1096-1105. En., Sum. En., 40 Ref., Il. [Dept. of Plant Pathology, Univ. of California, Berkeley-CA 94720, USA]

Phaseolus vulgaris. Plant toxins. Pseudomonas syringae pv. phaseolicola. USA.

Genes involved in the production of phaseolotoxin by strain NPS 3121 of the halo blight pathogen of beans were identified by Tn5 mutagenesis and cosmid cloning. Some 5180 kanamycin-resistant colonies were screened for the loss of phaseolotoxin production by a microbiological assay. Six independent, prototrophic, Tox- mutants were isolated that had Tn5 insertions in 5 different EcoRi fragments. All 6 mutants had Tn5 inserted in the same KpnI fragment, which had a length of approx. 28 kilobases including Tn5. The mutants produced residual toxin in vitro. EcoRI fragment containing Tn5 and flanking sequences from mutant NPS4336 was cloned and used to probe a wild-type genomic library by colony hybridization. Seven recombinant plasmids showing homology to this probe

were identified. Each Tox- mutant was restored in OCTase-specific toxin production by 2 or more of the recombinant plasmids. The data suggest that at least some of the genes involved in phaseolotoxin production were clustered in a large KpnI fragment. No homology was detected between the Tn5 fragment cloned from mutant NPS4336 and the total genomic DNA from closely or distantly related bacteria that do not produce phaseolotoxin. (AS)

0850

29182 TAMIETTI, G. 1984. Tentativi di lotta chimica in campo contro Pseudomonas phaseolicola (Burkh.) Dowson. (Attempts at chemical control of Pseudomonas phaseolicola in the field). Informatore Fitopatologico 34(11):27-30. It., Sum. It., En., 11 Ref., Il. [Istituto di Patologia Vegetale, Universita degli Studi di Torino, Italy]

Phaseolus vulgaris. Pseudomonas syringae pv. phaseolicola. Disease control. Chemical control. Italy.

During 1977-79 field trials were carried out against bean halo blight in Cigliano and Cuneo, the main crop areas of bean in Piedmont, Italy. Copper oxychloride at the dosage of 0.19-0.20 percent significantly reduced pod infections in 1977 and 1978, but not in 1979, only when applied in 4 sprays: the 1st on 10- to 12-day-old seedlings and 3 during flowering. Copper oxytetrachloride gave results similar to the copper oxychloride, but data should be confirmed. Streptomycin sulfate at 10 ppm and kasugamicin at 4 and 5 ppm reduced the disease but not significantly. Oxyquinoline sulfate and "biomicine" were completely ineffective. (AS)

0851

28982 TAYLOR, J.D.; TEVERSON, D.M. 1986. Halo-blight of Phaseolus bean. In National Vegetable Research Station. Annual Report 1985. Wellesbourne, England. pp.67-68. En.

Phaseolus vulgaris. Pseudomonas syringae pv. phaseolicola. Races. Resistance. Germplasm. Africa. Latin America.

Continuing the collaborative project between CIAT and National Vegetable Research Station (Wellesbourne, England), approx. 300 isolates of Pseudomonas syringae pv. phaseolicola from infected beans, collected from Africa and Latin America, were assigned to race 1, 2, 3, and 4. Preliminary tests for resistance were made on a collection of 454 Phaseolus vulgaris accessions from the CIAT germplasm collection. Race-specific reactions were most common, with 54 accessions resistant to race 3, 23 resistant to race 1, and 5 resistant to races 1 and 3; no specific resistance has yet been found to race 2. (CIAT)

0852

29127 TEMPLETON, M.D.; MITCHELL, R.E.; SULLIVAN, P.A.; SHEPHERD, M.G. 1985. The inactivation of ornithine transcarbamoylase by N(delta)-(N'-sulpho-diaminophosphinyl)-L-ornithine. Biochemical Journal 228(2):347-352. En., Sum. En., 17 Ref., Il. [Plant Diseases Division, Dept. of Scientific & Industrial Research, Auckland, New Zealand]

Phaseolus vulgaris. Pseudomonas syringae pv. phaseolicola. Enzymes. Plant toxins. New Zealand.

In vivo phaseolotoxin, a phytotoxin produced by Pseudomonas syringae pv. phaseolicola, is cleaved to release N(delta)- (N'-sulpho-diaminophosphinyl)- L-ornithine, the major toxic chemical species present in diseased bean leaf tissue. The interaction between N(delta)-(N'-sulpho-diaminophosphinyl)-L-ornithine and ornithine transcarbamoylase is reported.

N(delta)-(N'-Sulpho-diaminophosphinyl)-L-ornithine was found to be a potent inactivator of the enzyme, in contrast with phaseolotoxin, which previously has been reported to inhibit the enzyme reversibly. Inactivation by N(delta)-(N'-((35)S)sulpho-diaminophosphinyl)-L-ornithine resulted in the incorporation of (35)S into ethanol-precipitated protein. The stoicheiometry of (35)S incorporation was approx. 1 mol/mol of active sites. Cleavage of phaseolotoxin to N(delta)-(N'-sulpho-diaminophosphinyl)-L-ornithine in vivo appears to be an important function in the physiology of the disease. (AS (extract))

0853

29727 VISSER, R.; HOLZAPFEL, W.H.; BEZUIDENHOUT, J.J.; KOTZE, J.M. 1986. Antagonism of lactic acid bacteria against phytopathogenic bacteria. Applied and Environmental Microbiology 52(3):552-555. En., Sum. En., 36 Ref., Il. [Dept. of Microbiology & Plant Pathology, Univ. of Pretoria, 0002 Pretoria, South Africa]

Phaseolus vulgaris. Xanthomonas campestris pv. phaseoli. Erwinia carotovora. Pseudomonas syringae pv. syringae. Disease control. Biological control. Lactobacillus plantarum. Inoculation. South Africa.

A var. of lactic acid bacteria, isolated from plant surfaces and plant-associated products, were found to be antagonistic to test strains of the phytopathogens Xanthomonas campestris, Erwinia carotovora, and Pseudomonas syringae. Effective in vitro inhibition was found both on agar plates and in broth cultures. In pot trials, treatment of bean plants with a Lactobacillus plantarum strain before inoculation with Pseudomonas syringae caused a significant reduction of the disease incidence. (AS)
See also 0840 0927 0928 0929 0935 0954 0956 1004

E03 Mycoses

0854

29151 ABDEL-HAFEZ, S.I.I. 1984. Mycoflora of bean, broad bean, lentil, lupine and pea seeds in Saudi Arabia. Mycopathologia 88(1):45-49. En., Sum. En., 11 Ref. [Dept. of Botany, Faculty of Science, Assiut Univ., Assiut, Egypt]

Phaseolus vulgaris. Seeds. Mycoses. Saudi Arabia.

Using the seed-plate method on glucose-Czapek's agar at 28 degrees Celsius (plus or minus 2 degrees Celsius), 24 genera and 60 species in addition to 2 var. of fungi were collected from bean, broad bean, lentil, lupine, and pea seeds collected in markets in western Saudi Arabia. The most frequent genera were Aspergillus (16 species plus 2 var.), Penicillium (14 species), Rhizopus (1 species) and yeasts, followed by Fusarium (3 species), Mucor (4 species), and Drechslera (3 species). From the preceding genera, Aspergillus niger, A. flavus, Penicillium citrinum, Rhizopus stolonifer, Fusarium moniliforme or F. oxysporum, Mucor hiemalis or M. racemosus, and Drechslera spicifera were the most prevalent species. In beans 20 genera, 8 species, and 1 var. were collected: A. niger and A. flavus constituted 15.40 and 4.82 percent of total fungi in bean, Penicillium (in particular P. citrinum) 4.82 percent, R. stolonifer 20.23 percent, yeasts 33.14 percent, Fusarium 2.70 percent, Mucor 5.97 percent, and Drechslera 1.73 percent. (AS)

0855

28803 ADESANYA, S.A.; O'NEILL, M.J.; ROBERTS, M.F. 1986. Structure-related fungitoxicity of isoflavonoids. Physiological and Molecular Plant Pathology

29(1):95-103. En., Sum. En., 15 Ref., Il. [Dept. of Pharmacognosy, Faculty of Pharmacy, Univ. of Ife, Ile-Ife, Nigeria]

Phaseolus vulgaris. Aspergillus niger. Cladosporium cucumerinum. Phytoalexins. Fungicides. United Kingdom.

A series of isoflavones, isoflavanones, pterocarpans, isoflavans, and the coumestan aureol, obtained from Phaseolus vulgaris, P. aureus, P. mungo, P. coccineus, and P. lunatus, were tested for fungitoxicity against Aspergillus niger and Cladosporium cucumerinum. The relationship between their structure and fungitoxicity was also studied. A high level of lipophilicity and the presence of at least one phenolic function appear important to isoflavonoid fungitoxicity. The yield and range of structurally different isoflavonoids elicited in each of the 5 species in response to CuC12 are discussed in relation to plant/fungus interactions. (AS)

0856

28928 AKIEW, E.B. 1980. Pyracarbolid, a new systemic fungicide for bean rust control (Uromyces phaseoli). MSAC Research Journal no.6-7:72-74. En., Sum. En.

Phaseolus vulgaris. Uromyces phaseoli. Disease control. Fungicides. Philippines.

Bean plants were allowed to grow until symptoms of bean rust caused by Uromyces phaseoli were observed on a few plants. The test chemical pyracarbolid was then applied at rates of 0.01125, 0.0225, 0.03, and 0.045 percent a.i./ha. Based on a 1-9 rating system for infection, and results of 3 trials, pyracarbolid at 0.01125 percent a.i./ha gave effective control of U. phaseoli. Benomyl at 0.05 percent a.i./ha gave no control. No phytotoxic effect was observed at 0.01125 percent. Higher rates showed traces of phytotoxicity. (AS)

0857

27261 AYLOR, D.E.; FERRANDINO, F.J. 1985. Escape of urediniospores of Uromyces phaseoli from a bean field canopy. Phytopathology 75(11):1232-1235. En., Sum. En., 9 Ref., Il. [Dept. of Plant Pathology & Ecology, The Connecticut Agricultural Experiment Station, P.O. Box 1106, New Haven 06504, USA]

Phaseolus vulgaris. Uromyces phaseoli. Canopy. Disease transmission. USA.

Vertical profiles of wind speed and aerial concn. of urediniospores of Uromyces phaseoli were measured on several occasions above a 0.25-ha field of bean plants severely diseased with U. phaseoli. The aerial concn. of single (singlets) urediniospores and of clusters of 2 (doublets) and 3 (triplets) urediniospores were determined separately, and the upward flux at 0.5 m above the canopy was calculated for each. The upward flux, or escape, of singlets ranged between 6-31 spores/square meter/s and was about 2-7 times greater than the escape of doublets and about 5-30 times greater than the escape of triplets. The relative proportions of singlets, doublets, and triplets escaping the canopy agreed with the proportions of each released by the crop, as assessed by the relative no. of each caught on horizontal, sticky glass slides placed within the crop. (AS)

0858

28922 BISIACH, M.; MINERVINI, G.; VERCESI, A. 1985. Indagini sull'attivita' di Trichoderma spp. verso Pythium ultimum Trow. (Research on the activity of Trichoderma spp. against Pythium ultimum). Difesa delle Piante 8(2):115-125. It., Sum. It., En., 22 Ref., Il.

Phaseolus vulgaris. Pythium ultimum. Disease control. Trichoderma harzianum. Races. Seed treatment. Integrated control. Biological control. Chemical control. Italy.

The antagonistic activity of 11 strains of Trichoderma spp. against Pythium ultimum was tested on spinach and bean. One strain of T. viride, 1 of T. harzianum, and 1 of Trichoderma sp. were the most effective in controlling serious infection on both hosts. On bean, the protection index obtained by these strains varied from 75 to 90 percent. Emergence and development of seedlings were not modified by introducing only Trichoderma spp. into the soil. Effectiveness of the tested strains against P. ultimum was mostly due to their competitive activity. Advantages of seed treatments and the use of a mixture of antagonistic strains are discussed. An integrated control of P. ultimum based on biological and chemical methods is proposed. (AS)

0859

28802 DHINGRA, O.D.; FERNANDEZ, C.M.A.; KUSHALAPPA, A.C. 1986. Lack of relationship between field incidence of bean anthracnose and production of seeds, transmitting Colletotrichum lindemuthianum. Fitopatologia Brasileira 11(1):95-101. Pt., Sum. En., Pt., 8 Ref. [CENTREINAR, Caixa Postal 270, 36.570 Vicosa-MG, Brasil]

Phaseolus vulgaris. Colletotrichum lindemuthianum. Disease transmission. Rainfall. Seed transmission. Leaves. Pods. Brazil.

A study was conducted at 2 locations, Vicosa and Coimbra, in Brazil during the rainy and nonrainy seasons to determine the relationship between disease prevalence in bean fields and the production of seeds transmitting Colletotrichum lindemuthianum. Depending on the location and the season, the disease prevalence on leaves varied from 0 to 62.70 percent and on pods, from 0 to 52.72 percent. The percentage of seeds transmitting C. lindemuthianum varied from 0 to 4.16 percent. Depending on the location and the season of planting, disease prevalence on leaves accounted for only 29.0-40.6 percent of the variation in seed infestation/infection; on the other hand, disease prevalence on pods accounted for 38.6-52.0 percent of the variation in seed infestation/infection by C. lindemuthianum. In spite of high disease prevalence on leaves during the rainy season, the disease prevalence on pods and proportion of seeds transmitting the pathogen was low. In the nonrainy season, as compared with the rainy season, disease prevalence on leaves was low but on pods and seeds was high. The proportion of seeds transmitting the pathogen, produced during the rainy season, was considerably lower than those produced during the nonrainy season. (AS)

0860

28917 HERRERA I., L.; CAMARA, M.; GALANTAI, E. 1986. Supervivencia de Sclerotium rolfsii Sacc. en el suelo. (Survival of Sclerotium rolfsii in the soil). Centro Agrícola 13(2):34-38. Es., Sum. Es., En., 8 Ref., Il.

Phaseolus vulgaris. Sclerotium rolfsii. Etiology.

The survival of mycelium and the viability of sclerotia of Sclerotium rolfsii were studied under natural conditions using the method of bean stem segment colonized in plastic net bags buried at different soil depths. Mycelium survival decreased after 100 days on bean stem segments, reaching only 5 percent at a depth of 25 cm at 7 mo. The sclerotia lost their viability after 60 days, reaching between 10-20 percent germination at 150 days. Soil depth greatly affected the survival of S. rolfsii. The practical importance of these results and their interrelationship with S. rolfsii incidence on several hosts are discussed. (AS)

0861

28075 LAEMMLEN, F.; SAETTLER, F. 1980. White mold... an annual threat. Michigan Dry Bean Digest 4(4):24. En.

Phaseolus vulgaris. Whetzelinia sclerotiorum. Symptomatology. Etiology. Disease control. Chemical control. USA.

Symptoms of white mold on beans caused by Sclerotinia sclerotiorum and general characteristics of the fungus are briefly described. The conditions that allow the microorganism to survive from one season to another are mentioned as well as conditions required by the fungus to become active. Some considerations the grower should keep in mind to decide whether to control the disease are enumerated and general recommendations for chemical control of the disease with benomyl are given. (CIAT)

0862

28907 MEREDITH, F.I.; THOMAS, C.A.; HORVAT, R.J. 1986. Isolation of coumarin in snap beans and its effect on uredospore germination. Journal of Agricultural and Food Chemistry 34(3):456-458. En., Sum. En., 16 Ref., Il. [Richard B. Russell Agricultural Research Center, United States Dept. of Agriculture, Agricultural Research Service, Athens, GA 30613, USA]

Phaseolus vulgaris. Snap beans. Cultivars. Leaves. Pods. Analysis. Uromyces phaseoli. Disease physiology and biochemistry. USA.

Coumarin was isolated and identified for the 1st time from leaves and pods of 5 snap bean cv. Isolation of coumarin was by TLC and identification by thin-layer cochromatography, ultraviolet spectroscopy, and mass spectrometry. The max. concn. of coumarin in all leaf and pod tissues analyzed never exceeded 3.0 micrograms/g fresh wt. Results of uredospore germination test are presented, showing that coumarin concn. in the leaf and pod are below the threshold necessary to stimulate uredospore germination. (AS)

0863

28232 MORA N., O.A. 1986. Variabilidade patogenica de Uromyces phaseoli var. typica Arth. no Brasil e o problema da identificacao de racas fisiológicas. (Pathogenic variability of Uromyces phaseoli var. typica in Brazil and the problem of identification of physiological races). Tese Mag.Sc. Vicosa-MG, Brasil, Universidade Federal de Vicosa. 78p. Pt., Sum. Pt., 53 Ref., Il.

Phaseolus vulgaris. Isolation. Uromyces phaseoli. Cultivars. Races. Brazil.

Eighty monopustular isolates were obtained from bean leaves infected with Uromyces phaseoli coming from the states of Santa Catarina, Paraná, Sao Paulo, Rio de Janeiro, Minas Gerais, Espírito Santo, Goiás, and Pernambuco (Brazil). After multiplication, the isolates were inoculated on 20 differential var. and were evaluated according to a scale of degrees of infection. Fifty-three physiological races were identified. (AS-CIAT)

0864

29146 MORSHED, M.S. 1985. In vitro antagonism of different species of Trichoderma on some seed-borne fungi of bean (Phaseolus vulgaris L.). Bangladesh Journal of Botany 14(2):119-126. En., Sum. En., 10 Ref., Il. [Dept. of Botany, Dhaka Univ., Bangladesh]

Phaseolus vulgaris. Mycoses. Seed transmission. Culture media. Biological control. Bangladesh.

Antagonism between different species of Trichoderma and 5 bean seed-borne fungi (Fusarium oxysporum, F. culmorum, Alternaria tenuis, Botrytis cinerea, and Colletotrichum lindemuthianum) were demonstrated in vitro. The growth of T. viride was found to be vigorous in dual culture and effective as hyperparasite by penetration and coiling of its hyphae around the host hyphae. T. glaucum was effective as hyperparasite by metabolites and T. album produced lysis and inhibition of the pathogens. (AS)

0865

27742 MULLINS, C.A.; HILTY, J.W. 1986. Snap bean response to new fungicides for rust control. Bean Improvement Cooperative. Annual Report 29:71-72. En., 3 Ref. [Depts. of Plant & Soil Science & Entomology & Plant Pathology, Univ. of Tennessee Plateau Experiment Station, Rt. 9, Box 363, Crossville, TN 38555, USA]

Phaseolus vulgaris. Snap beans. Uromyces phaseoli. Disease control. Fungicides. Yields. USA.

The effect of 8 fungicides (maneb, propiconazol, bitertanol, HWG 1608, RH-3866, KWH 0519, DPX H6573, and XE 779) in snap bean rust control was evaluated at Plateau Expt. Station (Tennessee, USA) in 1985. No crop injury or yield reductions were found. A table with the doses, the application frequency, and the yields obtained is included. (CIAT)

0866

29161 PONTI, I.; LAFFI, F. 1984. Ruggine del fagiolo. Agente causale: Uromyces appendiculatus (Pers.) Link. (Bean rust. Causal agent: Uromyces appendiculatus). Informatore Agrario 40(41):43-44. It., Il.

Phaseolus vulgaris. Symptomatology. Etiology. Epidemiology. Disease control. Uromyces phaseoli. Italy.

The symptomatology, etiology, epidemiology, and control of bean rust are briefly described. (CIAT)

0867

28972 ROBERTI, R.; FLORI, P.; GIORDANI, G. 1985. Disinfezione del seme di fagiolo (Phaseolus vulgaris L.) contro Colletotrichum lindemuthianum (Sacc. et Magn.) Br. et Cav. (Bean seed treatment against Colletotrichum lindemuthianum). Difesa delle Piante 8(1):3-13. It., Sum. It., En., 11 Ref., Il.

Phaseolus vulgaris. Colletotrichum lindemuthianum. Disease control. Chemical control. Seed treatment. Italy.

The results of greenhouse and field trials conducted on the control of Colletotrichum lindemuthianum in beans are presented. Seeds were treated with various fungicides (6 g/kg seeds) and the microorganism was artificially inoculated into the soil. In the greenhouse, where a severe infection occurred, captafol and carboxin gave best results, followed by thiram and benomyl. In the field, thiram was most effective; good results were also obtained with benomyl, bitertanol, captafol, carboxin, and iprodione. Tests revealed the presence of C. lindemuthianum in the infected control group in about 11 percent of the beans. In the other treated groups, the pathogen was only found in very few seeds. (AS)

0868

28074 SAETTLER, A.W.; CORREA, F.J. 1983. Angular leaf spot in seed fields of Michigan red kidney beans. Michigan Dry Bean Digest 8(2):2-3. En., Il.

Phaseolus vulgaris. Isariopsis griseola. Symptomatology. Epidemiology. Cultivars. Resistance. Pathogenicity. USA.

Symptoms of angular leaf spot, caused by Isariopsis griseola, which was not considered a disease problem in the USA till the 1982-83 growing season, are briefly described. The procedure for the pathogenicity tests carried out in NE Michigan, USA, with different bean cv. is included. Foliage and pod reactions on beans obtained after inoculation of different isolates from Michigan and Wisconsin (USA), Colombia, and Brazil are described. Kidney and cranberry bean types were especially susceptible to the infection with Michigan and Wisconsin strains. (CIAT)

0869

28024 SANTOS, A.F. DOS; ATHAYDE, J.T.; DAN, E.L.; PACOVA, B.E.V. 1986. Fungos associados as sementes de feijao (Phaseolus vulgaris L.) no Estado do Espírito Santo. (Fungi associated with bean seeds in the State of Espírito Santo). Cariacica-ES, Brasil, Empresa Capixaba de Pesquisa Agropecuaria. Comunicado Técnico no.43. 3p. Pt., 3 Ref. [Empresa Brasileira de Pesquisa Agropecuaria, Centro de Pesquisa do Cacau, Caixa Postal 7, 45.600 Itabuna-BA, Brasil]

Phaseolus vulgaris. Mycoses. Seed. Brazil.

A total of 133 bean seed samples were collected from farmers' fields in the state of Espírito Santo, Brazil, to evaluate the fungus population. Fusarium spp. and Aspergillus sp. were observed on 65.9-70.9 percent, resp., of the samples. (CIAT)

0870

29109 SENGOOBA, T.N.; MUKIIBI, J. 1986. Studies on inoculum sources of angular leaf spot of beans caused by Phaeoisariopsis griseola in Uganda. Tropical Pest Management 32(4):288-291. En., Sum. En., 12 Ref. [Dept. of Agriculture, Kawanda Research Station, P.O. Box 7065, Kampala, Uganda]

Phaseolus vulgaris. Isariopsis griseola. Cultivars. Seed transmission. Etiology. Uganda.

The sources of inoculum for angular leaf spot of beans were investigated. The causal fungus was confirmed as seed-borne in all the cv. tested (Banja 2, K20, K111, K112 y K113). The fungus caused seed discoloration but not all infected seeds were discolored. Seed to seedling transmission was low. The fungus survived in infected crop debris for a max. of 9 and 4-6 mo. under indoor and outside conditions, resp. Under soil, the fungus survived for only 2 mo. Infected off-season crops and volunteer plants were present at the time of planting the seasons' crops and were an obvious source of the inoculum. It is concluded that the seed, crop debris, off-season crops, and volunteer plants are all possible sources of Isariopsis griseola infection under the local conditions of Kampala, Uganda. (AS)

0871

29128 SINGH, J.P.; MUSYIMI, A.B.K. 1980. Chemical control of bean rust in Kenya. East African Agricultural and Forestry Journal 45(3):207-209. En., Sum. En., 9 Ref.

Phaseolus vulgaris. Uromyces phaseoli. Disease control. Fungicides. Kenya.

Bean rust was most effectively controlled and a corresponding increase in yield obtained from 4 foliar sprays of either bitertanol at the rate of 1.75 liters/ha or triadimefon at the rate of 500 g/ha. (AS (extract))

0872

29103 TRIPATHI, K.C. 1985. Occurrence of floury leaf spot of French bean in Uttar Pradesh Hills. Indian Botanical Reporter 4(2):175. En., 2 Ref. [Govt. Valley Fruit Research Station, Srinagar (Garhwal) 246 174, India]

Phaseolus vulgaris. Ramularia phaseoli. Symptomatology. Etiology. Snap beans. India.

The symptomatology and etiology of floury leaf spot in French beans in Uttar Pradesh hills, India, are briefly described. Symptoms observed agree with those caused by Ramularia phaseolina. (CIAT)

0873

28888 TU, J.C. 1986. Control of anthracnose disease (Colletotrichum lindemuthianum) of navy bean (Phaseolus vulgaris). Mededelingen Van de Faculteit Landbouwetenschappen Rijksuniversiteit Gent 51(2b):645-651. En., Sum. En., Fr., 22 Ref. [Research Station, Research Branch Agriculture Canada, Harrow, Ontario NOR 1GO, Canada]

Phaseolus vulgaris. Colletotrichum lindemuthianum. Disease control. Integrated control. Seed treatment. Backcrossing. Canada.

The application of an integrated control program to control anthracnose in navy beans in southern Ontario, Canada, is discussed. Procedures consisted of seed treatment, pedigreed seed inspection, a 3-yr rotation, and a backcross breeding program. A seed treatment formulation, DCT (diazinon 6 percent, captan 18 percent, and thiophanate 14 percent), was developed and registered. Seed treatments provided added insurance to all the pedigreed seeds that were thoroughly inspected, to ensure zero anthracnose infection in the field. The 3-yr rotation was later found to be unnecessary, because an epidemiological investigation showed the inability of the fungus to overwinter in Ontario. The disease was brought under control by 1981, at which time no anthracnose was found. A backcross breeding program was also instituted in 1977 to transfer the ARE gene, a gene that confers resistance to the alpha, beta, gamma, delta, lambda, and epsilon races, to all recommended Ontario navy beans. In 1984, resistant cv. Harofleet, Harckent, OAC Seaforth, and OAC Rico were released and the disease was completely controlled. (AS)

0874

28889 TU, J.C. 1986. Integrated disease control of white mold (Sclerotinia sclerotiorum) in navy bean (Phaseolus vulgaris). Mededelingen Van de Faculteit Landbouwwetenschappen Rijksuniversiteit Gent 51(2b):731-740. En., Sum. En., Fr., 26 Ref. [Research Station, Research Branch Agriculture Canada, Harrow, Ontario NOR 1GO, Canada]

Phaseolus vulgaris. Whetzelinia sclerotiorum. Disease control. Integrated control. Canada.

Since 1978 an integrated control program has been adapted in Ontario, Canada, to combat the white mold in navy bean. The program includes (a) identifying disease-infested fields; (b) treating seeds with DCT (diazinon 6 percent, captan 18 percent, and thiophanate 14 percent; (c) predicting disease occurrence according to weather patterns; (d) applying preventive fungicide spray using chlorothalonil, benomyl, iprodione, or thiophanate methyl; and (e) developing tolerant and resistant cv. Each one of these components is described and discussed. The program has proven effective in controlling the white mold disease. (AS (extract))

0875

28890 TU, J.C. 1986. Isolation and characterization of three distinct biotypes of the gamma race of Colletotrichum lindemuthianum from white bean. Microbios 46(188-189):187-192. En., Sum. En., 8 Ref., Il. [Research Station, Research Branch, Agriculture Canada, Harrow, Ontario NOR 1GO]

Phaseolus vulgaris. Races. Colletotrichum lindemuthianum. Cultivars. Pathogenicity. Canada.

Three distinct biotypes of Colletotrichum lindemuthianum were isolated from a series of white bean cv. which showed a differential range of disease severities when inoculated with the gamma race. The biotypes differed from the parental gamma race in pathogenicity, spore production, and cultural characteristics in Mathur's agar. They also exhibited noticeable differences in colony features on Mathur's agar containing a concn. of 25 mg benomyl/liter. Their pathogenicity differences were persistent and were confirmed by reinoculation. The biotypes, however, did not differ significantly in growth rate and spore size. (AS)

0876

29148 TU, J.C. 1985. An improved Mathur's medium for growth, sporulation, and germination of spores of Colletotrichum lindemuthianum. Microbios 44(178):87-93. En., Sum. En., 13 Ref., Il. [Agriculture Canada, Research Station, Harrow, Ontario NOR 1GO Canada]

Phaseolus vulgaris. Colletotrichum lindemuthianum. Culture media. pH. Canada.

The race delta of Colletotrichum lindemuthianum was grown on Mathur's medium at different pH, day length, and concn. of dextrose, yeast extract, and agar under lab. conditions, in an attempt to improve sporulation and culture stability. Growth, sporulation, and germination of spores of the fungus were monitored relative to nutritional and cultural factors. An improved Mathur's medium, which met the requirements for growth, sporulation, and germination of spores, was formulated. It contained dextrose, 11.2 g; $MgSO_4.7H_2O$, 2.5 g; KH_2PO_4, 2.7 g; Bacto peptone, 1.0 g; yeast extract, 0.8 g; Bacto agar, 12 g; and 1 liter of water. The medium had a final pH of 5.5. Incubation of plates was best in total darkness at room temp. (22 degrees Celsius). For optimum results, 25 ml of agar/standard size (10 cm) Petri plate was needed. These nutritional and cultural factors have been successfully used for the past 2 yr to maintain cultures of C. lindemuthianum with high spore production and viability. (AS)

0877

27785 VARON DE AGUDELO, F.; MAQUILON L., T. 1985. Pudrición carbonosa del frijol. (Ashy stem blight of beans). ASCOLFI Informa 11(3):23. Es. [Centro Nacional de Investigaciones, Apartado Aéreo 233, Palmira, Colombia]

Phaseolus vulgaris. Macrophomina phaseoli. Symptomatology. Colombia.
The symptoms of ashy stem blight, caused by Macrophomina phaseoli, in bean var. Calima are described. (CIAT)

0878

29131 ZULU, J.N.; WHEELER, B.E.J. 1981. Level of disease incidence on trifoliolate leaves of beans (Phaseolus vulgaris) in relation to primary infection on simple leaves infected with the same fungus. Zambia Journal of Science and Technology 6(1):14-19. En., Sum. En., 4 Ref., Il.

Phaseolus vulgaris. Cultivars. Uromyces phaseoli. Inoculation. Leaves. Resistance. Zambia.

Expt. with plants of Phaseolus vulgaris cv. Prince showed that 1st trifoliolate leaves inoculated with rust (Uromyces phaseoli) developed significantly fewer pustule no., if the simple leaves of the same plants were infected with the same rust disease; however, expt. with cv. Pinto (more susceptible) did not show this association. Inoculating the simple leaves of cv. Prince with a higher concn. of the inoculum did not increase the resistance of the 1st trifoliolate leaves. Similarly, inoculating the simple leaves of Prince with a noncompatible rust (U. viciae-fabae) did not induce resistance to U. phaseoli in the 1st trifoliolate leaves. (AS) See also 0722 0765 0818 0826 0840 0844 0893 0927 0928 0929 0935 0937 0948 0960 1004

E04 Viroses

0879

28961 BARAKAT, A.; STEVENS, W.A. 1986. Effects of Gypsophila paniculata extracts on the infectivity of plant viruses. Microbios Letters 31(123-124):137-142. En., Sum. En., 19 Ref. [Dept. of Botany, Faculty of Science, Ain Shams Univ., Cairo, Egypt]

Phaseolus vulgaris. Snap beans. Viroses. Resistance. Disease control. Egypt.

Aqueous extracts of Gypsophila paniculata when sprayed onto the upper leaf surfaces of Phaseolus vulgaris, Gomphrena globosa, and Nicotiana tabacum (local lesion hosts to tobacco necrosis virus, potato virus X, and TMV, resp., reduced local lesion no. Inhibition was most effective when the spray was made 1 day before inoculation with the virus, but was still effective after 6 days. The inhibition of local lesion production by potato virus X decreased more rapidly than inhibition of tobacco necrosis virus or TMV. Application of G. paniculata extracts to lower leaf surfaces brought about inhibition of virus applied to the upper surfaces and some form of induced resistance was indicated. Resistance also occurred in young leaves of French bean when G. paniculata inhibitor was applied to the primary leaf opposite to that receiving the virus. (AS)

0880

28692 CACERES O., S.R.; MORALES, F.J. 1985. Incorporación de genes de resistencia dominante y recesiva a cepas del virus del mosaico común en dos variedades comerciales de frijol (Phaseolus vulgaris L.). (Incorporation of dominant and recessive resistance genes to bean common mosaic virus strains in two commercial bean varieties). Acta Agronómica 35(4):7-20. Es., Sum. Es., En., 3 Ref.

Phaseolus vulgaris. Bean common mosaic virus. Cultivars. Resistance. Crossbreeding. Genes. Races. Colombia.

Monogenic dominant resistance was incorporated in F4 and F5 lines possessing commercial grain type characteristics similar to those of Diacol Calima, a BCMV-susceptible bean cv. of economic importance in Colombia. This study, however, confirmed earlier reports that indicated the linkage between I-gene hypersensitive resistance to BCMV and the darker red (purple) color. Simultaneously, recessive genes (effective against necrotic BCMV strain capable of challenging the hypersensitive gene that conditions dominant resistance to common mosaic) were successfully combined with the dominant hypersensitive gene in red kidney grain type derived from the var. Royal Red. It is expected that this kind of multiple resistance, dominant and recessive, would protect bean genotypes against all of the known BCMV strains. (AS)

0881

28804 DESCHAMPS P., H.M. 1986. Hospedantes alternos del mosaico dorado de la habichuela (Phaseolus vulgaris L.). Tesis Mag.Sc. Mayaguez, Universidad de Puerto Rico. 64p. Es., Sum. Es., En., 45 Ref., Il.

Phaseolus vulgaris. Snap beans. Bean golden mosaic virus. Bemisia tabaci. Vectors. Host range. Disease transmission. Cultivars. Puerto Rico. Dominican Republic.

A survey of the host range of BGMV was conducted in the Dominican Republic and virus transmission tests were carried out with several plant species that are frequently associated with the insect vector Bemisia tabaci. The inoculum used in these tests was obtained in the Dominican Republic. The geminivirus was detected in the families Nyctaginaceae, Papilionaceae, Euphorbiaceae, Tiliaceae, Malvaceae, Sterculiaceae, Convolvulaceae, and Compositae. Phaseolus lunatus cv. Haba de Tocón, P. vulgaris cv. Top Crop and Pompadour, and Macroptilium lathyroides were the only species affected. These showed symptoms similar to those observed under field conditions in Puerto Rico. It was found that both strains of BGMV (Puerto Rican and Dominican) have the same host range. (AS)

0882

29612 EL-HAMMADY, M.; HABIB, S.A.; ABO-EL-ATTA, O.K.; AWAD, M. 1983. Interaction between BCMV and BYMV in relation to anatomical structure of bean leaves (Phaseolus vulgaris L.). Annals of Agricultural Sciences 28(3):1123-1141. En., Sum. En., Ar., 25 Ref., Il. [Faculty of Agriculture, Ain Shams Univ., Cairo, Egypt]

Phaseolus vulgaris. Bean common mosaic virus. Bean yellow mosaic virus. Leaves. Cytology. Egypt.

Single infection with BCMV and BYMV reduced thickness, no., and size of certain tissues and cells in bean leaves. Palisade cells were abnormal in their shape and arrangement, intercellular spaces differed compared with healthy leaves, chloroplasts were markedly affected, development and differentiation of mesophyll tissue into palisade and spongy cells was reduced, and crystals found normally in phloem cells were replaced by some other storage compounds. Double infection with both viruses revealed the existence of an antagonistic effect between the 2 viruses on anatomical characters of bean leaves. (AS)

0883

28896 HERRERA G., G.; SEPULVEDA R., P. 1986. Determinación de una nueva raza del virus del mosaico amarillo del frejol en Chile. (Determination of a new strain of bean yellow mosaic virus on beans in Chile). Agricultura Técnica 46(2):137-142. Es., Sum. En., Es., 9 Ref., Il. [Estación Experimental La Platina, Inst. de Investigaciones Agropecuarias, Casilla 439/3, Santiago, Chile]

Phaseolus vulgaris. Cultivars. Bean yellow mosaic virus. Symptomatology. Chile.

During the 1982-83 and 1983-84 seasons, bean var. Orfeo-INIA, Blanco-INIA, and Tórtola-INIA (resistant to BYMV) showed the following symptoms of infection: mosaic, leaf deformation, and sometimes apical necrosis. The isolated virus was identified as a new strain of BYMV, previously unreported in Chile, on the basis of symptomatology, transmission by mechanical means and by aphids (in a nonpersistent form), lack of transmission by seeds, host range, physical properties, morphology and size of the virus particles. (AS)

0884

27752 KELLY, J.D.; SAETTLER, A.W. 1986. Severe virus outbreaks affect Michigan dry bean production. Bean Improvement Cooperative. Annual Report 29:9-10. En., 2 Ref. [Crop & Soil Sciences, United States Dept. of Agriculture, Agricultural Research Service, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Bean common mosaic virus. Bean yellow mosaic virus. Strains. Cultivars. Resistance. USA.

The isolation of a new necrotic strain of BCMV in Michigan, USA, is reported. The real threat of the new strain is the severe black root or top necrosis reaction induced in hypersensitive resistant I-gene cv. at normal temp. The higher no. of insect vectors present during the 1985 season was demonstrated dramatically by the outbreak of BYMV. Studies are being conducted to verify the no. and type of BCMV strain(s) present in Michigan and to screen presently grown commercial cv. against these strain(s) to identify resistant cv. (CIAT)

0885

28901 MAKKOUK, K.M.; LESEMANN, D.E.; VETTEN, H.J.; AZZAM, O.I. 1986. Host range and serological properties of two potyvirus isolates from Phaseolus vulgaris in Lebanon. Tropical Agriculture Research Series 19:187-194. En., Sum. En., 18 Ref., Il. [National Council for Scientific Research & Faculty of Agricultural & Food Sciences, American Univ. of Beirut, Lebanon]

Phaseolus vulgaris. Bean common mosaic virus. Isolation. Analysis. Antisera. Lebanon.

Two virus isolates obtained from Phaseolus vulgaris in Lebanon were identified as potyviruses with close serological relationship to each other, to blackeye cowpea mosaic virus, to the BCMV-NY 15, and to adzuki bean mosaic virus (AzMV). Both isolates infected 6 plant species belonging to 3 families. The 2 isolates were differentiated from each other by their reaction on 6 IITA-TVu cowpea lines as well as on 7 P. vulgaris cv. In double antibody sandwich ELISA both virus antigens strongly reacted with blackeye cowpea mosaic virus, BCMV-NY 15, and AzMV antisera and weakly with antisera to cowpea aphid-borne mosaic virus, BYMV, and some isolates of BCMV. In reciprocal ELISA tests, antisera to these 2 virus isolates reacted strongly with blackeye cowpea mosaic virus and BCMV-NY 15. Immunosorbent electron microscopy tests confirmed the ELISA results, giving strong reactions when both isolates were tested with antisera to blackeye cowpea mosaic virus, BCMV-NY 15, and AzMV. (AS)

0886

29139 REDOLFI, P. 1983. Protein changes and hypersensitive reaction in virus-infected bean leaves. Rivista di Patologia Vegetale 19(1):7-14. En., Sum. En., It., 23 Ref., Il. [Istituto di Fitovirologia Applicata C.N.R., Via O. Vigliani 104, 10135 Torino, Italy]

Phaseolus vulgaris. Tobacco necrosis virus. Alfalfa mosaic virus. Leaves. Proteins. Italy.

Alterations in the protein patterns of hypersensitively infected (tobacco necrosis virus and alfalfa mosaic virus) bean leaves are reported. Hypersensitive viral infection of bean leaves resulted in the accumulation of at least 3 soluble protein components in leaf tissue. These components appeared to be virus-stimulated but host dependant. One of these proteins was also detected in uninfected leaves as a consequence of increasing age or photoperiod, or when plants reached the flowering stage. These features

are reminiscent of the new, host-coded proteins detected during hypersensitive viral infection of other plant species. (AS)

0887

29200 RUBIES-AUTONELL, C.; FACCIOLI, G. 1985. Distribution of bean common mosaic and bean yellow mosaic viruses in bud tips of Phaseolus vulgaris L. Phytopathologia Mediterranea 24(3):241-244. En., Sum. En., It., 25 Ref., Il. [Istituto di Patologia Vegetale, Universita degli Studi, Bologna, Italia]

Phaseolus vulgaris. Bean common mosaic virus. Bean yellow mosaic virus. Apical meristems. Laboratory experiments. Analysis. Leaves. Disease transmission. Italy.

Distribution of BCMV and BYMV in axillary meristems of bean cv. Taylor was studied by light autoradiography and infectivity tests on shoots obtained by in vitro culture. In autoradiographs BYMV was always absent in meristems of 4 leaf primordia, while BCMV was observed invading the whole meristem in 36 percent of the cases; in 27 percent of the meristems the dome and 1st 2 leaf primordia were virus free, and 36 percent were free up to the 4th-5th leaf primordium. Infectivity tests fully confirmed results on BYMV and gave data similar to those obtained for BCMV: about 70 percent of 4 leaf primordia meristems were virus invaded. (AS)

0888

28891 TU, J.C. 1986. Isolation and characterization of a new necrotic strain (NL-8) of bean common mosaic virus in southwestern Ontario. Canadian Plant Disease Survey 66(1):13-14. En., Sum. En., Fr., 6 Ref. [Research Branch, Harrow Research Station, Agriculture Canada, Harrow, Ontario, NOR 1GO, Canada]

Phaseolus vulgaris. Bean common mosaic virus. Races. Isolation. Pathogenicity. Canada.

Several isolates of BCMV were obtained from Sanilac bean plants showing severe mosaic and occasionally vein necrosis. Based on their pathogenicity to a series of differential hosts, the isolates were determined to be the NL-8 race of BCMV. This is the 1st report of this race in Canada. (AS)
See also 0840 0846 0927 0928 0931 0935 0940 0950 0959 1004

E05 Nematodes

0889

28927 ELLIOTT, A.P.; BIRD, G.W.; SAFIR, G.R. 1984. Joint influence of Pratylenchus penetrans (Nematoda) and Glomus fasciculatum (Phycomycetes) on the ontogeny of Phaseolus vulgaris. Nematropica 14(2):111-119. En., Sum. En., Es., 22 Ref., Il. [Dept. of Plant Pathology & Physiology, Virginia Polytechnic Inst. & State Univ., Blacksburg, VA 24061, USA]

Phaseolus vulgaris. Pratylenchus penetrans. Mycorrhizae. Growth. Yields. USA.

The joint influence of Pratylenchus penetrans and Glomus fasciculatum on the ontogeny of navy beans was examined under greenhouse conditions. Navy bean root colonization by G. fasciculatum was less in the presence of P. penetrans than in its absence. Population densities of P. penetrans were initially lower in plants exposed to only P. penetrans than in plants grown in the presence of both organisms. After 600 cumulative degree-days at a base of 10 degrees Celsius, nematode population densities were greater in

plants exposed to both P. penetrans and C. fasciculatum than in those grown only in the presence of the nematode. Furthermore, the reproductive rate of G. fasciculatum was reduced in the presence of P. penetrans. Plant growth and yield were reduced in the presence of P. penetrans, and increased in the presence of G. fasciculatum. (AS)

0890

29199 GREEN, C.D.; VERDEJO, S. 1985. Colonisation of Pisum sativum and Phaseolus vulgaris by Pratylenchus penetrans in sterile media. Nematologica 31(4):452-457. En., Sum. En., 16 Ref. [Biological & Chemical Research Inst., P.M.B. 10, Rydalmere, New South Wales 2116, Australia]

Phaseolus vulgaris. Pratylenchus. Growth. Roots. Australia.

Pratylenchus penetrans colonized roots of Pisum sativum and Phaseolus vulgaris better from fine graded sand than from perlite. Multiplication was more successful when 200 rather than 20 nematodes were introduced. The growth of P. vulgaris was decreased by introducing 200 nematodes compared with 20. In perlite, growth was inversely proportional to the final no. of nematodes in the roots probably because root contact with the growing medium concentrated the nematode attack. (AS)

0891

29166 HASSELROT DE GOMEZ, T.A. 1986. Reconocimiento de nematodes fitoparásitos asociados al cultivo del poroto (Phaseolus vulgaris L.) en el noroeste argentino. (Identification of plant parasitic nematodes associated with the bean crop in northwestern Argentina). Acta Zoologica Lilloana 38(2):107-111. Es., Sum. En., 12 Ref., Il.

Phaseolus vulgaris. Nematodes. Argentina.

Fifty samples of soil taken in bean fields from 18 circumscriptions of the Tucuman province, Argentina, were analyzed to identify the nematode species present in the crop. The following genera were found: Meloidogyne, Heterodera, Pratylenchus, Helicotylenchus, Hoplolaimus, Paratylenchus, Tylenchorhynchus, Criconemoides, Xiphinema, and Trichodorus. The root-knot nematodes Meloidogyne javanica, M. incognita, M. arenaria, and M. decalineata are one of the most serious problems for bean production in NW Argentina. Damage, importance, and dispersion of these pests are mentioned. (AS)

0892

29184 MELTON, T.A.; JACOBSEN, B.J.; NOEL, G.R. 1986. Effects of temperature on development of Heterodera glycines on Glycine max and Phaseolus vulgaris. Journal of Nematology 18(4):468-474. En., Sum. En., 23 Ref., Il. [USDA, ARS, Dept. of Plant Pathology, Univ. of Illinois, Urbana, IL 61801, USA]

Phaseolus vulgaris. Snap beans. Heterodera glycines. Glycine max. Temperature. Hosts and pathogens. Cultivars. Resistance. USA.

Soybean cyst nematode-resistant Fayette and susceptible Williams 79 soybeans and resistant WIS (RRR) 36 and susceptible Eagle snap beans were used to determine the effects of host and temp. on the development, female production, sex ratios, and host response to Heterodera glycines. Temp. were maintained constant at 16, 20, 24, 28, and 32 degrees Celsius using water-filled tanks. The developmental stage of the nematode was predicted by an equation and accounted for 84 percent of the variation. Male: female ratios did not differ within this range and were generally less than one. At all temp. the resistant soybean produced the greatest no. of necrotic responses to H. glycines infection, followed by the resistant snap bean.

The susceptible soybean and snap bean produced the fewest necrotic responses. (AS)

0893

28925 MORGAN-JONES, G.; RODRIGUEZ-KABANA, R.; GOMEZ T., J. 1984. Fungi associated with cysts of Heterodera glycines in the Cauca Valley, Colombia. Nematropica 14(2):173-177. En., Sum. Es., 12 Ref. [Dept. of Botany, Plant Pathology & Microbiology, Alabama Agricultural Experiment Station, Auburn Univ., AL 36849, USA]

Phaseolus vulgaris. Heterodera glycines. Mycoses. USA.

Results of a survey of fungi associated with Heterodera glycines cysts in Valle del Cauca, Colombia, a region where the nematode was unknown before 1982, showed the presence of a relatively reduced no. of mycoflora species. The cysts for the study were obtained from soils of soybean and bean fields located near Palmira. Predominating fungi species were Fusarium equiseti, F. lateritium, F. moniliforme, F. oxysporum, F. solani, Geotrichum candidum, Gliocladium catenulatum, G. roseum, Paecilomyces lilacinus, Phoma medicaginis var. pinodella, Memnomella echinata, and Trichocladium asperum. The presence of Stagonospora heteroderae, a species that had already been found in association with H. glycines cysts in the USA, was also observed. More than a 3rd of the examined cysts were colonized by fungi. (AS-CIAT)
See also 0818

E06 Physiological Disorders

0894

28909 CHEVONE, B.I.; HERZFELD, D.E.; KRUPA, S.V.; CHAPPELKA, A.H. 1986. Direct effects of atmospheric sulfate deposition on vegetation. Journal of the Air Pollution Control Association 36(7):813-815. En., Sum. En., 23 Ref. [Virginia Polytechnic Inst. & State Univ., Blacksburg, VA 24060, USA]

Phaseolus vulgaris. Ozone. SO2. Plant injuries. Chlorophyll. Air pollution. Plant physiological disorders. USA.

Acid sulfate aerosol (500 micrograms/cubic meter) had no effect on soybean or pinto bean (cv. WYO 166) after a single 4-h exposure; however, visible injury and chlorophyll loss occurred when plants were sequentially exposed to acid aerosol and O3 (380 micrograms/cubic meter) for 4 h. Ambient wet and dry sulfate concn. appear insufficient to directly impact vegetation. (AS)

0895

29180 CRAKER, L.E.; BERNSTEIN, D. 1984. Buffering of acid rain by leaf tissue of selected crop plants. Environmental Pollution (Series A) 36(4):375-381. En., Sum. En., 10 Ref., Il. [Dept. of Plant & Soil Sciences, Univ. of Massachusetts, Amherst, MA 01003, USA]

Phaseolus vulgaris. Dwarf beans. Leaves. Plant physiological disorders. S. USA.

The buffering ability of leaf tissue of several crops, among them red kidney bush bean, was evaluated by placing sections of leaves in a simulated, sulphuric acid rain solution. Changes in the pH of the solution were followed for up to 4 h with large differences in acid buffering among the plants being measured. It is hypothesized that the buffering could protect crop plants from extensive acid rain injury. Red kidney beans and wheat had the greatest pH change among the species tested. Also, leaf

sections from red kidney beans, red clover, and Phleum pratense plants appeared the most susceptible to visual injury from acid rain. (CIAT)

0896

29111 ITO, O.; OKANO, K.; TOTSUKA, T. 1986. Effects of NO2 and O3 exposure alone or in combination on kidney bean plants: amino acid content and composition. Soil Science and Plant Nutrition 32(3):351-363. En., Sum. En., 16 Ref., Il. [Dept. of Farm Chemicals, National Inst. of Agro-Environmental Sciences, 3-1-1, Kannondai, Yatabe, Ibaraki, 305 Japan]

Phaseolus vulgaris. NO2. Ozone. Amino acids. Roots. Leaves. Japan.

The effects of NO2 and O3 exposure alone or in combination were investigated with respect to the amino acid content and composition in kidney bean. The short-term exposure (up to 8 h) to NO2 at a concn. of 4.0 ppm alone or in combination with O3 at a concn. of 0.4 ppm induced a rapid increase in the total amino acid content, among which glutamine accounted for most of the part. Total amino acid content was also increased by O3 exposure at 0.4 ppm after a lag period of 2 h. Ammonium level became higher in the case of combined exposure to NO2 and O3, while it remained constant in the case of exposure to NO2 and O3 alone. When the exposure period was extended to 2-7 days (long-term exposure), the increase in the content of the total amino acids was observed in most of treatments. Roots of the plants exposed to various concn. of NO2 and O3 showed the most remarkable increase in the content of total amino acids. Asparagine, in place of glutamine, became a major amino acid. The percentage of asparagine was especially increased by the mixed exposure to NO2 and O3. These results indicate that glutamine which accumulates considerably in the early phase of the gas exposure (short-term exposure) seems to be gradually converted into other amino acids, mainly asparagine. Most of the amino acids in the primary and trifoliate leaves showed a high correlation with the total amino acids. (AS) See also 0734 0828

F00 PEST CONTROL AND ENTOMOLOGY

0897

28694 ALVARADO F., M.C. 1987. Estudios sobre preferencia de alimentación y de oviposición del Empoasca kraemeri Ross and Moore (Homoptera: Cicadellidae). (Studies on Empoasca kraemeri (Homoptera: Cicadellidae) preference for feeding and oviposition on bean varieties). Tesis Bióloga-Entomóloga. Cali, Colombia, Universidad del Valle. 52p. Es., Sum. Es., 23 Ref., Il.

Phaseolus vulgaris. Empoasca kraemeri. Cultivars. Insect biology. Resistance. Colombia.

Research was carried out at CIAT-Palmira to verify the existence of the Empoasca kraemeri non-preference phenomenon for feeding and oviposition under field conditions. Four bean var. (EMP 81, EMP 89, EMP 124, and EMP 135), selected for their resistance characteristics from previous studies, were used. EMP 81 was reconfirmed as a tolerant var. for leafhopper oviposition and feeding. EMP 89 and EMP 135 showed an intermediate performance within the mechanism. EMP 124 was the only var. showing nonpreference regarding E. kraemeri oviposition and feeding, thus being a promising material for increasing the levels of resistance in beans to E. kraemeri. No relationship between plant damage and the no. of nymphs and adults was found and adult and nymph counts 30 days after planting were not significant. (AS-CIAT)

0898

28975 JARRY, M.; CHACON, A.; PARFAIT, G. 1985. Influence des fluctuations de la température et de l'hygrométrie sur "l'activité" quotidienne d'Acanthoscelides obtectus sur des plantes de Phaseolus vulgaris en plein champ. (Influence of temperature fluctuations and hygrometry on the daily activity of Acanthoscelides obtectus on Phaseolus vulgaris plants in the field). Bulletin de la Société Zoologique de France 110(4):395-402. Fr., Sum. Fr., En., 11 Ref., Il. [Univ. of Pau et des Pays de l'Adour, Avenue de l'Université 64000 PAU, France]

Phaseolus vulgaris. Acanthoscelides obtectus. Temperature. Relative humidity. Podding. Solar radiation. Shading. Intercropping. Zea mays. France.

The daily activity of Acanthoscelides obtectus in bean fields reaches a peak during the hot period of the day. Adult activity depends on temp. (above 20 degrees Celsius), sunshine, moisture, and the phenological stage of the pods. The influence of these different environmental factors on A. obtectus activity may be related to a decrease of bruchid attacks in 2 exptl. situations: bean/maize intercropping and artificially shaded plots. (AS)

0899

29164 OGENGA-LATIGO, M.V.; KHAEMBA, B.M. 1985. Some aspects of the biology of the black bean aphid Aphis fabae Scopoli reared on the common bean Phaseolus vulgaris L. Insect Science and its Application 6(5):591-593. En., Sum. En., Fr., 11 Ref., Il. [International Centre of Insect Physiology & Ecology, P.O. Box 30772, Nairobi, Kenya]

Phaseolus vulgaris. Aphis fabae. Insect biology. Laboratory experiments. Kenya.

Investigations were conducted in the greenhouse to evaluate the biological performance of Aphis fabae when bred on 2 common bean var. Mean developmental period of the aphid was 7.8 days at 26.5 degrees Celsius (range 15.0-32.5 degrees Celsius) on bean var. Mwezi Moja (GLP.10) and Red Haricot (GLP.3). The reproductive life of the aphid averaged 15.3 days (range 11-17 days) during which each mother aphid produced on av. 55.2 and 56.2 nymphs on the 2 bean var., resp. Nymphs (66.2 percent) were born during the daytime (0600-1800 h), whereas only 33.8 percent of the nymphs were produced during the night (1800-0600 h). There were 2 peaks of diurnal nymphal production, and more nymphs were born during the morning peak (0600-0800 h) than during the mid-afternoon peak (1400-1600 h). A very high rate of A. fabae population increase was observed. (AS)

0900

29613 PIMBERT, M. 1985. Comparaison du comportement de ponte de Zabrotes subfasciatus Boh. (Col., Bruchidae) en présence de gousses ou de graines de Phaseolus vulgaris L. (A comparative study of the oviposition behavior of Zabrotes subfasciatus (Col., Bruchidae) in the presence of pods or seeds of Phaseolus vulgaris). Biology of Behaviour 10(4):309-319. Fr., Sum. En., Fr., 14 Ref., Il. [Inst. de Biocénotique Expérimentale des Agrosystemes, Univ. F. Rabelais, LA CNRS 340, Avenue Monge, Parc Grandmont, F 37200 Tours, France]

Phaseolus vulgaris. Zabrotes subfasciatus. Pods. Seeds. Oviposition. France.

When in the presence of Phaseolus vulgaris pods, punctured to allow access to the seeds, most females of Zabrotes subfasciatus oviposited randomly or uniformly on the seeds accessible to them; however, when females were

offered seeds only, the pattern of oviposition was much more heterogenous. The egg distribution pattern of about 50 percent of the females showed different degrees of aggregativity, while the other half of the population oviposited at random on the seeds. Both the fecundity and ovarian activity of females in the presence of isolated seeds or seeds inside pods of the host plant were comparable. These results are discussed in terms of the insect's observed oviposition behavior in the field. Implications for the exptl. study of behavior are stressed. (AS)

0901

28906 PRANDO, H.F.; CRUZ, F.Z. DA 1986. Aspectos da biologia de Liriomyza huidobrensis (Blanchard, 1926) (Diptera, Agromyzidae) em laboratorio. (Biological aspects of Liriomyza huidobrensis (Diptera:Agromyzidae) in the laboratory). Anais da Sociedade Entomologica do Brasil 15(1):77-88. Pt., Sum. En., Pt., 8 Ref. [Empresa Catarinense de Pesquisa Agropecuaria, Caixa Postal 277, 88.300 Itajaí-SC, Brasil]

Phaseolus vulgaris. Liriomyza huidobrensis. Insect biology. Brazil.

To obtain information about the biology of Liriomyza huidobrensis on bean cv. Turrialba-4, the following determinations were made (mean values in parentheses): developmental cycle (15.86 days), embryonic development (2.13 days), larval period (5.84 days), pupal period (7.91 days), longevity of adults on the host plant (females, 11.42 days; males, 4.3 days), no. of eggs/female (133), and no. of daily feeding punctures (277.29). The insect behavior during its active phases was also observed and the no. of molts, some particularities about the feeding behavior of larvae and adults, sex ratio, and observations on reproduction were recorded. (AS)

0902

28212 RUPPEL, R.F. 1981. First flowers mark the beginning of a critical period for insect control. Michigan Dry Bean Digest 5(4):7. En., Il.

Phaseolus vulgaris. Insect control. Flowering. USA.

Since the appearance of the 1st flowers on bean plants marks the beginning of a critical period for pest control, some recommendations are included related to plant developmental stages during which crop monitoring should be carried out. The type of injury caused by the most common bean pests is described in general terms and the time at which insecticide sprayings should be done is indicated. (CIAT)

0903

29664 SHARAF, N.S. 1986. Suitability of three host plants for the mass rearing of two-spotted spider mite under greenhouse conditions. Dirasat 13(5):151-156. En., Sum. Ar., En., 11 Ref., Il. [Dept. of Plant Protection, Faculty of Agriculture, Hohenheim Univ., 1973, Jordan]

Phaseolus vulgaris. Tetranychus urticae. Laboratory experiments. Jordan.

Greenhouse expt. were conducted to determine the suitability of common bean, broad bean, and red clover plants for rearing and maintaining large no. of 2-spotted spider mite, Tetranychus urticae. Bean was the most suitable host for rearing T. urticae, but was the most susceptible to damage of heavy mite infestations. Results suggest that broad bean is the most suitable host for rearing T. urticae in greenhouse. (AS (extract)) See also 0826

0904

28950 BAILEY, J.C.; CATHEY, G.W. 1985. Effect of chlordimeform on tarnished plant bug (Heteroptera: Miridae) nymph emergence. Journal of Economic Entomology 78(6):1485-1487. En., Sum. En., 8 Ref.

Phaseolus vulgaris. Lygus lineolaris. Chemical control. Insect control. USA.

Greenhouse and lab. studies were conducted to determine if chlordimeform affected percent egg hatch of Lygus lineolaris. Pole bean (Phaseolus vulgaris) pods and cotton plants in which L. lineolaris adults had deposited eggs were treated with chlordimeform; nymphs were counted 7 days after adults were removed. When pole bean pods were sprayed with or immersed in a 0.09 percent solution of chlordimeform, nymphal emergence was not significantly reduced. (AS)

0905

29000 BERNSTEIN, C. 1985. A simulation model for an acarine predator-prey system (Phytoseiulus persimilis-Tetranychus urticae). Journal of Animal Ecology 54(20:375-389. En., Sum. En., 26 Ref., Il. [Université Claude Bernard, Lyon 1, Laboratoire de Biometrie, 69622 Villeurbanne, Cedex, France]

Phaseolus vulgaris. Tetranychus urticae. Predators and parasites. Phytoseiulus persimilis. Plant injuries. Mite control. Insect biology. USA.

A model is presented that simulates the population dynamics of 2 mites, prey (Tetranychus urticae) and predator (Phytoseiulus persimilis), on a single plant, together with the results of 3 expt. on French beans designed to validate the model. In addition to the reproduction and age structure of both populations and the attack on the prey by the predators, the model explicitly includes the damage the prey (a phytophage) causes to the plant and the emigration of prey and predators. The behavior of the model showed good agreement with the results of the expt. Sensitivity analysis shows that the most critical parameters are those affecting the reproduction of prey and predators. The model was moderately sensitive to the parameters that controlled the emigration and development of both species and the attack on the prey by the predators. The exclusion of the different processes that control the emigration of prey and predators had a strong influence on the simulated dynamics of both populations. (AS (extract))

0906

28895 CALIL, A.C.P.; CHANDLER, L.; GALVAO, J.D.; CASALI, V.W.D.; NOGUEIRA, S.B. 1985. Tabela de vida das culturas para o feijoeiro (Phaseolus vulgaris L.), com enfase nas pragas e seus danos em tres plantios no periodo chuvoso. (The crop life table for beans, with emphasis on pests and their damage, for three planting dates during the rainy season). Revista Ceres 32(181):196-226. Pt., Sum. Pt., En., 49 Ref., Il. [Univ. Federal de Vicosa, 36.570 Vicosa-MG, Brasil]

Phaseolus vulgaris. Injurious insects. Plant development. Timing. Planting. Plant injuries. Brazil.

To understand the relationships between bean pests and the time of plant growth and development, bean cv. Negrito 897 was planted on 3 different dates (Nov. 20 and Dec. 16, 1980, and Jan. 12, 1981) during the rainy season in Vicosa (Minas Gerais, Brazil). Plant mortality for the 3 dates was 38.4, 37.2, and 94.3 percent, resp., calculated from a planting rate of

15 seeds/m of row. Insect pests were responsible for 17.2, 15.4, and 69.7 percent mortality. Comparative data for the 3 plantings were, resp.: 10.9, 8.3, and 2.0 pods/plant; 5.8, 5.8, and 4.8 grains/pod; and 4.4, 1.2, and 0 seeds/pod (harvest). The low pod set in the 3rd planting resulted from the severe defoliation (pod counts on surviving plants) and prevalent weather. Most in-pod (grain-seed) losses were caused, directly or indirectly, by insect pests. Etiella zinckenella damaged 7.6, 8.2, and 3.1 percent of the grain in the 3 plantings, Chalcodermus angulicollis 0, 0.8, and 19.2 percent, and fungi (generally associated with pod damage caused by these 2 pests) 2.4, 12.8, and 13.2 percent. Seed losses for the 3 plantings were, resp., 24.1, 79.3, and 100 percent, and yields recorded were, resp., 1602, 280, and 0 kg/ha. (AS (extract))

0907

29717 CANTWELL, G.E.; CANTELO, W.W.; CANTWELL, M.A. 1986. Effect of beta-exotoxin of Bacillus thuringiensis on development of the Mexican bean beetle (Coleoptera:Coccinellidae). Great Lakes Entomologist 19(2):77-80. En., Sum. En., 11 Ref. [Vegetable Laboratory, Agricultural Research Service, USDA, BARC-East, Beltsville, MD 20705, USA]

Phaseolus vulgaris. Epilachna varivestis. Bacillus thuringiensis. Laboratory experiments. Insect biology. USA.

Mexican bean beetle (Epilachna varivestis) larvae were fed several levels of Bacillus thuringiensis var. thuringiensis that contained the beta-exotoxin to determine if this treatment would extend or prolong their preadult life span. Feeding on bean foliage sprayed with a solution containing 2 g/liter a.i. diluted 1:10,000, extended the life by 7.5 days. Dilutions of 1:15,000 and 1:20,000 extended the life by over 3 and 5 days, resp. By extending the time of larval development, enhancement of parasite or predator activity may occur. (AS)

0908

28652 CANTWELL, G.E.; CANTELO, W.W.; SCHRODER, R.F.W. 1985. The integration of a bacterium and parasites to control the Colorado potato beetle and the Mexican bean beetle. Journal of Entomological Science 20(1):98-103. En., Sum. En., 5 Ref. [Vegetable Lab., Horticultural Science Inst., Agricultural Research Service, USDA, BARC-East, Beltsville, MD 20705, USA]

Phaseolus vulgaris. Snap beans. Epilachna varivestis. Biological control. Predators and parasites. Bacillus thuringiensis. USA.

Sprays of Bacillus thuringiensis subsp. thuringiensis, which contained the beta-exotoxin, were applied to small-scale field plots of tomatoes infested with the Colorado potato beetle and to bush snap bean plots infested with the Mexican bean beetle (Epilachna varivestis) in Maryland, USA. Two species of eulophid parasites were used in conjunction with the bacterium in an effort to reduce beetle populations. The larval parasite Pediobius foveolatus was released on beans. Treatments in which the bacterium was used, either alone or in combination with a parasite, significantly reduced adults and 3rd- and 4th-instar larvae of beetles. P. foveolatus by itself was able to significantly reduce both 3rd and 4th instar larval and adult populations of E. varivestis. (AS (extract))

0909

28886 CASTILLO DE LEON, S.E.; ALVARADO M., E. 1986. Ciclo de vida y algunas características del comportamiento de Epilachna varivestis Mulsant, en frijol, en Sacapulas, El Quiché. (Life cycle and some behavioral characteristics of Epilachna varivestis in beans in Sacapulas, El Quiché). Tikalia no.1:41-50. Es., Sum. En., 4 Ref., Il.

Phaseolus vulgaris. Epilachna varivestis. Insect biology. Guatemala.

The biology and behavior of Epilachna varivestis in beans were evaluated under lab. and field conditions in Sacapulas (El Quiché, Guatemala). The greatest no. of adults on the plant was found between 6 and 10 h, and that of the larvae between 6 and 13 h. Larvae and adults were observed more frequently in the upper and middle parts of the plant. (CIAT)

0910

27753 KAREL, A.K.; MATEE, J.J. 1986. Yield losses in common beans following damage by beanfly, Ophiomyia phaseoli Tryon (Diptera: Agromyzidae). Bean Improvement Cooperative. Annual Report 29:115-116. En., 2 Ref. [Dept. of Crop Science, Sokoine Univ. of Agriculture, Box 3005, Morogoro, Tanzania]

Phaseolus vulgaris. Cultivars. Insect control. Insecticides. Ophiomyia phaseoli. Yields. Tanzania.

Yield losses of bean var. Selian Wonder, Kabanima, T8, and T3 caused by the bean fly (Ophiomyia phaseoli) were evaluated at Sokoine U. of Agriculture (Morogoro, Tanzania) during 1983. The main treatments were plots sprayed weekly with lindane at 500 g a.i./300 liters water/ha for 6 wk., and unsprayed plots. Oviposition by the bean fly started when plants were 7 days old. The larval-pupal counts were significantly more in control than in treated plots. Seed yield was significantly higher in treated than in control plots (713 and 477 kg/ha, resp.). Seed yield losses of 33 percent were recorded due to damage by the bean fly. (CIAT)

0911

28916 MONTECINOS, M.T.; ARRETZ V., P.; ARAYA, J.E. 1986. Chemical control of Delia platura in Phaseolus vulgaris with seed and soil treatments in Chile. Crop Protection 5(6):427-429. En., Sum. En., 20 Ref. [Dept. Sanidad Vegetal, Facultad de Ciencias Agrarias y Forestales, Univ. de Chile, Casilla 1004, Santiago, Chile]

Phaseolus vulgaris. Delia platura. Insect control. Chemical control. Chile.

A field trial with beans was performed in the Santiago area, Chile, to evaluate the insecticidal effect of aldrin, carbofuran, chlorpyriphos, diazinon, and lindane, applied to the seed or to the seed furrow, against the bean fly Delia platura. Plant emergence was reduced with carbofuran and diazinon as a seed treatment, and chlorpyriphos in the furrow, in relation to the checks. All insecticidal treatments reduced the damage to the plants, demonstrating the value of using insecticides for controlling this pest. (AS)

0912

29178 MUNTHALI, D.C.; WYATT, I.J. 1986. Factors affecting the biological efficiency of small pesticide droplets against Tetranychus urticae eggs. Pesticide Science 17(2):155-164. En., Sum. En., 19 Ref., Il.

Phaseolus vulgaris. Snap beans. Tetranychus urticae. Acaricides. Malawi.

The interaction between droplet size (18-146 microns) and pesticide concn. (0.5-40.0 g a.i./liter) on the biological efficiency of small, monosized spray droplets was assessed by determining the effects on mortality of Tetranychus urticae eggs using oil-based formulations of dicofol as the toxicant and leaf discs of French bean cv. The Prince as the test surface. A positive curvilinear relationship was found between the spacing of droplets that was required to produce 50 percent kill (LS50) and the original diameter of the droplet, D, such that LS50 = 14.48D(b), where b varied from 0.65 to 1.44 and bore a U-shaped relationship to concn. The

optimum concn. was therefore approx. 10 g/liter. The theoretical, practical, and economic implications of these results are discussed. (AS)

0913

27730 RANGAPPA, M.; KRAEMER, M.E.; DUNNING, J.; BENEPAL, P.S.; ROBBINS, E. 1986. Effects of ozone on Mexican bean beetle (Epilachna varivestis) feeding and egg-laying efficiency on bean (Phaseolus vulgaris L.). Bean Improvement Cooperative. Annual report 29:100. En. [Virginia State Univ., Petersburg, VA 23803, USA]

Phaseolus vulgaris. Ozone. Epilachna varivestis. Insect biology. USA.

The effect of O3 on feeding and egg-laying efficiency of Epilachna varivestis was determined on 6 bean accessions (PI 193830, PI 226893, PI 226929, PI 290990, PI 311812, and PI 370598) selected for their resistance to O3, and 2 susceptible var. (BBL-290 and PI 142904). Before the bloom stage, a uniform trifoliate leaf of each plant was caged in and 2 female E. varivestis were introduced to feed for 48 h. The 2 female leaf feeding preference and the total leaf damage on all bean accessions grown in chambers of low O3 concn. (nonfiltered air + 0.02 ppm O3) was significantly higher as compared with the carbon-filtered air, nonfiltered air, and ambient treatments; however, there were no significant differences in higher O3 concn. (CIAT)

0914

28056 RUPPEL, R.F. 1985. The bean leaf beetle in Michigan. Michigan Dry Bean Digest 9(3):12. En., Il. [Dept. of Entomology, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Cerotoma trifurcata. Insect biology. Insect control. Plant injuries. USA.

The biology, damage, and control of Cerotoma trifurcata, a bean pest in Michigan, USA, are described. (CIAT)

0915

28201 RUPPEL, R.F. 1980. Insects and bean pests. Michigan Dry Bean Digest 4(4):3,28-29. En., Sum. En., 4 Ref.

Phaseolus vulgaris. Delia platura. Epilachna varivestis. Tetranychus. Injurious insects. Injurious mites. USA.

A total of 144 species and an additional 13 species-complexes of insect and related pests of beans were recorded from the USA. These included species from 11 orders or phylla and 40 families. Pests of every stage and part of the bean plant were recorded and serious pests of beans were reported from each state. The pattern of infestation was a diversity of polyphagous species attacking beans without apparent regional differences in intensity. The Mexican bean beetle, seedcorn maggot, and 2-spotted spider mite were the most important species of bean pests nationally. Noctuids, aphids, and mites were the most important species-complexes of bean pests nationally. A complete listing of insects and related bean pests is included. (AS)

0916

28202 RUPPEL, R.F. 1980. Insects in Michigan beans. Michigan Dry Bean Digest 4(4):2. En., Il.

Phaseolus vulgaris. Injurious insects. Plant injuries. USA.

The main insect species attacking beans in Michigan, USA, are enumerated in descending order of importance: seed corn maggot, tarnished plant bug,

potato leafhopper, bean aphid, green cloverworm, and Mexican bean beetle. The damage they cause is briefly described. (CIAT)

0917

29110 SCHREINER, I.; NAFUS, D.; BJORK, C. 1986. Control of Liriomyza trifolii (Burgess) (Dip: Agromyzidae) on yard-long (Vigna unguiculata) and pole beans (Phaseolus vulgaris) on Guam: effect on yield loss and parasite numbers. Tropical Pest Management 32(4):333-337. En., Sum. En., 9 Ref., Il. [College of Agriculture & Life Science, Univ. of Guam, Mangilao, GU 96913, USA]

Phaseolus vulgaris. Climbing beans. Liriomyza trifolii. Insecticides. Predators and parasites. Yields. USA.

The agromyzid leafminer Liriomyza trifolii was accidentally introduced to Guam, USA, in the late 1970s, resulting in serious crop losses to fresh pole bean cv. Takii Flat Pod Kentucky Wonder and yard-long bean cv. Green Pod Kaohsiung. A series of insecticide tests showed that none of the chemicals in use on beans controlled the leafminer to any significant extent; however, synthetic pyrethroids provided excellent control. The most common parasites found were Hemiptarsenus semialbiclavus and Chrysonotomyia formosa. Fenvalerate was not found to have a significantly deleterious effect on the no. of these parasites found in bean leaves. A strong correlation between the no. of mines/leaflet and the yield was observed in yard-long beans. Yields declined rapidly as the seasonal mean no. of mines/leaflet increased from 5 to 15 but declined less rapidly at higher no., reaching a min. non-zero level when the leaves were completely consumed by the miners. (AS)

0918

28937 TABANGIN, N.T.; TABBUAC, A.T.; TIBUNSAY, G.B.; CARDONA JUNIOR, E.V. 1980. Seasonal abundance of thrips on snap beans with notes on their insecticidal control. MSAC Research Journal no.6-7:56-63. En., Sum. En., 6 Ref., Il.

Phaseolus vulgaris. Snap beans. Thysanoptera. Insect control. Chemical control. Philippines.

Thrip population during the planting season (Nov. 1978-May 1979) and the effect of insecticide application to control thrips were studied at the College Exptl. Station of Mountain State Agricultural College (La Trinidad, Benguet, Philippines). Snap bean leaves were sampled weekly with the aid of a magnifying glass. The efficacy of the insecticides was determined by the no. of thrips found before and after application. The heaviest infestations occurred during the vegetative and the flower initiation stages. Consequently, peak infestation was during Jan. and Feb. Thrip population decreased considerably from April to May. Strict control of thrips is necessary during peak mo. Phosalone (Zolone 35 percent emulsifiable concentrate) at 500, 600, and 700 g a.i. is recommended. (AS)
See also 0724 0927 0928 0930 0936 1004 1055

G00 GENETICS AND PLANT BREEDING

0919

29756 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Bean germplasm activities. Data management. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.33-34. En.

Phaseolus vulgaris. Database. Germplasm. Colombia.

During early 1986 computer programs were written to manage the expt. part of the bean database. In mid-year the programs were redesigned and recompiled to better access the data. In all, some 53 new dialogs were written to facilitate consultation of the bean database. All of the bean evaluation nursery and IBYAN data will be loaded together with passport and other data provided by the genetic resources unit. (CIAT)

0920

29757 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Bean germplasm activities. Genetic variability from biotechnological techniques. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.35-41. En., Il.

Phaseolus vulgaris. Tissue culture. Embryo. Phaseolus lunatus. Phaseolus acutifolius. Crossbreeding. Analysis. Culture media. Colombia.

During 1986, activities with Phaseolus in the biotechnology research unit focused on: developing tissue culture techniques for regeneration of bean plants using various organs and tissues; developing electrophoretic techniques for genotype identification; and monitoring research activities in aspects of bean biotechnology in other institutions, for the establishment of collaborative projects. Areas identified for this type of project are: (1) development of a tissue culture cycle in Phaseolus to allow regeneration of plants from nonorganized cell tissue cultures; (2) development of molecular markers in Phaseolus vulgaris using DNA restriction fragment length polymorphisms. The results obtained are included. (CIAT)

0921

29755 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Bean germplasm activities. Germplasm collection, multiplication and distribution. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.21-31. En.

Phaseolus vulgaris. Germplasm. Propagation. Plant habit. Seed characters. Phaseolus lunatus. Phaseolus coccineus. Phaseolus acutifolius. Plant introductions. America. Europe. Asia. Africa.

During 1986 the emphasis on the acquisition of Phaseolus germplasm continued to be directed to land races and wild species. In addition to intensive expeditionary work in Latin America, several interesting materials from Europe, Asia, and Africa were received. Of the last batch of 6000 new accessions approved by the Instituto Colombiano Agropecuario for multiplication in CIAT greenhouses and isolated fields, about 1100 materials were multiplied from 23 countries (mainly from USA, Peru, and Rwanda). Characterization of germplasm by plant habit and seed size, using the descriptors proposed by CIAT, continued to detect similar groups of germplasm. A duplicate of the base collection for preservation in long-term storage (2000 accessions) was sent to the Centro Nacional de Recursos Genéticos, Brazil. Four collection trips to Guatemala, Argentina, Peru, and Mexico were carried out by the genetic resources unit, of which the results and outstanding conclusions are presented. Future plans include the collection of germplasm in Costa Rica and the aforementioned countries and research on seed multiplication and morphoagronomic evaluation, especially for yield and adaptation. (CIAT)

0922

28977 CROUSE, E.J.; MUBUMBILA, M.; STUMMANN, B.M.; BOOKJANS, G.; MICHALOWSKI, C.; BOHNERT, H.J.; WEIL, J.H.; HENNINGSEN, K.W. 1986.

Divergence of chloroplast gene organization in three legumes: Pisum sativum, Vicia faba and Phaseolus vulgaris. Plant Molecular Biology 7(2):143-149. En., Sum. En., 30 Ref., Il. [Inst. de Biologie Moléculaire et Cellulaire du CNRS, 15 Rue Descartes, F-67084 Strasbourg Cedex, France]

Phaseolus vulgaris. Chloroplasts. RNA. DNA. Genes. France.

Isolated chloroplasts from Pisum sativum were found to contain at least 32 tRNA species. Hybridization of in vitro labeled, identified, chloroplast tRNAs to Pisum chloroplast DNA fragments revealed the locations of the tRNA genes on the circular chloroplast genome. Comparison of this gene map to the maps of Vicia faba and Phaseolus vulgaris showed that the chloroplast genomes of Pisum and Phaseolus are otherwise more closely related than either genome is to the chloroplast genome of Vicia. Furthermore, the results suggest how possible recombination events could be involve.. in the evolution of these 3 closely related, but divergent, chloroplast genomes. (AS)

0923

29192 GREEN, G.A.; WEIL, J.H.; STEINMETZ, A. 1986. The sequences of two nuclear genes and a pseudogene for tRNA(Pro) from the higher plant Phaseolus vulgaris. Plant Molecular Biology 7(3):207-212. En., Sum. En., 22 Ref., Il. [Inst. de Biologie Moléculaire et Cellulaire, Univ. Louis Pasteur, 15 rue Descartes, F-67084 Strasbourg, France]

Phaseolus vulgaris. Genes. Hybridizing. DNA. RNA. France.

A genomic bank of nuclear DNA (nDNA) from the higher plant Phaseolus vulgaris, constructed using the lambda EMBL-4 vector, has been screened for the presence of tRNA genes. One of the many positive recombinants was found to hybridize several times stronger than the other positives, and has been shown to contain several tRNA genes. The structure of 2 nuclear tRNA genes for tRNA(Pro), namely tRNA(Pro)(UGG) and tRNA(Pro)(AGG), and that of a `pseudogene' for tRNA(Pro) is reported. This `pseudogene', despite showing 95 percent homology with the other tRNA(Pro) species presented here, has several features which are likely to affect its transcription or its functioning as a tRNA. (AS)

0924

29162 KOZERA, W.; ROSZKO, A. 1985. The influence of fast neutrons on the size and variation of morphological characters in N2 plants of two varieties of dwarf bean-Phaseolus vulgaris L. Genetica Polonica 26(3):367-373. En., Sum. En., Ru., Pl., 14 Ref., Il. [Al. 28 Listopada 48, 81-425 Kraków, Poland]

Phaseolus vulgaris. Dwarf beans. Cultivars. Irradiation. Seed. Mutation. Agronomic characters. Poland.

As a result of studies of N2 generation obtained after seed irradiation of 2 dwarf bean var. grown for dry seeds (a small-seeded Biala Wyborowa and a coarse-seeded Bomba) with 4 doses of fast neutrons (6.0, 8.5, 12.0, and 15.0 J/kg), it was found that the variation range of the following characters increased: seed wt./plant and per pod, 1000-seed wt., pod no./plant, plant shape coefficient, and plant height. The optimal mutagen dose for var. Biala Wyborowa appeared to be the dose of 6.0 J/kg and that for var. Bomba, 15.0 J/kg. (AS) See also 0716 0717 0720 0774

0925

28037 ADAMS, M.W.; SAETTLER, A.W.; HOSFIELD, G.L.; GHADERI, A.; KELLY, J.D.; UEBERSAX, M.A. 1986. Registration of Swan Valley and Neptune navy beans. Crop Science 26(5):1080-1081. En., 6 Ref.

Phaseolus vulgaris. Cultivars. Resistance. Bean common mosaic virus. Uromyces phaseoli. Colletotrichum lindemuthianum. Pseudomonas syringae pv. phaseolicola. Isariopsis griseola. Fusarium solani phaseoli. Agronomic characters. USA.

The morphological and agronomic characters, the origin, and the genetic resistance of navy bean cv. Swan Valley and Neptune to different diseases (BCMV, rust, several strains of anthracnose, halo blight, angular leaf spot, and root rot) are described. (C[illegible])

0926

28039 ALLAVENA, A.; FADDA, A. 1986. Grazia and Patrizia bush bean. HortScience 21(4):1081-1082. En., Il. [Istituto Sperimentale per l'Orticoltura Via Paullese, 28-20075 Montanaso Lombardo (MI), Italy]

Phaseolus vulgaris. Dwarf beans. Cultivars. Resistance. Bean common mosaic virus. Agronomic characters. Italy.

The morphological and agronomic characters, the origin, and the genetic resistance to BCMV of yellow-podded bush bean cv. Grazia and Patrizia are described. (CIAT)

0927

29758 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Bean germplasm activities. Variability from interspecific hybridization. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.43-51. En.

Phaseolus vulgaris. Phaseolus coccineus. Hybridizing. Resistance. Germplasm. Ascochyta phaseolorum. Ophiomyia phaseoli. Bean common mosaic virus. Rhizoctonia solani. Xanthomonas campestris pv. phaseoli. Colombia.

Progress made in the genetic improvement of Phaseolus vulgaris through interspecific hybridization in 1986 included: (1) the implementation of an international yield trial for P. coccineus to assess the value of this crop, and make new germplasm available for direct use; (2) the identification of new sources of resistance to Ascochyta leaf spot in Colombia, to bean fly for which a research collaboration has been set up in Taiwan and East Africa, and to BCMV; and (3) the development of new interspecific lines to be incorporated in a next bean evaluation nursery trial. The results of these trials are presented. Interspecific hybrid lines will be sent to Guatemala, to be evaluated for resistance to Apion godmani. (CIAT)

0928

29753 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. 318p. En., Il.

Phaseolus vulgaris. Snap beans. Germplasm. Database. Propagation. Plant breeding. Hybridizing. Resistance. Mycoses. Viroses. Bacterioses. Injurious insects. Adaptation. Yields. Photoperiod. Temperature. Drought. Nitrogen

fixation. Nutritive value. Transfer of technology. Central America. Caribbean. Brazil. Peru. Mexico. Argentina. Asia. Africa. Netherlands.

The activities carried out by the CIAT Bean Program in 1986 are reported. Bean germplasm activities covered collection, multiplication and distribution, data management, genetic variability from biotechnological techniques, and variability from interspecific hybridization. Individual character improvement studies were conducted on resistance to fungal, bacterial, and viral diseases and invertebrate pests, yield potential, photoperiod and temp. adaptation, drought and acid soils tolerance, N fixation, nutritional quality, and snap beans. Genetic improvement also aimed at evaluation in uniform nurseries (bean evaluation nursery, VEF; preliminary trials, EP; and IBYAN). Agronomic practices were evaluated in on-farm trials. Regional activities were carried out in Central America, the Caribbean, Brazil, Peru, Mexican highlands, Argentina, West Asia, Andean zone, Africa (Great Lakes Region, East and Southern Africa), and the Netherlands, in the latter with the Institute for Horticultural Plant Breeding. Individual papers are recorded in this publication under the following consecutive no.: 0800 0801 0802 0840 0919 0920 0921 0927 0929 0930 0931 0932 0933 0934 0935 0936 0937 0938 0939 0940 0941 0942 0943 0981 0993 1002 1003 1004 (CIAT)

0929

29759 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Improvement of individual characters. Resistance to fungal and bacterial diseases. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.55-81. En., Il.

Phaseolus vulgaris. Germplasm. Resistance. Uromyces phaseoli. Isariopsis griseola. Colletotrichum lindemuthianum. Xanthomonas campestris pv. phaseoli. Cuba. Mexico. Colombia. Kenya. Zaire. Tanzania. Burundi.

Main activities conducted during 1986 regarding the improvement of individual characters in bean comprised the evaluation of several advanced and segregating bean nurseries for their reactions under field conditions to rust, angular leaf spot, anthracnose, common bacterial blight, and halo blight as well as the development of methodologies to better determine disease resistance mechanisms. Results of these evaluations are included. (CIAT)

0930

29761 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Improvement of individual characters. Resistance to invertebrate pests. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.96-117. En., Il.

Phaseolus vulgaris. Germplasm. Resistance. Empoasca kraemeri. Acanthoscelides obtectus. Zabrotes subfasciatus. Apion godmani. Bemisia tabaci. Trialeurodes vaporariorum. Insect biology. Cultivars. Colombia. Central America.

The search for new sources of resistance to Empoasca kraemeri, Acanthoscelides obtectus, Zabrotes subfasciatus, and Apion godmani among bean germplasm materials continued in 1986. Special emphasis was placed on the study of mechanisms of resistance to E. kraemeri, A. obtectus, and Z. subfasciatus and in the reorganization of a network to evaluate resistance to A. godmani in Central America. Studies on the biology, ecology, mass rearing, and possible var. preferences of Bemisia tabaci and Trialeurodes vaporariorum were also initiated. Results are included in table form. (CIAT)

0931

29760 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Improvement of individual characters. Resistance to viral diseases. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.82-95. En., Il.

Phaseolus vulgaris. Resistance. Bean common mosaic virus. Bean golden mosaic virus. Host range. Germplasm. Backcrossing. Resistance. Inheritance. Bean chlorotic mottle virus. Colombia.

During 1986, research emphasis was shifted to BGMV while BCMV research focused on the incorporation of blackroot resistance in African germplasm and the backcrossing of I gene into Latin American var. The identification of alternate host plant species for BGMV is critical in the understanding of the endemic and epidemic characteristics of this virus. Using the artificial inoculation methodology implemented at CIAT, the evaluation of 57 plant species considered as possible BGMV hosts was initiated. To date, Phaseolus lunatus, P. coccineus, P. acutifolius, Canavalia sp., Vigna radiata, and Macroptilium lathyroides have been shown to be potential reservoirs of BGMV in nature. Preliminary isolation work conducted with the CIAT isolate of BGMV resulted in purified preparations of acceptable concn. Various bean chlorotic mottle virus isolates have been made and are currently being characterized. Results are included in table form. (CIAT)

0932

29768 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Improvement of individual characters. Snap beans. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.169-170. En.

Phaseolus vulgaris. Snap beans. Plant breeding. Adaptation. Dwarf beans. Climbing beans. Resistance. Colletotrichum lindemuthianum. Uromyces phaseoli. Bean common mosaic virus. Colombia. USA. Argentina. Iran. Bulgaria. Puerto Rico.

Snap bean improvement at CIAT has been carried out collaboratively with Washington State U. since 1983, to incorporate disease resistance and tropical adaptation from the dry bean improvement programs into green beans. An international adaptation nursery of advanced snap bean lines was distributed to 14 countries in Asia, Africa, Europe, and America. The current nursery consists of 204 bush and 32 climbing lines. In collaboration with the Instituto Colombiano Agropecuario, a regional trial of 19 and 14 bush and climbing snap bean lines, resp., was distributed. All climbing lines were resistant to anthracnose, the best being HAB 208, HAB 214, HAB 232, HAB 234, HAB 235, and HAB 236. Bush lines HAB 87, HAB 141, and HAB 173 were resistant to anthracnose, rust, and BCMV. (CIAT)

0933

29762 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Improvement of individual characters. Yield potential. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.118-135. En., Il.

Phaseolus vulgaris. Genotypes. Plant architecture. Adaptation. Yields. Maturation. Seed characters. Drought. Resistance. Photosynthesis. Pollination. Colombia.

Primary emphasis is being placed on a search for genotypes with erect architecture adapted to narrow row spacings and high populations and which show marked yield increases under intensive agronomic management. This research strategy is complemented by studies on specific problems such as

exploitation of late maturity; effects of seed size on tissue cell size, drought tolerance, and leaf photosynthetic rates; and possible inefficiencies in pollination. The results are included in table form. (CIAT)

0934

29777 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Regional activities. Africa. East Africa. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.278-282. En.

Phaseolus vulgaris. Varietal mixtures. Plant breeding. Transfer of technology. Plant introductions. Germplasm. Ethiopia. Kenya. Somalia. Uganda.

Detailed information is presented on the activities of the Eastern Africa regional bean program. This regional project covers Ethiopia, Kenya, Somalia, and Uganda. CIAT's regional activities aim primarily at strengthening national capabilities to conduct research relevant to small farmers' needs. Special attention is being given to training, both at CIAT and in Africa. Each country's var. development program is being strengthened by access to a wider range of germplasm. (CIAT)

0935

29776 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Regional activities. Africa. Great Lakes region. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.235-277. En., Il.

Phaseolus vulgaris. Germplasm. Cultivars. Resistance. Plant introductions. Isariopsis griseola. Colletotrichum lindemuthianum. Ascochyta. Pseudomonas syringae pv. phaseolicola. Xanthomonas campestris pv. phaseoli. Uromyces phaseoli. Bean common mosaic virus. Ophiomyia phaseoli. Cooking. Timing. Seed hardening. Water absorption. Varietal mixtures. Yields. Transfer of technology. Technology evaluation. Seed production. Rwanda. Zaire. Burundi.

The Great Lakes Regional Bean Program works with the agricultural research institutions of Burundi, Rwanda, and Zaire. Advanced breeding lines were introduced as potential new var. for the region and/or as sources of resistance to angular leaf spot, anthracnose, Ascochyta leaf spot, halo and common blight, rust, BCMV, and the bean fly. Together with locally collected germplasm, the introduced germplasm forms an excellent basis for the var. development programs. Advanced lines from all 3 national programs in the region were evaluated for cooking time, water absorption, and hard seed character. A collaborative project between the U. of Munchen and CIAT investigated the significance of var. mixtures in terms of yield gains to obtain information to develop a strategy for improving var. mixtures. The genotypes which gained most from being planted in mixtures were BAT 1297 and PVMX 1531. On-farm var. trials were carried out in Rwanda and Burundi. Diagnostic surveys and exploratory trials were also conducted in several regions of all 3 countries in the Great Lakes Region to establish on-station and on-farm research priorities. Cultural methods (seed selection and removal of diseased leaves and seedlings) in combination show promise as an effective way to control diseases in var. mixtures. The program in 1986 initiated the following technology development and testing trials: (a) chemical seed treatments for areas with root rot, bean fly, and soil acidity problems; (b) a detailed study on the acceptability of climbing beans in the Central Plateau region; (c) on-station trials testing the integration of soil improvement components such as legume-trees and green manures crops in bean production systems; and (d) techniques to improve farmers' self-seed production. (CIAT)

0936

29778 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Regional activities. Africa. Southern Africa. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.283-284. En.

Phaseolus vulgaris. Plant breeding. Cultivars. Yields. Adaptation. Resistance. Ophiomyia phaseoli. Transfer of technology. Tanzania. Malawi. Zambia. Zimbabwe. Mozambique. Angola. Botswana. Lesotho. Swaziland.

The Southern Africa Development Coordination Conference (SADCC) region covers Tanzania, Malawi, Zambia, Zimbabwe, Mozambique, Angola, Botswana, Lesotho, and Swaziland, and is the largest of the 3 regions hosting a CIAT bean program in Africa. Bean production from the SADCC region amounts to about 564 thousand t of dry seed, which is approx. a quarter of the total production of Africa. The strength of national programs differs substantially across the 9 countries. The Tanzania program is the largest. In most other countries in southern Africa, national scientists are part of grain legume research teams not devoted solely to beans. CIAT's regional activities have included the conduct of the 1st steering committee meeting, the convening of a bean fly workshop in Arusha, Tanzania, and the attendance of a board meeting of Southern African Center for Cooperation in Agricultural Research in Lusaka, Zambia. (CIAT)

0937

29775 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Regional activities. Andean zone. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.232-234. En.

Phaseolus vulgaris. Germplasm. Dwarf beans. Climbing beans. Selection. Yields. Intercropping. Zea mays. Cultivars. Resistance. Rhizoctonia solani. Colombia.

In 1985 3 new cv. (Frijolica 0-3.1, Frijolica 0-3.2, and Frijolica LS-3.3) were released as a result of collaborative research between the Instituto Colombiano Agropecuario (ICA) and CIAT. At the Centro Regional de Investigación (CRI)-La Selva (Antioquia, Colombia), 190 new advanced climbing bean lines were coded. A set of 32 lines has been selected on the basis of yield, disease resistance, and grain type, and these are currently in an advanced yield trial under low and high fertility. The best bush bean lines were PVA 476, PVA 7, and PVA 698. At CRI-Obonuco, 10 advanced climbing bean lines were planted in regional trials intercropped with maize in Ipiales, Contadero, and Cordoba. The most promising lines for possible var. release are AND 53 and ZAV 7. Bush bean lines were planted in El Tambo and Funes; at the 1st site the best new lines were AND 359, ICA 15551, and AND 311 and at the 2nd, the best new lines were PVA 3043, AFR 198, and PAV 3038. In 1985 a regional bush bean trial consisting of 7 bean lines, plus a local check, was organized in collaboration with ICA in the coffee growing region (medium alt. areas). Two small red mottle bean lines, PAI 29 and PAI 92, were superior to the other lines in overall yield. Web blight attacked the yield trial in many areas of Colombia; only PAI 29 and PAI 92 showed resistance. Because of the importance of this disease, a special observation nursery of 219 lines was formed in 1986. (CIAT)

0938

29774 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL 1987. Genetic improvement and related activities. Regional activities. Argentina and West Asia. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. p.231. En.

Phaseolus vulgaris. Germplasm. Plant introductions. Selection. Yields. Crossbreeding. Maturation. Argentina. Asia. Colombia.

In Dec. of 1985, 6 sets of white bean lines from the VAPA 86 CIAT nursery were sent to Argentina to be planted in various localities in Feb. 1986. This nursery comprises 520 entries, including the best large-seeded lines as well as small-seeded and medium-seeded lines. Each line was selected for specific characters, and the next phase will include yield trials under various conditions. The crossings include early maturing parents like G 2883, G 3027, and others. These are crosses made for different commercial grain types. A similar nursery WANABAN 86 was sent to various regions of Turkey, Bulgaria, Spain, Portugal, Iran, and Tunisia. Little information is available on results. Sixty-seven segregating populations were planted in Palmira, Colombia, to be evaluated under moderate drought stress. A new evaluation of reactions to anthracnose was conducted in Popayan with available germplasm from the germplasm bank. (CIAT)

0939

29771 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Regional activities. Brazil. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.198-226. En., Il.

Phaseolus vulgaris. Germplasm. Crossbreeding. Adaptation. Seed characters. Yields. Cultivars. Brazil.

Close collaboration between CIAT and Brazil continued during 1986. Germplasm development was conducted through evaluating the jointly developed crosses in Brazil, rather than selecting the fixed lines in CIAT prior to shipment to Brazil. By the end of 1986, those segregating populations were in the F4-F5 generations ready for adaptation trials in several states throughout the country. Results of these evaluations are included. (CIAT)

0940

29779 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Regional activities. IVT-CIAT collaboration. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.285-287. En.

Phaseolus vulgaris. Resistance. Bean common mosaic virus. Crossbreeding. Inheritance. Cultivars. Bean yellow mosaic virus. Selection. Netherlands. Colombia.

CIAT has a collaborative bean breeding project with the Institute for Horticultural Plant Breeding in the Netherlands. In 1986 research was concentrated on incorporating resistance to BCMV into CIAT-bred lines. Testing for beans resistant to the BCMV-Tn strain continued. Selections came from the 1st, 2nd, and 3rd crossing generations derived from CIAT lines x IVT 7620 (an interspecific cross with Phaseolus coccineus with resistance to BCMV and BYMV, including the Tn strain). Excellent resistance to BYMV was selected in the 1st crossing generation between CIAT breeding lines and IVT 7620. (CIAT)

0941

29773 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Regional activities. Mexican highlands. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. p.229. En.

Phaseolus vulgaris. Plant breeding. Adaptation. Resistance. Diseases and pathogens. Mexico.

At the beginning of 1986, 4 trials each comprising 45 segregated populations were sent to Mexico to decentralize the genetic improvement process, under conditions which combine specific adaptation with resistance to local diseases. Early populations were planted at CIAT-Palmira to find the highest yield potentials under conditions of high technological inputs. (CIAT)

0942

29772 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Regional activities. Peru. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.227-228. En.

Phaseolus vulgaris. Plant breeding. Seed production. Transfer of technology. Plant introductions. Technology evaluation. Peru.

In 1986 the project in Peru concentrated on 3 main activities: genetic improvement, seed production, and scientific training. The most significant advances in the coastal region consisted of the introduction of 35 advanced Canario type, BCMV-resistant bean lines. These lines were also evaluated in on-farm trials to determine which to release officially. The production of basic bean seed was promoted in Lambayeque, Arequipa, Cajamarca, and Valle de Chincha, and more than 150 ha were planted. Six scientists of the Instituto Nacional de Investigaciones y Promoción Agraria, working on beans, participated in training courses given at CIAT, and others took courses in Peru. (CIAT)

0943

29754 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Training. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.11-19. En.

Phaseolus vulgaris. Transfer of technology. El Salvador. Costa Rica. Nicaragua. Peru. Honduras. Europe. Asia. Africa. Colombia.

Training of scientists and extensionists at CIAT headquarters in the development, testing, and promotion of new breeding lines and agronomic practices continued to receive high priority in the bean program. A total of 180 scientists from El Salvador, Costa Rica, Nicaragua, Peru, Honduras, and Colombia were trained this year in on-farm research. Seventy-six scientists from the Americas, Europe, Asia, and Africa received training in various disciplines. Data are included on training provided at CIAT in specific disciplines and the no. of man-mo. of training provided by CIAT, by country; a list is included with name of trainee, country, institution, discipline, supervisor, and scientist-mo. at the bean program. (CIAT)

0944

28081 COYNE, D.P.; STEADMAN, J.R.; NULAND, D.S.; CAMPBELL, C.L. 1986. Monument, small, white dry bean. HortScience 21(3):542. En., 2 Ref., Il. [Univ. of Nebraska, Lincoln, NB 68583, USA]

Phaseolus vulgaris. Resistance. Bean common mosaic virus. Uromyces phaseoli. Whetzelinia sclerotiorum. Agronomic characters. Xanthomonas campestris pv. phaseoli. USA.

The morphological and agronomic characters, the origin, and the genetic resistance to several diseases (BCMV strains 1 and NY-15 and several

strains of rust) of the small, white dry bean cv. Monument are described. (CIAT)

0945

27763 DAVIS, J.; TAYLOR, J.; TEVERSON, D. 1986. Inheritance studies on resistance to halo blight. Bean Improvement Cooperative. Annual Report 29:91-92. En., 1 Ref. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Crossbreeding. Resistance. Inheritance. Pseudomonas syringae pv. phaseolicola. Cultivars. Races. Colombia.

Preliminary results are given of studies on the inheritance of resistance in 454 bean cv. to Pseudomonas syringae pv. phaseolicola strain 3 and its relationships with other kinds of resistance, evaluated in a collaborative project between National Vegetable Research Station (England) and CIAT. (CIAT)

0946

28831 EMPRESA CATARINENSE DE PESQUISA AGROPECUARIA. 1982. Programa feijao. (Bean program). In_____. Relatorio Técnico Anual 1981. Florianópolis-SC, Brasil. pp.103-107. Pt.

Phaseolus vulgaris. Germplasm. Plant introductions. Selection. Fertilizers. K. Adaptation. Brazil.

Results of research carried out by the bean program of the Empresa Catarinense de Pesquisa Agropecuaria, Brazil, are briefly given: germplasm introduction, evaluation, and utilization (among them promising selections from the CIAT IBYAN); bean response to K fertilization; use of pathogen-free seed. (CIAT)

0947

28272 HAMBLIN, J.; ZIMMERMANN, M.J. DE O. 1986. Breeding common bean for yield in mixtures. In Janick, J., ed. Plant breeding reviews. Westport, Conneticut, AVI Publishing Company. v.4, pp.245-272. En., 64 Ref., Il. [Dept. of Agriculture, Marine Terrace, Geraldton, Western Australia 6530, Australia]

Phaseolus vulgaris. Plant breeding. Selection. Intercropping. Zea mays. Yields. Relay crops. Planting. Timing. Plant habit. Inheritance. Australia.

An analytic review is presented of work related to breeding beans for yield in mixtures with maize, a major objective of breeding programs. The genetic implications of competition in pure stands are discussed, as well as bean yields in mixtures and relay cropping with maize, both at the same site and at different sites. The effect of planting beans before maize in mixtures is analyzed, as well as the use of both pure stand and mixture performance to predict bean yields. Correlations and genetic effects and heritabilities are discussed regarding the yield of segregating bean populations in pure stands and in mixtures with maize. The influence of plant habit and seed size on bean yields in mixture with maize, and the effect of eliminating low yielding bean cv. in either pure stands or mixtures are also discussed. The following breeding options for beans that are to be grown in pure stands or mixtures and/or relay cropping with maize are discussed: selection in 1 planting system; selection in more than 1 planting system; selection of beans and maize together; and a model approach. It was concluded that, to obtain max. yields in mixtures, plant breeders must breed for the cropping system (maize and beans) rather than breed for individual components (maize or beans), requiring a change in thinking and in the breeding methodology. (CIAT)

0948

28997 HILTY, J.W.; MULLINS, C.A. 1985. Evaluation of selected snap bean cultivars for resistance to rust. Tennessee Farm and Home Science no.136:6-7. En. [Dept. Entomology & Plant Pathology, Univ. Tennessee, Knoxville, TN 37901, USA]

Phaseolus vulgaris. Snap beans. Cultivars. Resistance. Plant breeding. Uromyces phaseoli. USA.

Snap bean lines and cv. were evaluated at Plateau Expt. Station near Crossville (Tennessee, USA) for resistance to rust during 1982-84. Those rated as highly resistant were Nep-2 in 1982, Aurora, Early Bird, and Nep-2 in 1983, and Early Bird and Sunkist in 1984. (CIAT)

0949

28062 KELLY, J.D.; ADAMS, M.W. 1983. Use of recurrent selection in pinto bean breeding. Michigan Dry Bean Digest 8(2):8. En., 3 Ref., Il. [Crop & Soil Sciences, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Germplasm. Plant breeding. Selection. Seed characters. Plant architecture. USA.

A system of recurrent selection is being utilized in an attempt to recombine desirable traits from 2 diverse bean germplasm sources. One germplasm source carries the desirable architectural plant type and disease resistance traits of the small-seeded types while the other carries desirable seed size, shape, and color characteristics of the pinto class. After 3 cycles of recurrent selection, some modest progress has been made in combining pinto seed size traits with desirable architectural traits. Progress after 2 cycles identified recombinant types for qualitative characters such as seed color with upright architecture. No recombinants with satisfactory seed size and architecture were identified. (CIAT)

0950

27748 KYLE, M.M.; DICKSON, M.H.; PROVVIDENTI, R. 1986. Linkage analysis of hypersensitive resistance to four viruses in Phaseolus vulgaris L. Bean Improvement Cooperative. Annual Report 29:80-81. En., 4 Ref. [New York State Agricultural Experiment Station, Geneva, NY 14456, USA]

Phaseolus vulgaris. Resistance. Crossbreeding. Bean common mosaic virus. USA.

Two selections, BT-1 (II) and BT-2 (ii), from bean cv. Black Turtle Soup were used as parents for the linkage study to minimize confounding segregation. F2 plants from the cross BT-2 x BT-1 were selfed and harvested individually to produce F3 families. The genotype of each F2 individual with respect to temp.-sensitive hypersensitive resistance to BCMV, cowpea aphid-borne mosaic virus, blackeye cowpea mosaic virus, and watermelon mosaic virus-2 was determined by F3 progeny tests. After mechanical inoculation, F3 families were held at 35 degrees Celsius for 4 days and evaluated. Seedlings carrying the I allele showed prominant local lesions and vascular necrosis, while ii genotypes held at this temp. rapidly developed severe epinasty, stunting, and striking foliar mosaic. Results suggest the possibility of a single major locus involved in resistance to these 4 viruses. (CIAT)

0951

27745 MASAYA, P.M.; WALLACE, D.H.; WHITE, J.W. 1986. Genetic control of flowering behavior of tropic adapted bean cultivars under two subtropical temperature regimes. Bean Improvement Cooperative. Annual Report 29:54-55. En., 5 Ref. [CIAT, Apartado Aéreo 6713, Cali, Colombia]

Phaseolus vulgaris. Cultivars. Crossbreeding. Genetics. Flowering. Genes. Temperature. Maturation. Guatemala.

In the Guatemalan localities of Chimaltenango and Cuyuta (19 and 29 degrees Celsius, resp.), the F2 populations from 6 crosses (ICTA Quetzal x JU 80-11, ICTA Quetzal x San Martin, ICTA Quetzal x Rabia de Gato, JU 80-11 x San Martin, JU 80-11 x Rabia de Gato, and San Martin x Rabia de Gato) were observed under 13 h natural daylength. In Chimaltenango there was no segregation in the crosses ICTA Quetzal x JU 80-11 and San Martin x Rabia de Gato, indicating no major genetic differences in the 2 sets of parents. In the remaining 4 crosses a 2-gene segregation pattern was noted in which earliness was dominant to lateness. In Cuyuta, the crosses JU 80-11 x San Martin and Rabia de Gato x San Martin showed 2 gene segregation patterns, with lateness being dominant. Results indicate that the genetic control of flowering behavior depends on 4 genes. (CIAT)

0952

27346 MORA N., O.A.; BORGES F., O.L. 1979. Evaluación de germoplasma y posterior selección para estabilidad del rendimiento en caraotas (Phaseolus vulgaris). (Germplasm evaluation and further selection for yield stability in beans). In Universidad Central de Venezuela. Instituto de Genética. Informe de Investigación 1979. Maracay. pp.74-81. Es.

Phaseolus vulgaris. Germplasm. Selection. Yields. Yield components. Agronomic characters. Resistance. Plant architecture. Plant habit. Maturation. Venezuela.

The collection, multiplication, preliminary evaluation, and screening for yield stability of bean germplasm in Samán Mocho, Venezuela, in 1978-79 are reported. A total of 140 black, red, white, and other colored bean germplasm accessions were collected from national and international sources, multiplied, and evaluated for agronomic characters (days to flowering, days to harvest maturity, growth habit, plant height, yield, reaction to pests and diseases, and plant architecture). Fifteen promising black bean accessions were evaluated within the IBYAN scheme for yield stability. Outstanding materials included Porrillo Sintético, BAT 58, BAT 518, BAT 64, and BAT 261. Since many var. showed good yield potential, their evaluation in other environments is recommended. (CIAT)

0953

28079 PARK, S.J.; TU, J.C. 1986. Association between BCMV resistant I gene and eye color of cv. Steuben. Bean Improvement Cooperative. Annual Report 29:4-5. En., 2 Ref. [Research Station, Agriculture Canada, Harrow, Ontario, Canada]

Phaseolus vulgaris. Plant breeding. Selection. Resistance. Bean common mosaic virus. Genes. Seed color. Backcrossing. Inheritance. Canada.

To determine the relationship between the I gene and eye color, a few bean lines with yellow, grey, and dark brown eye color were selected from cross Steuben 4/PI326.418 BC5 F3 populations. Some of the selected lines were segregating for eye color. F2 plants were inoculated with BCMV races 1 and 15 at the unifoliate stage, and examined for eye color. All the plants from the yellow eye class were susceptible to BCMV and segregated into creamy and yellow eye only. Plants in the grey and brown classes segregated into creamy, yellow, grey, and brown classes. All the BCMV-susceptible plants produced seed only with creamy or yellow eyes and all the resistant plants produced seed with grey or brown eye color. Since only BCMV-resistant plants produced seed with grey or brown eyes, the dominant resistant I gene and greenish brown B gene must be tightly linked in coupling phase. (CIAT)

0954

27738 PARK, S.J.; CHESNEY, M.; DHANVANTARI, B.N. 1986. Reaction to common bacterial blight in selfed progeny from Phaseolus vulgaris x P. acutifolius. Bean Improvement Cooperative. Annual Report 29:107-108. En., 2 Ref. [Research Station, Agriculture Canada, Harrow, Ontario, Canada]

Phaseolus vulgaris. Crossbreeding. Phaseolus acutifolius. Resistance. Hybrids. Xanthomonas campestris pv. phaseoli. Canada.

In 1984, crosses between common bean and tepary bean were begun in order to obtain hybrids resistant to Xanthomonas campestris pv. phaseoli. Using 13 field bean cv. as female parents and 5 tepary accessions as pollen parents, 413 pollinations were made and about 20 day-old embryos were rescued on Murashige and Skoog or B5 media. From the cultured embryos, 177 seedlings were rescued. Various growth rate and morphological abnormalities were observed. The F1 hybrids from the cross of Sacramento LRK x Tepary Buff grew about 15 cm tall and had 5 small, dark green, curly leaves. From the F2 generation, 111 seedlings were inoculated with bacterial blight. About 10 and 16 percent of the F3 and F4 plants, resp., showed resistant reaction to blight and a very small proportion of the resistant plants produced seed. (CIAT)

0955

28691 PRASAD, N.B.; RAM, H.H. 1985. Note on selection for pods per plant in the F2 generation of three crosses in French-bean (Phaseolus vulgaris L.). Legume Research 8(1):57-58. En., 5 Ref. [Dept. of Plant Breeding, G.B. Pant Univ. of Agriculture & Technology, Pantnagar, India]

Phaseolus vulgaris. Snap beans. Crossbreeding. Selection. Inheritance. Pods. India.

The effectiveness of F2 plant selection for pods/plant in 3 crosses of French bean was investigated. Three F2 (Contender x Big Bend Red, UPF-488 x Big Bend Red, and UPF-191 x Big Bend Red) were grown in winter. Three hundred individual F2 plants were scored in each cross for no. of pods/plant. Five percent (15 plants/cross) of the F2 plants were selected for high no. of pods/plant. Fifteen random F2 plants were also taken from each cross. These F3 progenies and 2 parental lines from each cross were evaluated in 1981. The differences in families and progenies within a family were significant, showing that selection for pods/plant in F2 of these 3 crosses of French bean was ineffective. This could be due to a greater effect of environment on this character, apparent by the low estimate of heritability. It is suggested that bulk population breeding would be a more effective method in breeding for a larger no. of pods/plant in the populations derived from these crosses. (CIAT)

0956

29656 USHER, T.; FERNANDES, A.; BUTLER, D.; RYLEY, M. 1985. Evaluation of Phaseolus vulgaris germplasm; screening for resistance to common blight. Queensland Journal of Agricultural and Animal Sciences 42(1):29-34. En., Sum. En., 13 Ref. [Hermitage Res. Sta., Queensland Dept. Primary Indust., Qld. Australia]

Phaseolus vulgaris. Xanthomonas campestris pv. phaseoli. Selection. Resistance. Germplasm. Inheritance. Plant breeding. Cultivars. Australia.

Initial screening of Phaseolus vulgaris germplasm for resistance to common blight (Xanthomonas campestris pv. phaseoli) has indicated 9 accessions with promising levels of field resistance. Effectiveness of mass selection in the germplasm was estimated at 42.8 percent. A supplementary study with

an F2 population suggested a broad sense heritability of 62 percent, and that expression of resistance was partially dominant. (AS)

0957

27775 ROMAN V., A. 1985. Frijolica LS nueva variedad de frijol "tipo cargamanto" tolerante a la antracnosis. (Frijolica LS, a new climbing bean variety tolerant to arthracnose). ICA Informa 19(4):16-18. Es., Il. [Centro Regional de Investigación Inst. Colombiano Agropecuario, La Selva, Rionegro, Antioquia, Colombia]

Phaseolus vulgaris. Agronomic characters. Resistance. Colletotrichum lindemuthianum. Isariopsis griseola. Uromyces phaseoli. Colombia.

The agronomic and morphological characters, the origin, and the genetic resistance of climbing bean var. Frijolica LS to several diseases (anthracnose, angular leaf spot, and rust) are described. (CIAT)

0958

28244 ROSS, W.M. 1986. Improving plants for tolerance to iron deficiency and other mineral nutrition problems: breeding and genetic points of view. Journal of Plant Nutrition 9(3-7):309-333. En., Sum. En., 23 Ref. [Dept. of Agronomy, Univ. of Nebraska, Lincoln, NE 68583, USA]

Phaseolus vulgaris. Hybridizing. Genetics. Mineral deficiencies. Fe. Inheritance. Plant introductions. Selection. Experiment design. Mutation. Polyploidy. Tissue culture. USA.

A broad literature review is given on different aspects of plant breeding (among the crops studied, beans) for the mineral uptake efficiency: inheritance of traits; modes of reproduction (asexual and sexual); plant introduction; selection; pedigree and population breeding; hybridization; biotype obtainment; exptl. designs and genetical statistics; induced mutations and polyploidy; tissue, cell, and organ culture; protoplast culture and fusion; and genetic engineering. (CIAT)

0959

29190 SARRAFI, A.; ECOCHARD, R. 1986. Modification of heterosis for protein and yield components by bean common mosaic virus in Phaseolus vulgaris. Plant Breeding 97(3):279-282. En., Sum. En., De., 13 Ref. [Dept. of Plant Breeding, Faculty of Agriculture, 145 Av. de Muret, F-31076 Toulouse Cedex, France]

Phaseolus vulgaris. Bean common mosaic virus. Cultivars. Heterosis. Hybrids. Yields. Yield components. Protein content. Resistance. France.

The effect of BCMV on yield, yield components, and seed protein content was studied in 4 bean cv. (Shad, Naz, Sadaf, and Ministry) and their F1 hybrids. Results showed a significant yield decrease in diseased plants; 100-seed wt. was also significantly reduced in one of the diseased var. (Shad). The percentage of protein was increased in diseased plants due to nonprotein N. Usually the percentage of heterosis in BCMV-diseased F1 hybrid of 2 susceptible var. decreased while in F1 hybrids of susceptible x resistant var. it increased. This study shows the danger of drawing conclusions in quantitative genetic studies when dealing with both diseased and healthy plants. (AS)

0960

29671 SHAO, F.M.; TERI, J.M. 1981. Promising Phaseolus bean lines resistant to anthracnose in Tanzania. East African Agricultural and Forestry Journal 47(1-4):14-16. En., Sum. En., 6 Ref.

Phaseolus vulgaris. Cultivars. Selection. Resistance. Colletotrichum lindemuthianum. Tanzania.

Twenty bean lines were screened for resistance to anthracnose by artificially inoculating them with different isolates of Colletotrichum lindemuthianum in the field (Morogoro, Tanzania) and in the greenhouse. One line, P-260, was immune to anthracnose and 5 lines, UAC 57, UAC 79, P-304, P-618, and P-774, were highly resistant. Lines UAC 41, EAI 2889, EAI 4110, P-2, P-360, and P-504 were moderately resistant. The remaining lines were susceptible. The immune and resistant lines have some undesirable consumer characteristics and they can therefore be used as sources of resistant genes in breeding programs. Alternatively, they can be improved to eliminate the undesirable characteristics since some of them are also high yielding. (AS)

0961

28824 SORESSI, G.P. 1985. Induced mutation and breeding in vegetable crops. In Gyorffy, M.; Paal, H., eds. Conference on the possibilities of increasing genetic variability in the plant kingdom, 1984. Proceedings. Martonvásár, Hungary, Agricultural Research Institute of the Hungarian Academy of Sciences. pp.17-32. En., Sum. En., 52 Ref., Il.

Phaseolus vulgaris. Plant breeding. Mutation. Bean common mosaic virus. Seed color. Hungary.

A brief survey of the studies carried out in Italy on theoretical and applied plant mutagenesis, particularly on tomato, peas, and beans, is given. An undesired seed coat color of some BCMV-resistant and agronomically well performing bean genotypes was changed through an EMS seed treatment. (AS (extract))

0962

28242 TEIXEIRA, M.G.; ANTUNES, I.F.; ZIMMERMANN, M.J. DE O.; COSTA, J.G.C. DA 1980. Melhoramento genético de cultivares de feijao de graos tipo "preto" e "mulatinho". (Breeding of black-seeded and brown-seeded bean cultivars). Goiania-GO, Empresa Brasileira de Pesquisa Agropecuaria. Centro Nacional de Pesquisa Arroz, Feijao. Pesquisa em Andamento no.15. 2p. Pt.

Phaseolus vulgaris. Cultivars. Selection. Seed color. Plant breeding. Brazil.

The breeding program of the Centro Nacional de Pesquisa-Arroz, Feijao (Brazil) has selected 95 black-seeded and brown-seeded bean cv. that are being evaluated by the Empresa Pernambucana de Pesquisa Agropecuaria. (CIAT)

0963

27719 THOMAS, C.V. 1983. Genetic, morphological and physiological studies of drought and heat resistance in tepary beans (Phaseolus acutifolius A. Gray) and common beans (P. vulgaris L.). Ph.D. Thesis. Riverside, University of California. 97p. En., Sum. En., 88 Ref., Il.

Phaseolus vulgaris. Phaseolus acutifolius. Drought. Temperature. Resistance. Hybridizing. Rooting. Crossbreeding. Yields. Inheritance. Yield components. USA.

A study was conducted to (1) evaluate the role of rooting depth in drought resistance of tepary beans and common beans; (2) determine the genetics of several traits in tepary beans, especially lanceolate leaflet shape, a possible component of heat resistance; and (3) attempt to transfer drought and heat resistance from tepary beans to common beans by interspecific

hybridization. It was found that teparies always had longer roots than common beans when moisture and temp. stress was severe. This could be an important component of the greater drought resistance exhibited by teparies compared with common beans. Inheritance of leaf shape, flower color, no. of seeds/pod, and seed wt. was investigated in crosses between 1 domesticated tepary (P. acutifolius var. latifolius), PI321638, and 2 wild teparies (P. acutifolius var. tenuifolius). Var. tenuifolius has lanceolate leaflets and is found in more xeric habitats than var. latifolius. Flower color was under single gene control with purple dominant to white. Leaf length, leaf width, and the ratio leaf length:width were each controlled by no more than 3-4 genes of primarily additive effect. The mode of inheritance of the no. of seeds/pod was unclear. Seed wt. was controlled by a large no. of genes, with both additive and dominance effects. From the interspecific crosses made between lines of tepary beans and lines of common beans, 29 of the 39 mature F1 hybrid plants reared by embryo culture had either or both the common bean Masterpiece or tepary PI321638 as parent. Of 16 mature F1 genotypes, 5 produced BC1 and/or allotetraploid progeny. Field trials showed that some common bean BC1F2 and BC2F1 families outyielded common bean parental cv. when subjected to drought and heat stress. (AS)

0964

29660 VAID, K.; GUPTA, V.P.; SINGH, R.M. 1985. Stability analysis in dry beans. Crop Improvement 12(1):28-31. En., Sum. En., 7 Ref. [Dept. of Genetics & Plant Breeding, Banaras Hindu Univ., Varanasi 221005, India]

Phaseolus vulgaris. Germplasm. Yields. Yield components. Inheritance. Genotypes. India.

Twenty-eight dry bean germplasm lines, selected on the basis of ecogeographic and genetic divergence, were assessed for stability of yield and yield components in India. The 6 environments used for the evaluation of the material were sowing dates, locations, and seasons. Four of the 28 germplasm lines (HUR-49, HUR-21, HUR-62, and HUR-37) were significantly high yielders but they possessed low stability of performance. Four other lines (HUR-15, HUR-87, HUR-91, and HUR-9) possessing high stability were av. yielders. The stability of performance in grain yield was related to the stability of performance for pod no., but there was no such relationship with other yield components. (AS) See also 0732 0755 0797 0800 0801 0802 0803 0813 0839 0845 0851 0863 0873 0880 0883 0884 0976 1004 1049

G02 Cytogenetics

0965

27740 NIKOLOVA, V.; ZAGORCHEVA, L.; PORJAZOV, I. 1986. Induced autotetraploids in beans (Phaseolus vulgaris L., Phaseolus acutifolius A. Gray, Phaseolus coccineus L.). Bean Improvement Cooperative. Annual Report 29:126. En. [Maritsa Vegetable Crops Research Inst., 4003 Plovdiv, Bulgaria]

Phaseolus vulgaris. Phaseolus acutifolius. Phaseolus coccineus. Hybridizing . Colchicine. Plant fertility. Polyploidy. Chromosomes. Bulgaria.

In 1983-84, Phaseolus vulgaris, P. acutifolius, and P. coccineus were hybridized at a tetraploid level at the Maritsa Vegetable Crops Research Institute (Bulgaria). To obtain colchiploids an aqueous solution of colchicin 0.1 and 0.2 percent was used. Autotetraploids in the 3 species

were distinguished by similar morphological and citomorphological characteristics. They had lower rate of growth and development, thicker stems, and more compact and hairy dark green leaves. Seed fertility of polyploid plants of the 3 species was reduced. Pollen morphology, the size and the no. of stomata as well as the no. of the chloroplasts in the latter are the right criteria for polyploid identification with the 3 species. There were significant chromosome conjugation disturbances in microsporogenesis of the tetraploid forms of the 3 species. (CIAT)

G03 Polyploidy

See 0958 0965

H00 NUTRITION

0966

28962 BANWELL, J.G.; BOLDT, D.H.; MEYERS, J.; WEBER JUNIOR, F.L.; MILLER, B.; HOWARD, R. 1983. Phytohemagglutinin derived from red kidney bean (Phaseolus vulgaris): a cause for intestinal malabsorption associated with bacterial overgrowth in the rat. Gastroenterology 84(3):506-515. En., Sum. En., 53 Ref., Il. [Division of Gastroenterology & Clinical Nutrition, Dept. of Medicine, Case Western Reserve Univ., Cleveland, OH 44106, USA]

Phaseolus vulgaris. Phytohemagglutinins. Analysis. Animal nutrition. Diets. Animal physiology. USA.

The effects of phytohemagglutinin, a lectin derived from raw red kidney bean, on small intestinal absorptive function and morphology, and on the intestinal microflora, were studied. Phytohemagglutinin was isolated in purified form by thyroglobulin-sepharose 4B affinity chromatography. Red kidney bean and phytohemagglutinin (6.0 and 0.5 percent, resp., of dietary protein) were fed in a purified casein diet to weanling rats for up to 21 days. Wt. loss, associated with malabsorption of lipid, N, and vitamin B12, developed in comparison with animals pair-fed isonitrogenous casein diets. Antinutritional effects of red kidney bean were reversible on reinstitution of a purified casein diet. An increase in bacterial colonization of the jejunum and ileum occurred in animals fed red kidney bean and phytohemagglutinin. When antibiotics were included in the diet, malabsorption of ((3)H)triolein and (57)Covitamin B12 in red kidney bean-fed animals was partially reversed and, in germ-free animals, purified phytohemagglutinin had no demonstrable antinutritional effect. (AS (extract))

0967

29183 DOBBINS, J.W.; LAURENSON, J.P.; GORELICK, F.S.; BANWELL, J.G. 1986. Phytohemagglutinin from red kidney bean (Phaseolus vulgaris) inhibits sodium and chloride absorption in the rabbit ileum. Gastroenterology 90(6):1907-1913. En., Sum. En., 22 Ref., Il. [Dept. of Medicine, Yale Univ. School of Medicine, P.O. Box 3333, New Haven, CT 06510, USA]
Phaseolus vulgaris. Phytohemagglutinins. Diets. Animal nutrition. USA.

Phytohemagglutinin, derived from red kidney bean, can induce malabsorption and diarrhea when fed to rats. The effect of phytohemagglutinin on ion transport in the rabbit ileum in vitro was determined. Compared with control tissues, phytohemagglutinin (1 mg/ml) added to the mucosal solution increased short-circuit current, decreased net Na and Cl absorption, and decreased tissue conductance. It is suggested that dietary

lectins may play a role in regulating intestinal fluid and electrolyte transport. (AS (extract))

0968

29722 ESTRUCH, R.; DAMJANOV, I. 1986. Lectin histochemistry applied to human nerves. Archives of Pathology and Laboratory Medicine 110(8):730-735. En., Sum. En., 24 Ref., Il. [Dept. of Pathology & Laboratory Medicine, Hahnemann Univ., Philadelphia, PA 19102-1192, USA]

Phaseolus vulgaris. Lectins. Biochemistry. Human physiology. Analysis. USA.

Eight plant lectins, among them types E4 and L4 from Phaseolus vulgaris, were found to bind to normal and pathologically altered nerves in humans. Only 2 lectins, from Helix pomatia and Maclura pomifera, were found to bind selectively to pathologically altered nerves. The changes recognized by lectin histochemistry were not pathognomonic of any specific type of nerve injury. This study provides baseline data on the reaction pattern of human peripheral nerve with a series of lectins and shows that lectin histochemistry could provide means for the study of peripheral nerve pathology. (AS (extract))

0969

29662 GREER, F.; PUSZTAI, A. 1985. Toxicity of kidney bean (Phaseolus vulgaris) in rats: changes in intestinal permeability. Digestion 32(1):42-46. En., Sum. En., 16 Ref. [The Rowett Research Inst., Bucksburn, Aberdeen AB2 9SB, Scotland]

Phaseolus vulgaris. Animal nutrition. Antinutritional factors. Proteins. Lectins. Scotland.

Rats fed on diets containing kidney bean showed increased intestinal permeability to intravenously injected (125)I-labelled rat serum proteins after an intragastric challerge with bean proteins. The enhanced accumulation of radioactive serum proteins in the lumen and walls of the small intestine indicated increased vascular permeability. It is suggested that dietary lectins may, at least in part, be responsible for this loss of serum proteins and thus contribute towards the overall toxicity of kidney bean proteins. (AS)

0970

28918 INFANTE Y., D.; PEREZ T., G.; BRITO L., M. 1986. Análisis de las características físicas y nutricionales de nueve variedades de frijol colorado. (Analysis of the physical and nutritional properties of nine red bean varieties). Centro Agrícola 13(2):68-73. Es., Sum. Es., En., 6 Ref.

Phaseolus vulgaris. Cultivars. Cooking. Seed characters. Dry matter. Protein content. Venezuela.

Nine var. of red beans were evaluated for several physical and nutritional characteristics (color, brilliance, cooking time, broth thickness, percent of peel, DM and protein contents). Var. M-112 had the highest protein content. Likewise, the correlations between cooking time and color and brilliance were significant, confirming that var. of more brilliance and darker color required a longer cooking time. It was also proved that the var. that required less cooking time do not have thicker broths. (AS)

0971

29194 KING, T.P.; PUSZTAI, A.; GRANT, G.; SLATER, D. 1986. Immunogold localization of ingested kidney bean (Phaseolus vulgaris) lectins in epithelial cells of the rat small intestine. Histochemical Journal

18(8):413-420. En., Sum. En., 22 Ref., Il. [Rowett Research Inst., Bucksburn, Aberdeen, AB2 9SB, Scotland]

Phaseolus vulgaris. Lectins. Animal nutrition. Analysis. Scotland.

The interactions between dietary kidney bean lectins and the epithelial cells of the rat small intestine were investigated by immunogold electron microscopy. The results demonstrated that the lectins bind to the glycocalyx of duodenal and jejunal microvilli and that some of these dietary constituents are endocytosed into lysosomal pathways within both absorptive and secretory gut cells. It is concluded that the lysosomal response serves to limit the absorption of nutritionally significant levels of these dietary toxins. (AS)

0972

29631 KOEHLER, H.H.; HERRICK, H.E.; BURKE, D.W. 1986. Differentiating the lectin activity in twenty-four cultivars of dry beans (Phaseolus vulgaris L.). Journal of Food Science 51(6):1471-1475. En., Sum. En., 43 Ref., Il. [Dept. of Food Science & Human Nutrition, Washington State Univ., Pullman, WA 99164-2032, USA]

Phaseolus vulgaris. Cultivars. Phytohemagglutinins. Animal nutrition. Antinutritional factors. Analysis. USA.

Hemagglutination activity of 24 dry bean cv. was estimated with rabbit, rat, bovine, and human erythrocytes. NPU evaluated the nutritional toxicity to weanling rats of the beans fed at 10 percent protein. Nonprotein and 10 percent casein control diets were included. SDS-polyacrylamide gel electrophoresis indicated lectin-containing beans. Beans evaluated (in order of decreasing lectin activity) were: Aurora, Sanilac, Royal Red, Red Kloud, Roza, Rufus, Harris, Viva, Fiesta, Black Turtle Soup, Chief, Hyden, UI-59 Sutter. The following were nontoxic: Blue Mountain, GN-1140, Holberg, Nodak, Olathe, Pindak, JM-126, NW-410, NW-590, UI-114. Combined hemagglutination tests and SDS-polyacrylamide gel electrophoresis enabled rapid screening of dry beans for toxic lectins. (AS)

0973

28924 NOAH, N.D.; BENDER, A.E.; REAIDI, G.B.; GILBERT, R.J. 1980. Food poisoning from raw red kidney beans. British Medical Journal 281(6234):236-237. En., Sum. En., 11 Ref.

Phaseolus vulgaris. Plant toxins. Human nutrition. Phytohemagglutinins. England.

Outbreaks of gastroenteritis associated with eating raw red kidney beans are reported and results from biochemical examinations of beans and expt. carried out with rats to determine the cause of the poisoning are presented and analyzed. A hemagglutinin appears to be the toxic factor; however, it is destroyed by adequate cooking. Recommendations are given on adequate cooking of red kidney beans, which should not be eaten raw or undercooked. (CIAT)

0974

29129 THORN, K.A.; TINSLEY, A.M.; WEBER, C.W.; BERRY, J.W. 1983. Antinutritional factors in legumes of the Sonoran desert. Ecology of Food and Nutrition 13(4):251-256. En., Sum. En., 17 Ref. [Dept. of Nutrition & Food Science, Univ. of Arizona, Tucson, AZ 85721, USA]

Phaseolus vulgaris. Phaseolus acutifolius. Antinutritional factors. Lectins. Trypsin. Nutritive value. Laboratory animals. USA.

Ten samples of legumes indigenous to the Sonoran Desert (Phaseolus acutifolius var. latifolius, Phaseolus vulgaris, Lysiloma watsonii, and Parkinsonia aculeata) were analyzed for antinutritional factors: flatulent oligosaccharides, trypsin inhibitors, lectins, phytic acid, and cyanogenic glycosides. The raffinose and stachyose contents of the beans ranged from 0 to 3.57 percent and from 0 to 5.45 percent, resp. The TIA ranged from 2.3 to 60.4 trypsin inhibitor units/mg; heat treatment decreased TIA from 0 to 97 percent. Phytic acid ranged from 0.48 to 1.02 percent. Cyanogenic glycosides were not detected in any of the samples. Lectin extracts from all of the legume samples agglutinated rabbit, hamster, and bovine red blood cells. Reduction of hemagglutinating activity upon heat treatment ranged from 0 to 100 percent. (AS)

0975

28213 UEBERSAX, M.A.; ZABIK, M.E. 1981. 1980 update: bean flour product utilization. Michigan Dry Bean Digest 5(2):24-25. En., Sum. En., Il.

Phaseolus vulgaris. Bean flour. Research. Human nutrition. Processing. USA.

Research advances toward the utilization of specific bean flour fractions such as whole bean flour, navy bean hulls, navy bean protein concentrate, and high starch fraction are reviewed. Potential uses of bean flour fractions in formulated food are included in table form. (CIAT)

0976

28603 WASSIMI, N.N. 1985. Genetic analyses of cooking time, nutritional, and culinary quality in dry beans (Phaseolus vulgaris L.). Ph.D. Thesis. East Lansing, Michigan State University. 198p. En., Sum. En., 114 Ref., Il.

Phaseolus vulgaris. Cooking. Timing. Tannin content. Protein content. Inheritance. Crossbreeding. USA.

A study was undertaken to determine the inheritance of cooking time and uniformity, tannin and protein content, and the culinary quality of a diverse population of beans. Eight strains were crossed in diallel and the 8 parents and F2 and F3 progenies grown at 2 locations (Isabela, Puerto Rico and Michigan, USA) for evaluation. Highly significant differences were observed among entries for cooking time, uniformity of cooking, tannin and protein content, and for 8 of 9 culinary quality traits. Quick cooking characteristics of parental strains were transmitted to progenies. Crosses of low x low and high x high protein parents had progenies that were also low and high, in protein content, resp. Selection aimed at improving the cooking time and cooking uniformity, soakability, and palatability of beans can be practiced in generations when plants are more heterozygous after the initial cross. Selection for low tannin and high protein among progeny from a cross should result in the stabilization of these traits in a single cv. (AS (extract))

0977

29159 WONG, S.; TRAIANEDES, K.; O'DEA, K. 1985. Factors affecting the rate of hydrolysis of starch in legumes. American Journal of Clinical Nutrition 42(1):38-43. En., Sum. En., 11 Ref., Il.

Phaseolus vulgaris. Digestibility. Canned beans. Starch content. Processing. Human nutrition. USA.

To understand the mechanism for the extremely slow rate of digestion and absorption of carbohydrate from legumes, among them red kidney beans, a no. of factors which could potentially affect the process in vitro were examined. The rate of hydrolysis of legume starch in vitro was not affected by the presence of fat (as either butter or an emulsion); however,

it was significantly increased in commercially available canned bean preparations, suggesting that the high temp. used in the canning process may alter the availability of starch in legumes. In vitro starch hydrolysis rate was also significantly increased by grinding legumes finely prior to cooking. The slow rate of digestion and absorption of legume carbohydrate does not appear to be due to viscosity since increasing the shaking rate of viscous mixture of either red kidney beans or lentils from 0 to 120 oscillations/min did not affect the hydrolysis rate, and a thick viscous mixture of either of these legumes did not retard the diffusion of free glucose from a dialysis sac into the dialysate. (AS)

0978

28941 WOOLF, N.J.; HERNIT, M.C.; BUTCHER, L.L. 1986. Cholinergic and non-cholinergic projections from the rat basal forebrain revealed by combined choline acetyltransferase and Phaseolus vulgaris leucoagglutinin immunohistochemistry. Neuroscience Letters 66(3):281-286. En., Sum. En., 12 Ref., Il.

Phaseolus vulgaris. Animal physiology. Biochemistry. Lectins. Analysis. USA.

A 2-color fluorescence method is described for demonstrating immunohistochemically the anterogradely transported plant lectin Phaseolus vulgaris leucoagglutinin (PHAL, fluorescein isothiocyanate label) and choline acetyltransferase (ChAT, rhodamine label) on the same rat brain section. Application of this method to the study of projection neurons in the vertical and horizontal limbs of the diagonal band, the substantia innominata, and nucleus basalis revealed that both cholinergic and noncholinergic pathways followed similar trajectories to their targets. (AS (extract)) See also 0773 1054 1063 1069 1073

H01 Foods and Nutritive Value

0979

28228 BRESSANI, R. 1985. Protein quality and nutritional value of beans. Research Highlights 2(6):1-4. En., Il. [INCAP, P.O. Box 1188, Guatemala, Guatemala]

Phaseolus vulgaris. Nutritive value. Digestibility. S. Protein content. Cooking. K. Proteins. Guatemala.

The hard-to-cook condition, bean protein quality, and digestibility are analyzed. In research carried out by the Instituto de Nutrición de América Central y Panamá, a significant interaction between environmental and genetic factors and cooking time was found. Studies on S content show a significant interaction between var. and locality; however, the var. has a greater effect on S content. The broth from cooked beans contains around 1 percent protein and high levels of polyphenols and K. (CIAT)

0980

28921 BRESSANI, R.; ELIAS, L.G.; BRAHAM, J.E. 1982. Reduction of digestibility of legume proteins by tannins. Journal of Plant Foods 4(1):43-55. En., Sum. En., 13 Ref., Il.

Phaseolus vulgaris. Tannin content. Proteins. Digestibility. Trypsin. Human nutrition. Seed coat. Guatemala.

The effect of polyphenolic compounds present in the seed coat of colored var. of common bean is discussed. From human studies it was estimated that polyphenols accounted for only 7 percent of true protein digestibility, while other factors such as trypsin inhibitors and poorly-digested storage proteins may account for as much as 25 percent. It was concluded that the effect of polyphenolic compounds on protein digestibility is relatively small and would be expected to be lower when beans were a part of a mixed diet. Therefore, other factors in cooked beans may be responsible for most of the low digestibility values reported. (AS)

0981

29767 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Improvement of individual characters. Nutritional quality. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.163-168. En.

Phaseolus vulgaris. Germplasm. Protein content. Cooking. Timing. Statistical analysis. Water absorption. Planting. Cultivars. Digestibility. Colombia.

The principal activities carried out in 1986 in the nutrition and quality lab. are reported. A statistical analysis of all the parameters of acceptability on all bean materials evaluated in the lab. from 1981 to 1985 was executed. A joint project was carried out between CIAT and Instituto de Nutrición de Centroamérica y Panamá (Costa Rica) on methods to measure cooking time. Studies also aimed at identifying the important parameters for water absorption and at determining the influence of site, planting time, and var. of the cv. on acceptable nutritional characteristics. A joint project with Italy's National Institute of Nutrition was initiated to study tannins, fiber content, and other factors responsible for the low digestibility of beans; likewise, a prototype model of a modified Mattson's automatic cooker was assessed. No significant differences were found for the protein content among the majority of the tested var., but some differences were observed for seed color. Planting time has a marked effect on protein content. Results from planting of Rojo 70 and Rojo de Seda in Palmira, Restrepo, and Quilichao (Colombia) indicate that site is strongly correlated to grain hardness, water absorption, and cooking time. (CIAT)

0982

28963 DESHPANDE, S.S.; SATHE, S.K.; SALUNKHE, D.K. 1984. Dry beans of Phaseolus: a review. Part 3. Critical Reviews in Food Science and Nutrition 21(2):137-195. En., 463 Ref., Il. [Dept. of Food Science, Univ. of Illinois, Urbana, IL, USA]

Phaseolus vulgaris. Processing. Timing. Nutrient value. Antinutritional factors. Human nutrition. Cooking. Proteins. USA.

A comprehensive literature review on the different aspects of dry bean processing is given: time required for preparation, effects of processing on the nutritional quality, and miscellaneous processing methods for eliminating some antinutritional factors (extraction, enzymatic methods, irradiation, membrane filtration, precipitation, anion exchange, or certain specific chemical treatments). The different current uses given to beans and the production of protein concentrates and isolates are also analyzed. (CIAT)

0983

29614 GARCIA-OLMEDO, R.; DIAZ, A.; VILLANUEVA, M.J. 1985. Estudio de la fibra alimentaria en legumbres cocinadas según recetas típicas de la cocina española. (Dietary fiber in legumes cooked according to typical Spanish

recipes). Anales de Bromatología 37(1):79-90. En., Sum. Es., En., 14 Ref., Il. [Depto. de Bromatología, Toxicología & Análisis Químico Aplicado de la Facultad de Farmacia, Univ. Complutense, Madrid, España]

Phaseolus vulgaris. Cooking. Dietary value. Composition. Human nutrition. Spain.

Studies were carried out to determine the dietary fiber content and composition of several Spanish dishes: stewed lentils, fabada asturiana (navy bean/meat dish), and chickpea soup. Southgate's scheme was used to analyze composition: non-cellulose polysaccharides, cellulose, lignin, and dietary fiber. Resp. values for the navy bean/meat dish were 2.55, 1.43, 0.26, and 4.24 percent fresh wt. basis. Results obtained before and after the cooking process were compared to determine its possible influence on these values. (CIAT)

0984

28958 JOOD, S.; MEHTA, U.; SINGH, R. 1986. Effect of processing on available carbohydrates in legumes. Journal of Agriculture and Food Chemistry 34(3):417-420. En., Sum. En., 17 Ref. [Haryana Agricultural Univ., Dept. of Foods & Nutrition, Hisar-125 004, India]

Phaseolus vulgaris. Processing. Cooking. Sugar content. Starch content. Carbohydrate content. Human nutrition. Flatulance. India.

The effect of various treatments, such as soaking in plain water and sodium bicarbonate solution, cooking of soaked seeds, autoclaving of soaked seeds, germination and frying of germinated seeds, commonly employed to destroy the flatulence factors in legumes, was investigated on available carbohydrates of Phaseolus vulgaris, Cicer arietinum, Phaseolus mungo, Cajanus cajan, and Vicia faba. Total soluble sugars, reducing sugars, nonreducing sugars, and starch content in above pulses ranged from 7.09 to 10.33 percent, 0.18 to 0.83 percent, 6.91 to 9.60 percent, and 43 to 53 percent, resp. The contents of all these components decreased under various treatments; however, on germination for 24 h, the losses in the amount of total sugars, reducing sugars, and nonreducing sugars were higher than observed in seeds germinated for 48 h. On further germination up to 96 h, the contents of these sugars increased. Starch content, on the other hand, decreased. When the present observations are combined with those of a previous paper, it appears that germination of pulses for 24 h is a reasonably good treatment for reduction of flatus-producing carbohydrates as well as avoiding excess losses of the available carbohydrates. (AS)

0985

29117 LOWGREN, M.; LIENER, I.E. 1986. The effect of slow-cooking on the trypsin inhibitor and hemagglutinating activities and in vitro digestibility of brown beans (Phaseolus vulgaris, var. Stella). Qualitas Plantarum 36(2):147-154. En., Sum. En., 26 Ref., Il. [Dept. of Nutrition, Univ. of Uppsala, Box 551, Uppsala 75122, Sweden]

Phaseolus vulgaris. Cooking. Timing. Digestibility. Proteins. Temperature. Trypsin. Phytohemagglutinins. Nutrient value. Human nutrition. Sweden.

Brown and kidney beans were subjected to 2 modes of cooking in a household slow cooker A, a fixed low setting (120 watts) for 10 h; B, a high setting (210 watts) for 2.5 h and a low setting (120 watts) for 7.5 h. Temp. changes in the beans were recorded. With treatment A, over 90 percent of the hemagglutinating and trypsin inhibitor activities occurred after 6 h at which time the temp. had reached 80 degrees Celsius. With treatment B, inactivation of these activities was almost complete at the end of 2 h when a max. temp. of 100 degrees Celsius had been attained. The in vitro

digestibility of the bean protein was considerably increased by either treatment. By way of contrast, only 20 min of heating was required to destroy these activities when the beans were brought to a boil in an open vessel. (AS)

0986

29119 MOHAMMADIHA, H.; MOSTAFAVI, P. 1984. Enzyme digest and acid hydrolyzed index of protein quality evaluation. Iranian Journal of Public Health 13(1-4):43-54. En., Sum. En., 20 Ref., Il. [Biochemistry Dept., Medical School, Univ. of Teheran, Teheran, Iran]

Phaseolus vulgaris. Proteins. Enzymes. Digestibility. Analysis. Amino acids. Animal nutrition. Hydrolysis. Iran.

A pancreatopeptidase (elastase) digest index was devised for a rapid and accurate estimation of protein quality. This index was calculated on the basis of all the amino acids released by an in-vitro elastase digestion, acid hydrolysis of same sample, and the residue of enzyme hydrolyzed. The amino acids were determined by TLC. Samples used were cooked white kidney beans, cooked and over-heated soybean powder, and skimmed milk powder. Good correlation was observed between elastase index value and their biological values reported in the literature from feeding trials. The pattern of amino acids released by acid and by enzyme hydrolysis were about the same. (AS)

0987

29167 SCHWARCZ, H.P.; MELBYE, J.; KATZENBERG, M.A.; KNYF, M. 1985. Stable isotopes in human skeletons of southern Ontario: reconstructing palaeodiet. Journal of Archaeological Science 12(3):187-206. En., Sum. En., 62 Ref., Il. [Dept. of Geology, McMaster Univ., Hamilton, Ontario, Canada]

Phaseolus vulgaris. Diets. Protein content. History. Canada.

The introduction of beans into the native diet about AD 1100, should have caused a decrease in the (15)N content of human bone collagen because legumes are deficient in this isotope, with respect to meat and fish; however, no significant change was observed in the (15)N/(14)N ratio of human bone collagen over the period from 2300 BC to AD 1640. It is concluded that meat and fish remained the main sources of protein even after the advent of agriculture into southern Ontario, Canada. (AS (extract)) See also 0760 0764 0928 1050 1056 1065 1067 1070

100 MICROBIOLOGY

0988

29602 DEHNE, H.W.; BACKHAUS, G.F. 1986. The use of vesicular-arbuscular mycorrhizal fungi in plant production. 1. Inoculum production. Zeitschrift fur Pflanzenkrankheiten und Pflanzenschutz 93(4):415-424. En., Sum. En., De., 23 Ref. [Institut fur Pflanzenkrankheiten und Pflanzenschutz der Universitat Hannover, Herrenhauser Strabe 2, D-3000 Hannover 21]

Phaseolus vulgaris. Mycorrhizae. Inoculation.

Vesicular-arbuscular mycorrhizal fungi were grown on various host plants (among them, beans) in a hydroponic culture system. Particles of expanded clay from mycorrhizal stock cultures were found to contain high levels of spores and fungal mycelium. Inoculations were carried out with these particles as well as with inocula from stock cultures in sandy soils. Expanded clay was decontaminated from infestations with Pythium sp. without

substantial loss of mycorrhizal infectivity. Various vesicular-arbuscular, mycorrhizal fungi bound to an inorganic carrier, such as expanded clay, provided a highly efficient method for inoculating various host plants. (AS) See also 0889

I01 Rhizobium spp., Nitrogen Fixation and Nodulation

0989

28954 AMARA, D.S.; MILLER, R.H. 1986. Effect of moisture and salt stress on selected Rhizobium phaseoli strains. Mircen Journal of Applied Microbiology and Biotechnology 2(3):373-382. En., Sum. En., Fr., Es., 19 Ref., Il. [Dept. of Agronomy, Njala Univ. College, Private Mail Bag, Freetown, Sierra Leone]

Phaseolus vulgaris. Strains. Rhizobium phaseoli. Flooding. Nitrogen fixation. Nodulation. Soil moisture. Ca. Na. K. Mg. USA.

Studies of Rossmoyne silt loam by the plate count and fluorescent antibody techniques showed that flooding had no detrimental effects on survival and N2-fixing capacity of Rhizobium phaseoli strains. Short-term flooding apparently stimulated the activity of the bacteria, as indicated by the increase in nodulation and yield of Phaseolus vulgaris. The strains also differed in their ability to survive desiccation, and a decline in the population of all strains occurred at moisture tensions greater than 15 bars. The inhibitory concn. of salts to growth of R. phaseoli in solution were 0.3 percent for Na and K chlorides and 1.0 percent for Ca and Mg chlorides. The effects of Na and K sulfates were similar to the Na and K chlorides at 0.3 percent except for strain C-05 which was inhibited by 0.1 percent Na sulphate. Comparative growth averaged over all strains grown with 0.1 percent salts showed that the degree of inhibition was the same for both chloride and sulfate salts but that Na salts showed the greatest, and Mg salts the least, inhibition. It was concluded that some strains of R. phaseoli can survive soil flooding, desiccation, and salt stress in large enough no. to initiate nodule formation in some soils. (AS)

0990

28971 BARBO, C.V.S.; FABRICIO, A.C.; SANTOS, R.F. DOS 1987. Fixacao simbiotica do nitrogenio em soja e feijao no Estado de Mato Grosso do Sul. (Symbiotic nitrogen fixation on soybeans and field beans in the state of Mato Grosso do Sul). Dourados-MS, Brasil, Empresa Brasileira de Pesquisa Agropecuaria. Unidade de Execucao de Pesquisa de Ambito Estadual de Dourados. Pesquisa en Andamento no.21. 12p. Pt. [EMBRAPA-UEPAE de Dourados, Caixa Postal 661, 79.800 Dourados-MS, Brasil]

Phaseolus vulgaris. Nodulation. Rhizobium phaseoli. Strains. Nitrogen fixation. N. Cultivars. Inoculation. Yields. Dry matter. Brazil.

The response of field beans and soybeans to inoculation with Rhizobium phaseoli strains Co5 and SEMIA 487 and to N fertilizer (20 and 40 kg/ha at planting and 20 days after crop emergence, resp.) was evaluated at the Unidade de Execucao de Pesquisa de Ambito Estadual de Dourados (Mato Grosso do Sul, Brazil). The 1st evaluation of bean nodulation 20 days after the emergence showed a higher no. of nodules when seed inoculation took place (42.6 nodules/10 plants). With N fertilizer, the DM yield (0.70 g/plant) and total N (0.0349 g/plant) were significantly higher. In the 2nd evaluation, no differences were observed between treatments for DM wt. nor for yield. BAT 1550, LPM 10034, RAPE, H9B, A 338, A 282, cv. 6191, A 242, EMP 117, A 352, A 75, RICO PARDO 896, and A 241 gave the highest yields. (CIAT)

0991

29121 BOIARDI, J.L.; ARRARAS, E.A.; BALATTI, A.P.; MAZZA, L.A. 1983. Supervivencia de Rhizobium phaseoli en inoculantes a base de turba. (Survival of Rhizobium phaseoli in peat inoculants). Revista de la Facultad de Agronomía Universidad Nacional de La Plata 59(1-2):113-123. Es., Sum. Es., En., 17 Ref., Il. [Centro de Investigación y Desarrollo de Fermentaciones Industriales, Facultad de Ciencias Exactas, UNLP, Argentina]

Phaseolus vulgaris. Rhizobium phaseoli. Temperature. Inoculation. Argentina.

The preparation and conservation of peat-based inoculants for beans were studied, as well as the initial concn. of microorganisms in the product, the composition of bacterial medium suspension, and the conservation temp. Two kinds of inoculants were used: powder inoculum for seeds and granulated inoculum for soil. The results showed that the no. of viable cells in the product increases with the initial no. of bacteria. The addition of nutrients to the bacterial suspension is not necessary. Reducing the temp. to 4 degrees Celsius immediately after the elaboration decreases bacterial survival; low (4 degrees Celsius) or room temp. does not significantly modify the no. of microorganisms after the maturation period. Finally, cell viability is higher in powder inoculum than in granulated inoculum. (AS)

0992

29106 CAMPBELL, W.F.; WAGENET, R.J.; RODRIGUEZ, R.R. 1986. Salinity, water management and fertility interactions on yield and nitrogen fixation in snap-beans. Irrigation Science 7(3):195-204. En., Sum. En., 32 Ref., Il. [Plant Science Dept., USU, Logan, UT 84322-4820, USA]

Phaseolus vulgaris. Snap beans. Irrigation. Fertilizers. N. P. K. Yield components. Acetylene reduction. Salinity. Yields. Rhizobium. Rhizosphere. USA.

Greenhouse expt. were designed to determine whether irrigation (3 levels in 3 frequencies) and fertilizer supplements (2 and 3 N and P levels, resp.) could reduce the adverse effects of soluble salts on yield and N fixation in snap bean cv. Early Gallatin inoculated with Rhizobium phaseoli. Yield components, percent plant N, and acetylene reduction were reduced significantly as salinity and the interval between water applications increased. Fertilizer application had no effect on any plant component. Two- and three-way interactions confirmed the strong effects of the individual variables of salinity and irrigation frequency. Increasing irrigation frequency increased yield at all of the water salinities studied. Application of N, P, and K fertilizers helped maintain yields at low to moderate levels of soil salinity, but not at high salt levels. Snap bean plants harvested at seed maturity, however, did not show a significantly substantial benefit of fertilizer for Rhizobium in the stressed rhizosphere. (AS)

0993

29766 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Improvement of individual characters. N-fixation. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.153-162. En., Il.

Phaseolus vulgaris. Nitrogen fixation. Indeterminate cultivars. Determinate cultivars. Dwarf beans. Nodulation. Mutation. Genotypes. Rhizobium phaseoli. Colombia.

In the 1986 breeding program for enhanced N fixation, emphasis was placed on small-seeded indeterminate beans; however, at the beginning of 1986 it was decided that some priority should be given to materials for Africa, including larger seeded determinate and indeterminate bush types. In Popayan, Colombia, some lines such as Canadian Wonder, Catrachita, and RIZ 30 demonstrated good early nodulation, but by mid-flowering the nodules were already starting to senesce. In collaboration with Rothamsted Exptl. Station, United Kingdom, investigations into obtaining nonnodulating and supernodulating bean lines (lines which continue to nodulate in the presence of nitrate and which nodulate more than usual under all conditions) by mutation were carried out. Nodule mass is 1 component which has been identified in beans as contributing to improved fixation. Expt. carried out under field and glasshouse conditions to measure N fixation of different bean genotypes showed similar differences in N fixation. In general, the RIZ lines and A 268 fixed more N than the BAT lines. Data on differences between Rhizobium strains in tolerance and growth at low and high temp. are presented. (CIAT)

0994

29144 EARDLY, B.D.; HANNAWAY, D.B.; BOTTOMLEY, P.J. 1985. Characterization of rhizobia from ineffective alfalfa nodules: ability to nodulate bean plants (Phaseolus vulgaris (L.) Savi). Applied and Environmental Microbiology 50(6):1422-1427. En., Sum. En., 40 Ref. [Boyce Thompson Inst. for Plant Research, Ithaca, NY 14853, USA]

Phaseolus vulgaris. Nodulation. Rhizobium. Nitrogen fixation. N. pH. USA.

Rhizobium isolates obtained from root nodules of ineffectively nodulated, field-grown Medicago sativa plants were characterized to determine if these isolates possessed characteristics that could explain either their ineffectiveness in N2 fixation or their apparent ability to tolerate the moderately acid soil conditions from which they originated. Infectiveness tests on a broad range of legumes revealed that the isolates formed root nodules on M. sativa, M. lupulina, and Phaseolus vulgaris. These results provide evidence that, in some situations, ineffective nodulation of M. sativa in the field may be due to the presence of promiscuous, native Rhizobium species. (AS (extract))

0995

29682 HOOYKAAS, P.J.J.; DEN DULK-RAS, H.; REGENSBURG-TUINK, A.J.G.; VAN BRUSSEL, A.A.N.; SCHILPEROORT, R.A. 1985. Expression of a Rhizobium phaseoli Sym plasmid in R. trifolii and Agrobacterium tumefaciens: incompatibility with a R. trifolii Sym plasmid. Plasmid 14(1):47-52. En., Sum. En., 19 Ref., Il. [Univ. of Leiden, Dept. of Plant Molecular Biology, MOLBAS Research Group, Wassenaarseweg 64, 2333 AL Leiden, The Netherlands]

Phaseolus vulgaris. Rhizobium phaseoli. Strains. Identification. Nodulation. Netherlands.

Identification of the Sym plasmid in Rhizobium phaseoli strain RCC3622 is described. Introduction of this plasmid into R. trifolii or Agrobacterium tumefaciens strains resulted in bacteria capable of forming characteristic spherical root nodules on beans. This Sym plasmid, designated pSym9, was characterized as 275 MDa and nonconjugative. pSym9 was incompatible with the R. trifolii Sym plasmid pSym5, and carries genes determining a melanin-like black pigment. A 2nd plasmid of 135 MDa, pRph3622a, was also transferred from R. phaseoli to R. trifolii and A. tumefaciens. Transconjugants carrying this plasmid did not form root nodules on beans. In contrast to other Rhizobium plasmids, pRph3622a was unstable in A. tumefaciens. (AS)

0996

28912 HUNGRIA, M.; NEVES, M.C.P. 1986. Ontogenia da fixacao biológica do nitrogenio em Phaseolus vulgaris. (Ontogeny of biological nitrogen fixation in beans). Pesquisa Agropecuaria Brasileira 21(7):715-730. Pt., Sum. Pt., En., 52 Ref., Il. [Empresa Brasileira de Pesquisa Agropecuaria, Unidade de Apoio ao Programa Nacional de Pesquisa em Biologia do Solo, km. 47, 23.460 Seropédica-RJ, Brasil]

Phaseolus vulgaris. Cultivars. Rhizobium leguminosarum. Nitrogen fixation. Nutrient transport. Plant assimilation. N. Nodulation. Mineral content. Seed. Leaves. Brazil.

An expt. was performed under greenhouse conditions with 2 bean cv. (Negro Argel and Venezuela-350) inoculated with either Rhizobium leguminosarum biovar phaseoli strain CO5 or 127 K-17. Plants having the greatest N accumulation showed the highest rates of nitrogenase activity between flowering and mid-pod filling stage, lower loss of ATP via the evolution of H in the nodules, higher rates of N transport in the xylem sap, higher percentage of N as ureides in the xylem sap, and higher N remobilization from the leaves and stems to the seeds. The bean cv., the Rhizobium strain, and the interaction between cv. and strains affected all the parameters studied. The symbiosis of Negro Argel with CO5 accumulated 88 percent more N in seeds, lost less N in senescent leaves (N in senescent leaves/plant N), and had a HI of N (seed N/plant N) 20 percent greater than cv. Venezuela-350 inoculated with strain 127 K-17. (AS)

0997

29104 O'HARA, G.W.; DAVEY, M.R.; LUCAS, J.A. 1983. Association between the nitrogen fixing bacterium Azospirillum brasilense and excised plant roots. Zeitschrift fuer Pflanzenphysiologie 113(1):1-13. En., Sum. En., 41 Ref., Il. [School of Environmental & Life Sciences, Murdoch Univ., Murdoch, West Australia]

Phaseolus vulgaris. Nitrogen-fixing bacteria. Strains. Rhizosphere. Inoculation. Acetylene reduction. Nitrogen fixation. Australia.

Inoculation of vial-fed liquid and sand-vermiculite cultures of excised roots of Pennisetum americanum, Sorghum bicolor, Zea mays, and Phaseolus vulgaris with Azospirillum brasilense strains Sp 7, SpF 104, and SpF 105 was followed by attachment of bacteria to root hairs and epidermal cells. Subsequently, there occurred dense bacterial colonization of the root mucigel. Tetrazolium staining indicated bacteria to be present in the rhizosphere and endorhizosphere. There was no invasion of the stele of intact roots by Azospirillum. Approx. 1 x 10(7) bacteria were associated with each root explant within 7 days of inoculation, bacterial no. declining after this period. Nitrogenase activity, as determined by acetylene reduction, was detected only in roots inoculated with Azospirillum strain Sp 7 in mineral salts saturated sand-vermiculite cultures, although there occurred wide variation between explants. Acetylene reduction was not detected in control cultures and in roots inoculated with the mutant bacterial strains SpF 104 and SpF 105. (AS)

0998

29609 SHANTHARAM, S. 1985. Pole bean lectin binding to rhizobia: lack of correlation to specificity in root nodule symbiosis. Microbios Letters 30(117):43-50. En., Sum. En., 22 Ref., Il. [Dept. of Genetics, Iowa State Univ., Ames, IA 50011, USA]

Phaseolus vulgaris. Rhizobium. Lectins. Nodulation. USA.

Pole bean lectin from Phaseolus vulgaris cv. Kentucky Wonder labelled with colloidal gold particles was used to study whether it can bind to its homologous Rhizobium and specifically recognize the host plant. The results show that pole bean lectin binds to extracellular polysaccharide of all the species of Rhizobium employed in this study, irrespective of whether they can or cannot nodulate pole bean. In addition, the pole bean lectin has been shown to bind to the cell-surface pili in R. trifolii and R. leguminosarum and R. japonicum. The extracellular polysaccharide in all the rhizobia was found to be acidic in nature as it was stainable by ruthenium red. The data suggests that the pole bean lectin does not play a significant role in determining the host-specific interactions between Rhizobium and leguminous plants at the cell-surface level. (AS)

0999

28879 VARGAS C., H. 1986. Aislamiento y caracterización de cepas de Rhizobium phaseoli sobre la variedad de frijol Frijolica 0-3.2 para condiciones de Ipiales, Nariño. (Isolation and characterization of Rhizobium phaseoli strains on bean variety Frijolica 0-3.2 in conditions of Ipiales, Nariño). Tesis Ing.Agr. Palmira, Universidad Nacional de Colombia. 104p. Es., Sum. Es., En., 53 Ref., Il.

Phaseolus vulgaris. Strains. Rhizobium phaseoli. Isolation. Cultivars. Nitrogen fixation. Colombia.

Between 1985-86, 5 trials were carried out at CIAT-Palmira to evaluate and improve symbiotic N fixation in beans, using Rhizobium phaseoli strains obtained from the CIAT collection and from Ipiales, Colombia. All the strains from Ipiales and several of those from the CIAT collection were evaluated on bean var. Frijolica 0-3.2, while only Ipiales strains were assessed on var. Mortiño. In the 1st trial strains were isolated from nodules formed on roots of bean var. Frijolica 0-3.2, obtaining 15 strains which were named IpiHy and given a no. between 1 and 15. The 2nd trial measured the tolerance in vitro of the strains to grow under low temp.; 12 strains that were able to grow at 10 and 15 degrees Celsius were selected. In the third expt. biochemical tests were done to characterize the strains and to predict possible performance in the soil; strain CIAT 166 was discarded as it grew in peptone-glucose medium and strain CIAT 209, because of its atypical growth. The potential effectiveness of the different strains with bean var. Frijolica 0-3.2 and Mortiño was evaluated in the 4th expt. Significant differences were found between the strains. The yield of Frijolica 0-3.2 was slightly superior when N fertilizer was applied. In the 5th expt. the ability of the inoculated strains to compete with native soil rhizobia and cause a plant growth response was evaluated. Only a few very effective strains were seen to compete well in the soil. Strains IpiHy 10 and IpiHy 14 have good potential to be used as inoculants for improving the N fixation of the bean var. Frijolica 0-3.2 and Mortiño. (AS (extract))

1000

29632 TAU, J.L.; ARRARAS, E.A.; ERTOLA, R.J. 1984. Inoculación del poroto Alubia (Phaseolus vulgaris L) con rizobios en dos localidades de Salta. (Inoculation of Alubia beans with Rhizobium at two sites in Salta). Revista de la Facultad de Agronomia (Argentina) 60(1-2):121-125. Es., Sum. Es., En., 18 Ref. [Estación Experimental Agropecuaria de Salta (Cerrillos), INTA CC 228-4.400 Salta, Argentina]

Phaseolus vulgaris. Inoculation. Rhizobium phaseoli. Fertilizers. N. P. K. Yields. Nodulation. Argentina.

During 1982-83, 2 trials were carried out to evaluate the effect of inoculation with Rhizobium phaseoli strain F45 and the application of 60,

160, and 100 kg N, P, and K/ha, resp., on bean yield at the sites of Cerrillos and Horcones (Argentina). No response to the inoculation was observed. In Horcones a positive response to N fertilization was observed. (CIAT) See also 0716 0724 0928

J00 ECONOMICS AND DEVELOPMENT

1001

28189 CALDERON C., W. 1985. Beans in Africa. In Centro Internacional de Agricultura Tropical. Trends in CIAT Commodities. Cali, Colombia. Internal Document Economics 1.10. pp.74-78. En.

Phaseolus vulgaris. Production. Yields. Statistical data. Human nutrition. Protein content. Africa.

Data are given on worldwide bean production (MT) for the period 1981-83, as well as the mean production (MT), area cultivated, and mean yields in the different Sub-Saharan countries in Africa. Data on growth rates in bean production, area cultivated, and yields are also included for several African countries (Ethiopia, Tanzania, Uganda, Burundi, Rwanda, Angola, Madagascar, Republic of South Africa, and Zambia) for the periods 1962-70 and 1970-81. Finally, data are included on the nutritional role of beans in Sub-Saharan Africa during the period 1979-81 with respect to percentage of total protein from beans and the rank of beans among protein sources and among quality proteins. (CIAT)

1002

29781 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Evaluation and improvement of agronomic practices. Economics. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.303-309. En.

Phaseolus vulgaris. Marketing. Transfer of technology. Technology evaluation. Brazil. Colombia. Costa Rica. Dominican Republic. El Salvador. Nicaragua. Peru. Guatemala.

Economics research in the bean program continues to concentrate on production studies, marketing issues, policy analysis, and training. Diagnostic studies of current production systems and problems were conducted in Brazil, Colombia, Costa Rica, Dominican Republic, El Salvador, Nicaragua, and Peru. Results of preadoption evaluations in Peru and of adoption studies in Guatemala are included. To assess the distribution of benefits of alternative technologies biased towards small or towards large farmers, both among producer groups as well as among consumers of different income strata, a demand and supply model of beans was constructed for Brazil. The model shows that benefits to small farmers are highly sensitive to the degree of technology bias. Most of this research is conducted in collaboration with national programs, and strengthening their research capacity through training and joint projects is a major objective. (CIAT)

1003

29780 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Evaluation and improvement of agronomic practices. On-farm research. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.289-301. En.

Phaseolus vulgaris. Transfer of technology. Technology evaluation. Adaptation. Cultivars. Fertilizers. Intercropping. Zea mays. Spacing. Planting. Seed treatment. Yields. Peru. Colombia.

On-farm research activities in 1986 continued in the areas of training, network establishment, methodology adaptation, technology development on-farm, and technology adaptation to specific areas. One early result is a better understanding of the variability in the adaptation of the newly adopted var. Gloriabamba in different parts of Cajamarca, Peru. In Ipiales, Colombia, a wide selection of technologies which can be adopted one by one is now available to the farmer. Frijolica LS 3.3, released by the Instituto Colombiano Agropecuario in 1985, is being tested in farmer-managed trials in San Vicente (Antioquia, Colombia). Farmers in the area of Funes (Colombia) have adopted the bush bean line Ancash 66, apparently because of its tolerance to poor soils. Agronomic results between exptl. station and on-farm research are analyzed and compared. Results indicate the need for fertilizer, density, and plant protection practices to be developed and tested from an early stage on-farm. For these practices, station trials, however well conducted, are likely to be misleading. (CIAT)

1004

29770 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1987. Genetic improvement and related activities. Regional activities. Central America and the Caribbean. In_____. Bean Program. Annual Report 1986. Cali, Colombia. Working Document no.21. pp.185-197. En.

Phaseolus vulgaris. Transfer of technology. Technology evaluation. Resistance. Bean golden mosaic virus. Apion. Slugs. Rhizoctonia solani. Xanthomonas phaseoli. Central America. Caribbean.

In 1986 the bean program for Central America and the Caribbean, including tropical Mexico and Panama, continued with the transfer of technology generated by the national programs to the farmers, through efficient on-farm research. An efficient network of information and material on beans was formed, and was furthered by active exchange between the countries. Courses offered by the various countries were oriented towards the training of on-farm researchers to ease technology transfer between national programs and farmers. Research for the incorporation of resistance to BGMV, Apion, slugs, web blight, and common bacterial blight was continued. Results are included. (CIAT)

1005

28270 CENTRO INTERNACIONAL DE AGRICULTURA TROPICAL. 1985. Research strategies and projections: 1986-1990. Commodity programs: bean program. In_____. CIAT in the 1980s revisited. A medium-term plan for 1986 to 1990. Cali, Colombia. pp.85-111. En., 8 Ref., Il.

Phaseolus vulgaris. Agricultural projects. Cultivation systems. Plant breeding. Transfer of technology. Colombia.

Actual accomplishments and future plans of the CIAT Bean Program during the period 1986-90 are described. The major cropping systems studied include bush beans in monoculture; bush, semiclimbing, and climbing beans in relay systems with maize; bush beans in association with maize; and climbing beans in association with maize. The main constraints to increased production are related with diseases, pests, physiological problems, and soils. General strategies for the achievement of the bean program's goals are discussed; they are based on the genetic improvement of germplasm and the training of national program scientists to develop collaborative research networks. Staffing needs and the kind of research required are given on each of the following areas: plant breeding, pathology, physiology, virology, entomology, economics, cropping systems agronomy, agronomy/soil science, international trials, soil microbiology, and program leader. Furthermore, regional staffing requirements and the justification

of such positions are given for Central America and the Caribbean, Brazil and the Southern Cone, Eastern and Southern Africa, and West Asia-North Africa. Emphasis is given to bilateral arrangements and the development of collaborative research with basic research institutions. (CIAT)

1006

28867 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1985. Beans, dry. FAO Production Yearbook 39:136-137. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of dry beans for the different countries and continents during the period 1979-81 and for each year of the period 1983-85. (CIAT)

1007

28865 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1984. Beans, dry. FAO Production Yearbook 38:136-137. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of dry beans for the different countries and continents during the period 1974-76 and for each year of the period 1982-84. (CIAT)

1008

28863 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1983. Beans, dry. FAO Production Yearbook 37:134-135. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of dry beans for the different countries and continents during the period 1974-76 and for each year of the period 1981-83. (CIAT)

1009

28861 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1982. Beans, dry. FAO Production Yearbook 36:132-133. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of dry beans for the different countries and continents during the period 1974-76 and for each year of the period 1980-82. (CIAT)

1010

28859 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1981. Beans, dry. FAO Production Yearbook 35:120-121. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of dry beans for the different countries and continents during the period 1969-71 and for each year of the period 1979-81. (CIAT)

1011

28857 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1980. Beans, dry. FAO Production Yearbook 34:121-122. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of dry beans for the different countries and continents during the period 1969-71 and for each year of the period 1978-80. (CIAT)

1012

28855 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1979. Beans, dry. FAO Production Yearbook 33:120-121. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of dry beans for the different countries and continents during the period 1969-71 and for each year of the period 1977-79. (CIAT)

1013

28853 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1978. Beans, dry. FAO Production Yearbook 32:120-121. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of dry beans for the different countries and continents during the period 1969-71 and for each year of the period 1976-78. (CIAT)

1014

28851 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1977. Beans, dry. FAO Production Yearbook 31:118-119. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of dry beans for the different countries and continents during the period 1969-71 and for each year of the period 1975-77. (CIAT)

1015

28849 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1976. Beans, dry. FAO Production Yearbook 30:117-118. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of dry beans for the different countries and continents during the period 1961-65 and for each year of the period 1974-76. (CIAT)

1016

28847 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1975. Beans, dry. FAO Production Yearbook 29:91-92. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of dry beans for the different countries and continents during the period 1961-65 and for each year of the period 1973-75. (CIAT)

1017

28845 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1974. Beans, dry. FAO Production Yearbook 28:74-75. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of dry beans for the different countries and continents during the period 1961-65 and for each year of the period 1972-74. (CIAT)

1018

28843 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1973. Beans, dry. FAO Production Yearbook 27:101-105. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of dry beans for the different countries and continents for each year of the period 1962-73. (CIAT)

1019

28841 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1972. Beans, dry. FAO Production Yearbook 26:101-102. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of dry beans for the different countries and continents during the period 1961-65 and for each year of the period 1970-72. (CIAT)

1020

28868 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1985. Beans, green. FAO Production Yearbook 39:177. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of fresh beans for the different countries and continents during the period 1979-81 and for each year of the period 1983-85. (CIAT)

1021

28866 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1984. Beans, green. FAO Production Yearbook 38:175. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of fresh beans for the different countries and continents during the period 1974-76 and for each year of the period 1982-84. (CIAT)

1022

28864 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1983. Beans, green. FAO Production Yearbook 37:173. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of fresh beans for the different countries and continents during the period 1974-76 and for each year of the period 1981-83. (CIAT)

1023

28862 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1982. Beans, green. FAO Production Yearbook 36:170. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of fresh beans for the different countries and continents during the period 1974-76 and for each year of the period 1980-82. (CIAT)

1024

28860 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1981. Beans, green. FAO Production Yearbook 35:158. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of fresh beans for different countries and continents during the period 1969-71 and for each year of the period 1979-81. (CIAT)

1025

28858 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1980. Beans, green. FAO Production Yearbook 34:159. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of fresh beans for the different countries and continents during the period 1969-71 and for each year of the period 1978-80. (CIAT)

1026

28856 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1979. Beans, green. FAO Production Yearbook 33:158. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of fresh beans for the different countries and continents during the period 1969-71 and for each year of the period 1977-79. (CIAT)

1027

28854 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1978. Beans, green. FAO Production Yearbook 32:159. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of fresh beans for the different countries and continents during the period 1969-71 and for each year of the period 1976-78. (CIAT)

1028

28852 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1977. Beans, green. FAO Production Yearbook 31:156. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of fresh beans for the different countries and continents during the period 1969-71 and for each year of the period 1975-77. (CIAT)

1029

28850 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1976. Beans, green. FAO Production Yearbook 30:154. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of fresh beans for different countries and continents during the period 1961-65 and for each year of the period 1974-76. (CIAT)

1030

28848 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1975. Beans, green. FAO Production Yearbook 29:164. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of fresh beans for each year of the period 1964-75 for the world, Africa (Algeria, Egypt, Mauritius, Morocco, Reunion, South Africa, and Tunisia), North America (Bermuda, Canada, Guadeloupe, Martinique, Mexico, and USA), and South America (Argentina, Chile, Ecuador, Peru, and Uruguay). (CIAT)

1031

28846 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1974. Beans, green. FAO Production Yearbook 28:148. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of fresh beans for different countries and continents during the period 1961-75 and for each year of the period 1972-74. (CIAT)

1032

28870 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1973. Beans, green. FAO Production Yearbook 27:162. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of fresh beans for different countries and continents during the period 1961-65 and for each year of the period 1971-73. (CIAT)

1033

28869 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1972. Beans, green. FAO Production Yearbook 26:142. En., Fr., Es.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of fresh beans for different countries and continents during the period 1961-65 and for each year of the period 1970-72. (CIAT)

1034

28840 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1971. Dry beans. FAO Production Yearbook 25:154-159. En., Fr.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of dry beans for different countries and continents during the periods 1948-52 and 1961-65 and for each year of the period 1967-71. (CIAT)

1035

28838 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1970. Dry beans. FAO Production Yearbook 24:153-158. En., Fr.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of dry beans for different countries and continents for the period 1948-52 and 1961-65 and for each year of the period 1966-70. (CIAT)

1036

28836 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1969. Dry beans. FAO Production Yearbook 23:154-159. En., Fr.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of dry beans for the different countries and continents during the periods 1948-52 and 1952-56 and for each year of the period 1964-68. (CIAT)

1037

28834 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1968. Dry beans. FAO Production Yearbook 22:152-157. En., Fr.

Phaseolus vulgaris. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of dry beans for the different countries and continents during the periods 1948-52 and 1952-56 and for each year of the period 1964-67. (CIAT)

1038

28839 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1971. Green beans. FAO Production Yearbook 25:140-143. En., Fr.

Phaseolus vulgaris. Snap beans. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area (ha), production (MT), and yield (kg/ha) of snap beans for different countries and continents during the periods 1948-52 and 1961-65 and for each year of the period 1966-70. (CIAT)

1039

28837 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1970. Green beans. FAO Production Yearbook 24:139-142. En., Fr.

Phaseolus vulgaris. Snap beans. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), production (MT), and yield (kg/ha) of snap beans for different countries and continents during the periods 1948-52 and 1961-65 and for each year of the period 1965-69. (CIAT)

1040

28835 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1969. Green beans. FAO Production Yearbook 23:140-143. En., Fr.

Phaseolus vulgaris. Snap beans. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area harvested (ha), production (MT), and yield (kg/ha) of snap beans for different countries and continents during the periods 1948-52 and 1952-56 and for each year of the period 1964-68. (CIAT)

1041

28833 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1968. Green beans. FAO Production Yearbook 22:138-141. En., Fr.

Phaseolus vulgaris. Snap beans. Production. Yields. Statistical data. Africa. America. Asia. Europe. Oceania.

Data are included on area (ha), yield (kg/ha), and production (MT) of snap beans for different countries and continents during the periods 1948-52 and 1952-56 and for each year of the period 1963-67. (CIAT)

1042

28844 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1973. String beans. FAO Production Yearbook 27:161. En., Fr., Es.

Phaseolus vulgaris. Snap beans. Production. Yields. Statistical data. USA. Argentina. Chile. Peru. Venezuela. Turkey. France.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of snap beans for the world, North America (USA), South America (Argentina, Chile, Peru, and Venezuela), Asia (Turkey), and Europe (France) during the period 1961-65 and for each year of the period 1971-73 (CIAT)

1043

28842 FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS. 1972. String beans. FAO Production Yearbook 26:141. En., Fr., Es.

Phaseolus vulgaris. Snap beans. Production. Yields. Statistical data. USA. Argentina. Chile. Peru. Venezuela. Turkey. France.

Data are included on area harvested (ha), yield (kg/ha), and production (MT) of snap beans for the world, North America (USA), South America (Argentina, Chile, Peru, and Venezuela), Asia (Turkey), and Europe (France) during the period 1961-65 and for each year of the period 1970-72. (CIAT)

1044

28190 FRANCO, A.; CORREA, C.; RIVAS, L. 1985. Data appendices: beans. In Centro Internacional de Agricultura Tropical. Trends in CIAT Commodities. Cali, Colombia. Internal Document Economics 1.10. 5p. En., Dat. num.

Phaseolus vulgaris. Production. Statistical data. Latin America. Caribbean.

Data are given on bean production (MT) for the different Latin American and Caribbean countries and for both regions as a whole, during the periods 1966-68, 1974-76, and 1981-83. Data on bean production (kg) per capita are also included for the last period. (CIAT)

1045

28234 HONDURAS. SECRETARIA DE RECURSOS NATURALES. 1986. Sección de granos básicos. (Staple food grains section). In_____. Informe Anual 1985. Tegucigalpa. pp.124-128. Es., Il.

Phaseolus vulgaris. Production. Yields. Honduras.

Technical assistance activities of the staple food grains section of the Natural Resources Secretariat (Tegucigalpa, Honduras) during 1985-86 is presented. Data are provided on area planted, yield, and total production of maize, beans, rice, sorghum, and soybeans for each region of the country. From the total area planted to beans (65,521 ha), 32 percent had received technical assistance with an av. yield of 0.86 t/ha compared with 0.66 t/ha for areas without technical assistance. (CIAT)

1046

28300 KIRKBY, R.A. 1986. The role, organization and management of CIAT's activities in support of national bean improvement programs in Eastern Africa. Debre Zeit, Ethiopia, Cropping Systems Agronomist, CIAT Regional Program on Beans in Eastern Africa. 10p. En., 7 Ref. Paper presented at Consultative Group Meeting for Eastern and Central Africa Regional Research on Grain Legumes. Addis Ababa, Ethiopia, 1986. [CIAT Regional Program on Beans in Eastern Africa, P.O. Box 67, Debre Zeit, Ethiopia]

Phaseolus vulgaris. Developmental research. Plant breeding. Agricultural projects. Transfer of technology. Africa.

General information is given on African bean production and research opportunities. The objectives and organization of the CIAT bean program in Africa are mentioned, including the probable pattern of staffing and location of CIAT regional bean programs in the Great Lakes region, Eastern Africa, and Southern Africa. The philosophy and management of the regional program operations are described and methods used for the integration of independently funded regional programs are enumerated and briefly explained. The current collaborative research subprojects are mentioned as well as the bean information services CIAT provides in the region. (CIAT)

1047

28206 McGILL JUNIOR, J.A. 1977. White bean production in Africa is on the skids. Michigan Dry Bean Digest 1(2):6-7. En., Il.

Phaseolus vulgaris. Economics. Production. Statistical data. Africa.

The dramatic situation of white bean production in several African countries (Kenya, Ethiopia, Tanzania, and South Africa) is briefly analyzed for the period 1976-77. (CIAT)

1048

29663 MBATIA, O.L.E. 1985. Financial analysis of production of French beans in Kenya (Phaseolus vulgaris). Acta Horticulturae no.158:449-456. En., Sum. En. [Dept. of Agricultural Economics, Univ. of Nairobi, Kenya]

Phaseolus vulgaris. Snap beans. Costs. Trade. Income. Labor. Kenya.

Production costs of French beans were analyzed, and the financial gain for Kenyan small farmers was assessed. French beans are grown mainly for export, from Nov. to April. The costs of the inputs such as fertilizers, seed, labor for land preparation and harvesting were estimated. Some of the small farmers had direct access to the export markets but the majority of them had to sell to the exporters. A good majority of the farmers estimated a profit of about 25 percent but considered employment it provides for them and the rural people a very important benefit. (AS (extract))

1049

28883 PARISI, L. 1984. Leguminose da granella. (Grain legumes). Terra e Sole 39(500):233-237. It., Il.

Phaseolus vulgaris. Developmental research. Resistance. Bean common mosaic virus. Pseudomonas syringae pv. phaseolicola. Italy.

At a conference in Bologna, Italy, the results of 3 yr of research work carried out in Italy on field peas and beans were reported. Bean cv. suitable for large-scale cultivation and resistant to BCMV and Pseudomonas syringae pv. phaseolicola have been developed. Future breeding should focus on higher yields. (CIAT)

1050

29187 SHEWFELT, R.L.; RESURRECCION, A.V.A.; JORDAN, J.L.; HURST, W.C. 1986. Quality characteristics of fresh snap beans in different price categories . Journal of Food Quality 9(2):77-88. En., Sum. En., 21 Ref., Il. [Dept. of Food Science, Univ. of Georgia Experiment Station, GA 30212, USA]

Phaseolus vulgaris. Snap beans. Storage. Prices. Organoleptic properties. Marketing. Seed characters. USA.

Snap beans were collected from 9 lots at 5 wholesale warehouses over a 2-day period. The lots were separated into 3 groups based on wholesale price -- high, intermediate, and low. Lots were analyzed for quality by chemical, physical, and sensory methods to determine those quality factors most closely associated with the price of fresh beans at the wholesale level. Textural properties differentiated between beans in low and intermediate price groups. Appearance factors were more important than texture in distinguishing between beans of the high and intermediate price groups. (AS)

1051

28630 UNIDAD REGIONAL DE PLANIFICACION AGROPECUARIA. COLOMBIA. 1985. Subsector agrícola: frijol. (Agricultural subsector: beans). In_____. Diagnóstico agropecuario del Cesar. César, Proyecto PNUD/FAO/Col 83/012. pp.137-143. Es.

Phaseolus vulgaris. Production. Technology. Costs. Income. Prices. Marketing. Yields. Colombia.

Several aspects of bean production in Cesar, Colombia, are analyzed and discussed: importance of beans, technological level, profitability, credit

facilities, and marketing. Figures are given on area planted, yields, and production for the period 1975-83 as well as prices for the period 1976-82. (CIAT) See also 0834 0836 0935 0936 0942 0943

L00 GRAIN STORAGE

1052

28938 AGUILERA, J.M.; HAU, M.I.; VILLABLANCA, W. 1986. The effect of solar drying and heating on the hardness of Phaseolus beans during storage. Journal of Stored Products Research 22(4):243-247. En., Sum. En., 11 Ref., Il. [Dept. of Chemical Engineering, Catholic Univ., P.O. Box 6177, Santiago, Chile]

Phaseolus vulgaris. Drying. Solar drying. Seeds. Storage. Water content. Seed hardening. Temperature. Chile.

Small white beans were dried and heat processed before storage. Water removal in a solar drier was 4 times faster than conventional field drying in the pods. Heat treatments included particle-to-particle roasting using hot sand, and microwave heating. All samples stored for 212 days at low MC (4-5 percent) showed a slow rate of hardening at a low temp. of 18 degrees Celsius and a high temp. of 34 degrees Celsius; however, heat-treated and control beans became much harder when stored at a humidity of 9 percent and a temp. of 34 degrees Celsius. Heating and solar drying are effective treatments prior to bean storage, as they greatly reduce moisture to safer levels. (AS)

1053

29691 ALIZAGA, R. 1985. Efecto de la temperatura de secado y del contenido de humedad durante el almacenamiento sobre la calidad de la semilla de frijol. (Effect of drying temperature and moisture content during storage on bean seed quality). Agronomía Costarricense 9(2):165-170. Es., Sum. En., Es., 12 Ref., Il.

Phaseolus vulgaris. Seeds. Storage. Temperature. Water content. Drying. Timing. Germination. Hypocotyl. Costa Rica.

The effect of 5 drying temp. (25, 35, 45, 55, and 65 degrees Celsius) and 2 MC (13 and 16 percent) on bean seeds, stored at 25 degrees Celsius for 12 mo., was evaluated. The drying temp., time of storage, and seed MC had a significant effect on germination and hypocotyl length. In seed stored 13 percent MC, the time of storage and the drying temp. had practically no effect on germination, except when drying was at 65 degrees Celsius. Significant reductions in germination began after 3 mo. of storage in seed stored at 16 percent MC. Damage increased when the time of storage and the drying temp. increased. Hypocotyl length was shorter for seed stored at 16 percent MC and decreased considerably when the storage time was extended, particularly when the drying temp. were 55 and 65 degrees Celsius. (AS-CIAT)

1054

29626 SIEVWRIGHT, C.A.; SHIPE, W.F. 1986. Effect of storage conditions and chemical treatments on firmness, in vitro protein digestibility, condensed tannins, phytic acid and divalent cations of cooked black beans (Phaseolus vulgaris). Journal of Food Science 51(4):982-987. En., Sum. En., 22 Ref., Il. [Del Monte Corp., Research Center, P.O. Box 9004, Walnut Creek, CA 94598, USA]

Phaseolus vulgaris. Storage. Temperature. Relative humidity. Proteins. Digestibility. Tannin content. Enzymes. Phytic acid. USA.

Black beans stored at 30 or 40 degrees Celsius and 80 percent RH showed marked increases in firmness and decreases in in vitro digestibility of proteins. Changes in these properties were small when beans were stored at 5 degrees Celsius and 50 percent RH. The adverse effects of poor storage conditions could be practically eliminated by soaking beans in salt solutions instead of water. The changes in firmness and digestibility were accompanied by changes in the detectable concn. of tannins and phytates. Protein digestibility appears to be reduced by interactions between protein and tannins, especially high mol. wt. tannins. Concn. of these tannins is affected by polyphenol oxidase activity. Firmness increased and protein digestibility decreased as the phytic acid content decreased. (AS)
See also 1050 1056 1062 1072

L01 Stored Grain Pests

1055

28214 RUPPEL, R.F.; RUSSEL, H.L.; LOVE, A.P. 1981. Residual efficacy of grain protectants against the bean weevil. Michigan Dry Bean Digest 5(2):21. En., 2 Ref., Il.

Phaseolus vulgaris. Stored grain pests. Acanthoscelides obtectus. Zabrotes subfasciatus. Insect control. Chemical control. USA.

A test was designed to compare the residual effectiveness of some candidate grain protectants with those known to be effective against the weevils Acanthoscelides obtectus and Zabrotes subfasciatus. Results showed that Pyrenone (8, 16, and 32 ppm a.i.), fenitrothion (4 and 8 ppm a.i.), and chlorpyrifos-methyl (8 and 16 ppm a.i.) gave full control of the weevils for the 1-yr testing period. Control with malathion was less than expected, and DDVP is highly volatile and lacks residual protection. (CIAT)

M00 USES, INDUSTRIALIZATION AND PROCESSING

1056

29188 ADSULE, P.G.; DAN, A.; SATYANARAYANA, A.; RAJENDRAN, R. 1984. Studies on the suitability for canning of new French bean (Phaseolus vulgaris) selections. Journal of Food Science and Technology 21(4):203-205. En., Sum. En., 4 Ref. [Small Industries Service Inst., Government of India, 65/1 GST Road, Guindy, Madras-600 032, India]

Phaseolus vulgaris. Snap beans. Cultivars. Canned beans. Organoleptic properties. Storage. India.

Four selections of French beans developed at the Indian Institute of Horticultural Research (Bangalore, India) were assessed for physicochemical characteristics and suitability for canning. Selection No. 5 and 2 were found better than check var. Contender, which is reported to be the best for canning. Organoleptic score of canned French beans during storage for 12 mo. is included. (AS)

1057

28953 DESHPANDE, S.S.; CHERYAN, M. 1986. Water uptake during cooking of dry beans (Phaseolus vulgaris L.). Qualitas Plantarum Plant Foods for Human

Nutrition 36(3):157-165. En., Sum. En., 26 Ref., Il. [Dept. of Food Science, Smith Hall, Purdue Univ., West Lafayette, IN 47907, USA]

Phaseolus vulgaris. Cooking. Timing. Water content. USA.

Water uptake during cooking of 10 dry bean var. was investigated. Water uptake during early stages of cooking was characteristic of the var. Although the optimal cooking times varied widely (52-85 min), all the beans absorbed similar amounts of water when cooked for their optimal times. Cooking times were significantly correlated with water uptake during the 1st 20 min (r = -0.92) and hardness index (r = 0.76) of beans. Most other physical characteristics, except the surface area of beans, were generally unrelated to the water uptake during the 1st 20 min, optimal water uptake, and cooking times. No significant correlation was observed between phytate content and cooking times of beans. On cooking for their resp. optimal times, all var. absorbed nearly 1.5 times their wt. of water and attained a MC of about 65 percent (wet basis). (AS)

1058

27762 DESSERT, K. 1986. Compatability of on-farm evaluation of bean cooking time in Rwanda with bar drop cooking time index. Bean Improvement Cooperative. Annual Report 29:122-123. En. [Inst. des Sciences Agronomiques du Rwanda, B.P. 138, Butare, Rwanda]

Phaseolus vulgaris. Seeds. Cooking. Timing. Cultivars. Technology evaluation. Rwanda.

Twenty Rwandan farmers who had participated in on-farm bean var. trials during the 2nd growing season of 1985 were requested to prepare and consume each of the var. in their homes under traditional preparation methods. After consuming each of the var., the farmers evaluated cooking time using a 5 point hedonic scale. Samples were also evaluated in the lab. using the bar method. This method consists of placing 25 seeds, soaked overnight, in a cooker with a 90 g metal rod resting on top of each bean. Cooking time is that required for 13 of the 25 rods to perforate the seeds. Good compatibility between farmers' evaluation of cooking time under traditional methods and the lab. cooking index was obtained. Ikinimba and Rubona 5 were rated as the longest cooking var. both on-farm and in the lab. The range in cooking time index between Ikinimba and Kirundo was 15 min. (CIAT)

1059

29123 DRAKE, S.R.; CARMICHAEL, D.M. 1986. Frozen vegetable quality as influenced by high temperature short time (HTST) steam blanching. Journal of Food Science 51(5):1378-1379. En., Sum. En., 8 Ref. [USDA/ARS Tree Fruit Research Laboratory, 1104 N. Western Ave., Wenatchee, WA 98801, USA]

Phaseolus vulgaris. Snap beans. Canned beans. Processing. USA.

Quality differences in processed vegetables (among them, snap beans) can be controlled with high temp. short time (HTST) steam blanching. In addition, HTST blanching required significantly less energy to blanch vegetables than water blanching. HTST-blanched vegetables displayed quality parameters distinctly different than water-blanched vegetables. Differences in quality parameters were highly dependent upon the vegetable being blanched and the pressure and time of the HTST blanch. The quality of vegetables were similar between water and HTST blanching treatments, but by controlling the pressure and time of the HTST blanch, quality characteristics could be changed to meet individual requirements. HTST-blanched snap beans had greater moisture and less soluble solids than water-blanched snap beans. They also had smaller shear values (65-85 percent) and exhibited a lighter more delicate green color. High quality

frozen vegetables can be produced with HTST steam blanching but quality is dependent upon the particular vegetable and pressure and time of the HTST steam blanch. (AS)

1060

28070 HOSFIELD, G.L.; UEBERSAX, M.A.; VARNER, G.V. 1984. Processing quality evaluation of Michigan dry beans. Michigan Dry Beans Digest 9(1):10-11,28-29. En.

Phaseolus vulgaris. Canned beans. Seed characters. Processing. USA.

Quality considerations of dry edible beans demanded both by consumers and producers are mentioned and different methods of evaluation or calculation of food quality traits of beans (dry, soaked, and cooked bean surface color, soaked bean wt. and hydration ratio, cooked bean texture, washed drained wt. (g and ratio), splits, and processed bean moisture) are briefly described. Results of canning trials conducted to evaluate the processing quality of beans are included and analyzed. (CIAT)

1061

28983 KALDY, M.S. 1986. Matting characteristics of small white (navy) beans. Journal of Food Quality 9(3):161-165. En., Sum. En., 11 Ref., Il. [Research Station, Agriculture Canada, Lethbridge, Alberta, Canada T1J 4B1]

Phaseolus vulgaris. Canned beans. Processing. Seed characters. Canada.

Matting characteristics of small white beans were studied. Beans were canned as beans with pork in heavy sauce. The matting index showed that 38.1 percent of an Alberta-grown bean sample matted in the can while only 10.0 percent of an Ontario-grown bean sample matted. Alcohol-insoluble solids contents were 21.7 percent for Alberta-grown samples and 24.3 percent for Ontario-grown samples. Results of alcohol-insoluble solids analysis showed that the bean sample grown in Alberta (Canada) under conditions such as a short growing season, few heat units, and cool nights, did not mature as completely as the sample that was grown in Ontario under more favorable conditions. Selection of bean cv. that are suitable for Alberta growing conditions is recommended. (AS)

1062

29659 KERMASHA, S.; VAN DE VOORT, F.R.; METCHE, M. 1986. Lipase activity and fatty acid composition in stored full-fat French bean flour. Canadian Institute of Food Science and Technology Journal 19(3):92-94. En., Sum. En., Fr., 14 Ref., Il. [Dept. of Food Science & Agricultural Chemistry, Macdonald College, McGill Univ., 21111 Lakeshore Road, St. Anne de Bellevue, P.Q. H9X 1C0, Canada]

Phaseolus vulgaris. Snap beans. Bean flour. Storage. Temperature. Fatty acids. Organoleptic properties. Canada.

The production of free fatty acids due to lipase action in full-fat French bean flour may be closely related to the autoxidation of the lipid present, which has ramifications in terms of organoleptic quality. Lipase activity was determined in the succulent green bean, freshly prepared mature bean flour, and flour stored for 2 yr at 4 degrees Celsius and was found to be 21, 42, and 125 x 10(-6) microequivalents acid/mg protein/min, resp. The fatty acid profile of the mature bean flour was measured following storage at -18, 4, 20, and 35 degrees Celsius. The fatty acid profile of the bean flour did not change significantly in samples stored at -18 and 4 degrees Celsius; however, obvious changes took place in the samples stored at 20 and 35 degrees Celsius with a loss of long chain and the appearance of shorter chain fatty acids. The results indicated that

lipase was active in the flour, increasing in activity with storage and that temp. above 4 degrees Celsius accelerated the process of lipolysis in full fat flour significantly, even at low moisture levels. The action of lipase could therefore be a significant factor in the development of off-flavors and odors by contributing free fatty acids which in turn are more readily oxidized. (AS)

1063

29116 PILOSOF, A.M.R.; BOQUET, R.; BARTHOLOMAI, G.B. 1986. Effect of heat-moisture treatment of field bean (Phaseolus vulgaris) flour and protein isolate on water uptake. Cereal Chemistry 63(5):456-458. En., Sum. En., 13 Ref., Il.

Phaseolus vulgaris. Bean flour. Proteins. Processing. Temperature. Timing. Water absorption. Argentina.

Bean flour or protein isolates, equilibrated to MC between 14-40 percent, were heated at either 70 or 90 degrees Celsius for various times. At every MC the hydration capacity of bean flour increased with the time of heat treatment; increasing the MC increased the hydration capacity of the flour. The rate of water uptake of flour was increased by almost all heat-moisture treatments. The hydration capacity of bean protein isolate was reduced by heat-moisture treatments; extensive losses and hydration capacity occurred with increasing temp. and MC. The effect of heat-moisture treatments on the rate of water uptake of bean protein was not as pronounced as for bean flour. (AS)

1064

28923 RAO, M.A.; COOLEY, H.J.; VITALI, A.A. 1986. Thermal energy consumption for blanching and sterilization of snap beans. Journal of Food Science 51(2):378-380. En., Sum. En., 16 Ref., Il. [Dept. of Food Science & Technology, New York State Agricultural Experiment Station, Cornell Univ., Geneva, NY 14456, USA]

Phaseolus vulgaris. Canned beans. Processing. Snap beans. USA.

Steam consumption for a water blancher and a continuous pressure sterilizer was measured in a snap bean cannery. For the blancher, it ranged between 0.204-0.306 lb/lb of beans. The energy efficiency of the blancher was found to be between 26.3-52.3 percent. In a pilot scale test, the concn. of Ca, Mg, and K ions increased as the blanching water was recycled and the firmness of the beans after canning varied between 0.855-1.010 kN. Steam consumption by the continuous pressure sterilizer was related linearly to the loading rate of cans: steam consumed (lb/h) = 1075.9 + 0.073 x (cans/h). (AS)

1065

28908 RODRIGUEZ-SOSA, E.J.; VILLAFAÑE DE COLOM, S.; PARSI-RCS, O. 1984. Effect of processing on selected nutrients of beans (Phaseolus vulgaris). Journal of Agriculture of the University of Puerto Rico 68(1):45-51. En., Sum. En., Es., 17 Ref.

Phaseolus vulgaris. Processing. Canned beans. Mineral content. Ca. Mg. Fe. P. K. Cl. Na. Fat content. Cultivars. Puerto Rico.

Twenty-two dry bean selections were commercially canned and analyzed for Ca, Mg, Fe, Mn, P, Na, Cl, K, protein (N x 6.25), and fat content before and after processing. The retention percent for Mg, Fe, Mn, P, and K were 89.0, 95.0, 89.8, 67.4, and 55.4, resp. The Ca, Na, and Cl contents increased with processing. The increase in Ca content can be attributed to the hardness of processing water. Na and Cl were added as table salt. When

all selections were taken into account, no significant differences were observed between raw dry and processed beans with respect to Fe, Mn, protein, and fat content, but there were significant differences with respect to Ca, Mg, P, Na, Cl, and K. (AS)

1066

29163 SILVESTRI, G.; SIVIERO, P.; ANDREOTTI, R.; TOMASICCHIO, M.; MACCHIAVELLI, L. 1984. Grado di maturazione del fagiolino in rapporto alla trasformazione industriale. (Maturity degree of green beans in relation to commercial processing). Industria Conserve 59(2):125-129. It., Sum. It., En.

Phaseolus vulgaris. Snap beans. Processing. Maturation. Harvest. Timing. Organoleptic properties. Palatability. Storage. Italy.

Six var. of green beans for commercial processing were harvested several times at 2-day intervals in 1982 and 1983 in order to find a parameter suitable as indicator of optimum harvesting maturity. After determination of the agronomical characteristics, the beans from each harvest were blanched, frozen, and stored for about 3 mo. at -20 degrees Celsius. At the end of the storage period they were thawed, cooked, and evaluated organoleptically. No relationship could be found between degree of maturity and organoleptic characteristics of the beans, even if there seemed to be, for 3 var., a slight preference for the pods containing 3 percent of seeds. As a matter of fact, only the least ripe beans, i.e. the ones from the 1st harvest, were judged unacceptable, whereas no significant differences were found between the beans from the other harvests. (AS)

1067

29189 STONE, M.B.; YOUNG, C.M. 1985. Effects of cultivars, blanching techniques, and cooking methods on quality of frozen green beans as measured by physical and sensory attributes. Journal of Food Quality 7(4):255-265. En., Sum. En., 17 Ref. [Dept. of Foods & Nutrition, Kansas State Univ., Manhattan, KS 66506, USA]

Phaseolus vulgaris. Snap beans. Cultivars. Processing. Cooking. Palatability. Organoleptic properties. USA.

Effects of cv., blanching techniques, and cooking methods on the color, texture, and sensory characteristics of frozen green beans were investigated. Provider beans were firmer than the Contender cv. following frozen storage and cooking when evaluated instrumentally and by a sensory panel. Microwave-blanched beans were harder according to Instron measurements, and sensory scores for firmness and toughness were higher than beans blanched by boiling water or steam. Green beans blanched or cooked by microwaves had grassy aromas and strong off-flavors that were not detected in those blanched or cooked by conventional methods. Microwave-cooked beans were greener and firmer than those conventionally cooked. (AS)

1068

29158 TUSEKWA, B. 1985. Laboratory studies on production of canned mboga ya maharage. 1. Pre-heat processing operations. Mededelingen van de Faculteit Landbouwwetenschappen Rijksuniversiteit Gent 50(4):1383-1391. En., Sum. En., Nl., 17 Ref., Il. [Laboratory of Food Chemistry & Microbiology, Fac. of Agricultural Sciences, State Univ. of Ghent, Coupure Links, 653 B-9000 Ghent, Belgium]

Phaseolus vulgaris. Human nutrition. Canned beans. Timing. Processing. Tanzania.

A process for the home preparation of mboga ya maharage, a food of soft consistence served with rice, maize, cassava, or banana meal in Tanzania and other African, Asian, and Latin American countries, is described. Based on this recipe, the soaking and blanching times of navy beans and the formulation of ingredient proportions suitable for canning were established. Soaking and blanching times were determined to be 20 h at 6 degrees Celsius and 2 min at 98 degrees Celsius, resp. A sauce formula containing water, groundnuts, tomate puree, curry powder, salt, chilli, and onions was also made. (AS)

1069

29156 UEBERSAX, M.A.; ZABIK, M.E. 1986. Processing and use of dry, edible, bean flours in foods. American Chemical Society Symposium Series 312:190-205. En., Sum. En., 34 Ref., Il. [Dept. of Food Science & Human Nutrition, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Bean flour. Processing. Analysis. Digestibility. Nutritive value. Mineral content. Protein content. USA.

Navy, pinto, and black beans were dry roasted in a solid-to-solid heat exchanger, dehulled by air aspiration, pin-milled, and air-classified to yield whole, hulls, high protein, and high starch flour fractions. Proximate analyses were conducted and color, enzyme neutral detergent fiber, N solubility index, oligosaccharide content, SDS-polyacrylamide gel electrophoresis, and in vitro digestibility were determined and resulted in differences due to bean types, mill fractions, and processing variables. Samples of all fractions were analyzed by emission spectroscopy for minerals. Phytate P was present in the greatest quantity in the protein fraction (0.86-1.06 percent). Protein digestibility of the cotyledonary fractions, high protein and high starch, was similar for both bean types; however, digestibility of the hull fraction was greater for navy bean than that obtained from pinto bean. All flour fractions retained stability during conventional storage protocols. Quality attributes of foods incorporating fractions were objectively and subjectively evaluated. Acceptable cookies, donuts, quick breads, and leavened doughs were produced using high fiber or high protein fractions at moderate levels of substitution (20 percent) for wheat flour. (AS)

1070

28217 UEBERSAX, M.A.; ZABLIK, M.E.; LEE, J.P. 1982. Composition & utilization of dry roasted bean flour. Michigan Dry Bean Digest 7(1):16-17. En., Il. [Dept. of Food Science & Human Nutrition, Michigan State Univ., East Lansing, MI 48824, USA]

Phaseolus vulgaris. Bean flour. Drying. Temperature. Fat content. Fiber content. Ash content. Protein content. Starch content. Organoleptic properties. Dietary value. Human nutrition. USA.

Navy beans were dry roasted under 8 conditions (2 heating temp. x 2 heating times x 2 bean/bead ratios) in a solid-to-solid heat exchanger, dehulled by air aspiration, pin-milled, and air-classified to obtain 4 flour fractions (whole, hull, high protein, and high starch). Chemical analyses of moisture, fat, dietary fiber, ash, and protein were conducted on all 4 flour fractions. The MC of these fractions ranged from 6.0 to 8.9 percent. Limited fat content was found in all fractions with the high protein fraction containing the greatest fat level. Highest ash content was found in hull flour. Fiber content of hull flour was very high (40.5 percent) as was protein content (42.5 percent) of high protein fraction. Three types of peanut butter cookies -- control, high protein (30 percent bean protein concentrate substituted for flour), and high fiber (20 percent bean hulls substituted for flour) -- prepared at Michigan State U. bakery were

evaluated for their physical and sensorial characteristics. All cookies were rated acceptable by the panelists. (CIAT)

1071

29196 VAN BUREN, J.; BOURNE, M.; DOWNING, D.; QUEALE, D.; CHASE, E.; COMSTOCK, S. 1986. Processing factors influencing splitting and other quality characteristics of canned kidney beans. Journal of Food Science 51(5):1228-1230. En., Sum. En., 12 Ref. [Dept. of Food Science & Technology, New York State Agricultural Experiment Station, Cornell Univ., Geneva, NY 14456, USA]

Phaseolus vulgaris. Processing. Canned beans. Cooking. Water uptake. Temperature. Timing. USA.

Single factor changes from a standard canning process indicated that significant reductions in splitting resulted from higher soak Ca concn., higher soak temp., higher brine Ca concn., and shorter cooking times. Splitting in canned kidney beans was markedly reduced by soaking beans before cooking at temp. of 66-71 degrees Celsius in solutions containing 150-350 ppm $CaCl_2$. Treatments giving lower gain in wt. during soaking led to less splitting. Lower splitting was associated with lower drained wt. and firmer cooked beans. (AS)

1072

28930 VINDIOLA, O.L.; SEIB, P.A.; HOSENEY, R.C. 1986. Accelerated development of the hard-to-cook state in beans. Cereal Foods World 31(8):538,540,542,544,546,548,550,552. En., Sum. En., 35 Ref., Il. [Dept. of Grain Science & Industry, Kansas State Univ., Manhattan, Kansas, USA]

Phaseolus vulgaris. Cooking. Seeds. Seed hardening. pH. Storage. Water content. Bean starch. Cultivars. USA.

Differential scanning calorimetry of a 2:1 (wt.:wt.) mixture of water and fresh pinto beans (freeze-dried and ground) showed 2 endotherms at 80.5 and 100 degrees Celsius that were assigned to starch gelatinization and protein denaturation. After boiling 15 min in water, fresh (41 min cooking time) and hard-to-cook pinto beans (approx. 120 min cooking time) did not show either thermal event. When soaked at 41 degrees Celsius in buffers containing 0.002 percent chloramphenicol, pinto beans developed the hard-to-cook state most rapidly at pH 4; the beans were essentially uncookable in boiling water for 60 min when soaked at pH 4 for 8 h. Pinto beans also became uncookable when soaked at pH 5.5 for 3 days, at pH 6.0 for 4 days, at pH 6.5 for 6 days, and at pH 7.6 for 7 days. When fluoride ion (0.05 molar) or metaphosphate (0.2 molar) was added to the soaking medium at pH 4.7 and 4.1, resp., the beans remained 90-100 percent cookable after soaking at 41 degrees Celsius for 16 h, whereas control beans were uncookable. Red and white beans developed the hard-to-cook condition at opposite times when stored at 100 percent RH and 45 degrees Celsius or when soaked in acidic buffers at 41 degrees Celsius. Beans that are prone to the hard-to-cook state may harden during soaking and/or storage. (AS)

1073

28211 WASSIMI, N.N.; HOSFIELD, G.L.; UEBERSAX, M.A. 1981. Dry edible beans: the effect of seed coat color on soaking characteristics. Michigan Dry Bean Digest 5(4):12. En., 3 Ref.

Phaseolus vulgaris. Seed coat. Seed color. Cooking. USA.

Twenty strains of dry beans differing in seed coat color were grown and screened for soaking characteristics. Results showed large differences among strains for the rate of water uptake. In addition, interstrain

differences were noted for the percentage of hard seed after 48 h soaking time. Strains with few hardshell beans after 48 h soaking reached a water uptake plateau for soaking after 12 h, but strains with a significant amount of hard beans after 48 h soaking never reached their water uptake plateau. The percentage of hard seed among genotypes ranged from 0 to 56 percent with red-seeded and brown-seeded strains apparently most affected. These results suggest that the hardshell defect may be associated with testa color but further work is needed to corroborate this idea. (CIAT)
See also 0770 0773 0935 0975 0977 0981 0982 0983 0984 0985

ABBREVIATIONS AND ACRONYMS

A	Angstrom(s)
ABA	Abscisic acid
ac	Acre(s)
Af.	Afrikaans
a.i.	Active ingredient
alt.	Altitude
AMV	Alfalfa mosaic virus
approx.	Approximate(ly)
Ar.	Arab
atm.	Atmosphere
ATP	Adenosine 5'-triphosphate
av.	Average
BAP	6-Benzylaminopurine
BBMV	Broad bean mosaic virus
BCMV	Bean common mosaic virus
Bg.	Bulgarian
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
ca.	About (circa)
CAMD	Cassava African mosaic disease
CMV	Cassava African mosaic virus
CBB	Cassava bacterial blight
CBSD	Cassava brown streak disease
CEC	Cation exchange capacity
CER	CO2 exchange rate
CF	Cassava flour
CGR	Crop growth rate
Ch.	Chinese
CLM	Cassava leaf meal
CLV	Cassava latent virus
CM	Cassava meal
cm	Centimeter(s)
COD	Chemical oxigen demand
concn.	Concentration
CP	Crude protein
Cs.	Czech
CSL	Calcium stearyl lactylate
CSW	Cassava starch wastes
C.V.	Coefficient of variation
cv.	Cultivar(s)
2,4-D	2,4-dichlorophenoxyacetic acid
Da.	Danish
De.	German
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
En.	English
EP	Preliminary Trials, CIAT
Es.	Spanish
expt.	Experiment(s)
exptl.	Experimental
Fr.	French
ft-ca	Foot candles (10.76 lux)
FYM	Farmyard manure
g	Gram(s)
G	Giga (109)
GA	Gibberellic acid
gal	Gallon(s)
GE	Gross energy
GERs	Glucose entry rates
GLC	Gas-liquid chromatography
Gr.	Greek
h	Hour(s)
ha	Hectare(s)
HCN	Hydrocyanic acid
HDP	Hydroxypropyl distarch phosphate (modified cassava starch)
He.	Hebrew
Hi.	Hindi
HI	Harvest index
hp	Horsepower
Hu.	Hungarian
IAA	Indoleacetic acid
IBA	Indolebutyric acid
IBYAN	International Bean Yield and Adaptation Nursery, CIAT
Il.	Illustrations
in.	Inches
In.	Indonesian
It.	Italian
IU	International unit
J	Joule
Ja.	Japanese
kat	Katal (amount of enzymatic activity that converts 1 mole of substrate/s)
kcal	Kilocalorie(s)
kg	Kilogram(s)
kJ	Kilojoule

km	Kilometer(s)
KNap	Potassium naphthenate
Ko.	Korean
kR	Kiloroentgen(s)
La.	Latin
LAD	Leaf area duration
LAI	Leaf area index
lat.	Latitude
lb	Pound(s)
LD50	Mean lethal dose
LER	Land efficiency ratio
LPC	Leaf protein concentrate
lx	Lux
M	Mega
m	Meter(s)
Mal.	Malay
max.	Maximum
MC	Moisture content
ME	Metabolizable energy
meq	Milliequivalent(s)
met.	Methionine
mg	Milligram(s)
mho	Reciprocal ohm
min.	Minimum
min	Minute(s)
ml	Milliliter(s)
mm	Millimeter(s)
mo.	Month
mol. wt.	Molecular weight
m.p.	Melting point
NAA	Alpha-naphthalene acetic acid
NAD	Nicotinamide adenine dinucleotide
NADH	Nicotinamide adenine dinucleotide, reduced form
NAR	Net assimilation rate
NCE	Net CO2 exchange
NE	Northeast
NER	Net energy ratio
Nl.	Dutch
nm	Nanometer(s) (10-9 m)
no.	Number(s)
No.	Norwegian
NPFs	Negative production factors
NPR	Net protein ratio
NPU	Net protein utilization
NW	Northwest
OM	Organic matter
oz	Ounce(s)
p.	Page
P	Probability
Pa	Pascal(s)
PAN	Peroxyacetic nitrate
PCNB	Pentachloronitrobenzene
PDA	Potato dextrose agar
PER	Protein efficiency ratio
pH	Hydrogen ion concentration
Pl.	Polish
pp.	Pages
pphm	Parts per hundred million
PPI	Preplanting incorporation
ppm	Parts per million
PSA	Potato sucrose agar
Pt.	Portuguese
pv.	Pathovar
Ref.	Reference
resp.	Respective(ly)
Rf	Retardation factor-chromatography
RGR	Relative growth rate
RH	Relative humidity
RNA	Ribonucleic acid
Ro.	Romanian
rpm	Revolutions per minute
Ru.	Russian
s	Second
SBM	Soybean meal
SCN	Thiocyanate
SCP	Single cell protein
SDS	Sodium dodecyl sulfate
Sk.	Slovak
Sn.	Slovene
sp.	Species
spp.	Species
SSL	Sodium stearyl-2-lactylate
Sum.	Summary
Sv.	Swedish
t	Ton(s)
TDN	Total digestible nutrients
temp.	Temperature
TIA	Trypsin inhibitor activity
TIBA	2,3,5-Triiodobenzoic acid compound with N-methylmethanamine
TLC	Thin-layer chromatography
TMV	Tobacco mosaic virus
Tr.	Turkish
TSH	Thyroid-stimulating hormone
UDPG	Uridine diphosphate glucose
Uk.	Ukrainian
UMS	Unmodified cassava starch
Ur.	Urdu
UV	Ultraviolet
var.	Variety(ies), varietal
VEF	Bean Team Nursery, CIAT
VFA	Volatile fatty acids
vol.	Volume
VPD	Vapor pressure deficit
vpm	Volume per million
vs.	Versus
W	West, watt
wk.	Week
WP	Wettable powder
wt.	Weight
yr	Year(s)
/	Per

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0461 0467 0476 0478 0479 0493 0499
0573 0673 0675 0677 0679 0680 0681
0683 0990 0994 0995 0996 0998 1000

ECONOMICS
0140 0144 0154 0242 0337 0346 0347
0448 0504 0686 0689 0692 0693 0694
0699 0702 0703 0704 0707 0831 0834
0836 0837 0838 1047 1048 1050 1051

ECUADOR
0251 0422 0448 0464

EGYPT
0078 0102 0104 0220 0430 0701 0879
0882

EL SALVADOR
0604 0943 1002

ELASMOPALPUS LIGNOSELLUS
0451

ELECTRON MICROSCOPY
0206 0363

EMBRYO
0008 0024 0071 0748 0755 0920

EMERGENCE
0066 0123 0418 0419 0422 0433 0491
0588 0589

EMPOASCA FABAE
INSECT CONTROL
CHEMICAL CONTROL
0241 0242

EMPOASCA KRAEMERI
INSECT CONTROL
CHEMICAL CONTROL
0300
RESISTANCE
0239 0276 0300 0642 0643 0645 0897
0930

ENTOMOLOGY
0230 0231 0233 0244 0586 0605 0606
0609 0614 0616 0617 0618 0619 0620
0625 0899 0901 0905 0907 0909 0913
0914

ENZYMES
0005 0007 0014 0015 0019 0026 0027
0045 0053 0072 0084 0253 0314 0315
0369 0374 0376 0393 0394 0401 0405
0407 0423 0424 0441 0443 0479 0556
0563 0591 0726 0728 0736 0742 0761
0762 0765 0767 0771 0776 0777 0778
0779 0781 0783 0785 0788 0789 0790
0793 0794 0852 0974 0980 0985 0986
1054

EPILACHNA VARIVESTIS
0145 0238 0243 0605 0617 0618 0619
0625 0907 0908 0909 0913 0915
RESISTANCE
0358

EPINOTIA APOREMA
0624

ERWINIA CAROTOVORA
DISEASE CONTROL
0853
INOCULATION
0853

ESTIGMENE ACREA
PLANT INJURIES
0622

ETHIOPIA
0705 0934

ETHYLENE PRODUCTION
0170

ETHYLENE REDUCTION
0738

EUCALYPTUS CAMALDULENSIS
0830

EXPERIMENT DESIGN
0498 0502 0517 0708 0958

FAT CONTENT
0088 0319 1062 1065 1070
SEED
0081 0350 0435

FATTY ACIDS
0081 1062

FEDERAL REPUBLIC OF GERMANY
0177 0728

FERMENTATION
0760

FERTILIZERS
0038 0091 0093 0094 0095 0096 0099
0100 0101 0103 0105 0107 0111 0112
0113 0114 0115 0116 0117 0118 0122
0124 0125 0143 0144 0148 0205 0331
0336 0448 0449 0450 0451 0453 0454
0457 0460 0461 0463 0464 0465 0467
0468 0469 0470 0474 0475 0476 0481
0490 0493 0497 0500 0501 0652 0674
0682 0716 0724 0783 0798 0803 0805
0806 0807 0809 0820 0946 0992 1000
1003

FIBER CONTENT
0088 0319 0323 0350 0443 0709 0764
0787 1070

FIELD EXPERIMENTS
0813

FINLAND
0726 0788

FLATULENCE
0984

FLOODING
0074

FLOWERING
0009 0020 0025 0057 0102 0358 0389
0419 0422 0425 0428 0467 0491 0589
0613 0630 0646 0902
GENETICS
0455 0638 0951
PHOTOPERIOD
0098 0455 0482 0801
TEMPERATURE
0455 0482 0638

FOLIAGE
0090 0102 0175 0463 0494 0674 0676
0729 0791 0857

FRANCE
0004 0015 0036 0086 0434 0453 0614
0670 0675 0683 0709 0721 0723 0725
0748 0769 0898 0900 0922 0923 0959
1042 1043

FRESH PRODUCTS
0692

FRUITS
0408

FUNGICIDES
0384 0396 0565 0747 0818 0844 0855
0856 0865 0871

FUSARIUM
0143 0561 0577

FUSARIUM OXYSPORUM
0194
DISEASE CONTROL
0554
RESISTANCE
0204 0278

FUSARIUM SOLANI PHASEOLI
0191 0205 0558
DISEASE CONTROL
0185 0554 0571
EPIDEMIOLOGY
0207
RESISTANCE
0200 0278 0293 0925

GENES
0006 0011 0086 0089 0252 0256 0262
0264 0303 0309 0455 0597 0628 0638
0642 0717 0728 0732 0880 0922 0923
0951 0953

GENOTYPES
0002 0067 0121 0178 0266 0277 0462
0472 0506 0524 0571 0650 0652 0656
0663 0712 0720 0933 0964 0993

GEOGRAPHICAL DISTRIBUTION
0001 0003 0359 0717 0719

GERMAN DEMOCRATIC REPUBLIC
0375 0729 0795

GERMINATION
0052 0064 0390 0399 0418 0419 0423
0433 0439 0481 0491 0538 0754 0756
0790
SEED
0065 0068 0070 0263 0349 0398
TEMPERATURE
0062 0417 0638 1053

GERMPLASM
0063 0098 0107 0165 0180 0181 0249
0250 0251 0273 0275 0278 0282 0283
0285 0290 0295 0297 0298 0304 0307
0310 0358 0359 0361 0437 0579 0627
0632 0636 0641 0650 0653 0659 0716
0717 0800 0801 0802 0803 0839 0840
0851 0919 0921 0927 0928 0929 0930
0931 0934 0935 0937 0938 0939 0946
0949 0952 0956 0964 0981

GIBBERELLINS
0078 0755
CELL DIVISION
0375
SEED
0446

GLUCOSE
0398 0722

GLYCINE MAX
0202 0222 0892

GREEN MANURES
0092 0114 0115 0805 0815

GROWTH
0028 0051 0058 0060 0061 0067 0102
0104 0106 0118 0121 0228 0306 0335
0399 0421 0424 0428 0430 0480 0499
0588 0589 0596 0737 0750 0752 0753
0755 0799 0889 0890
LIGHT
0375 0381
MINERALS AND NUTRIENTS
0034 0035 0038 0042 0046 0048 0073
0105 0107 0122 0138 0325 0327 0391
0420 0467 0478 0493 0497 0757
NUTRIENT SOLUTION
0034 0048 0757
PLANTING
0493 0497
SALINITY
0427
SOLAR RADIATION
0452
SPACING
0493
TEMPERATURE
0048 0123 0462 0478

GROWTH CHAMBER EXPERIMENTS
0473 0482 0539 0813

GUATEMALA
0076 0144 0337 0353 0354 0764 0777
0846 0909 0951 0979 0980 1002

HARVESTING
0484 0492 0521 0823 1066

HEAT TREATMENT
0766

HELIOTHIS VIRESCENS
0622 0624

HELIOTHIS ZEA
0609
INSECT CONTROL
BIOLOGICAL CONTROL
0612

HEMIPTERA
0268 0610 0632
INSECT CONTROL
0904

HERBICIDES
0133 0136 0152 0371 0372 0407 0488
0489 0491 0499 0736 0825 0828
DISEASES AND PATHOGENS
0558

HETERODERA GLYCINES
0222 0892 0892

HETEROSIS
0266 0303 0654 0959

HISTORY
0987

HOMOPTERA
0211 0218 0239 0276 0607 0613 0645
0881 0899
INSECT CONTROL
0241 0242 0300

HONDURAS
0698 0943 1045

HOST RANGE
0182 0213 0223 0586 0594 0611 0881
0931

HOSTS AND PATHOGENS
0177 0892

HUMAN NUTRITION
0084 0275 0313 0316 0320 0321 0322
0323 0357 0432 0458 0667 0668 0670
0671 0672 0690 0712 0760 0764 0778
0966 0967 0973 0974 0975 0977 0979
0980 0982 0983 0984 0985 0987 1001
1068 1069 1070

HUMAN PHYSIOLOGY
0968

HUNGARY
0384 0396 0550 0771 0961

HYBRIDIZING
0003 0252 0271 0272 0275 0445 0634
0649 0655 0662 0665 0666 0732 0755
0923 0927 0928 0958 0963 0965

HYBRIDS
0649 0651 0654 0665 0666 0717 0755
0954 0959

HYDROLYSIS
0077 0084 0986

HYPOCOTYL
0072 0203 0393 0398 0399 0403 0573
1053

ILLUMINATION
0031 0729 0733 0734

INCOME
0140 0144 0154 0242 0337 0448 0504
0694 0695 0704 0707 0831 0834 0837
1048 1051

INDETERMINATE CULTIVARS
0501 0993

INDIA
0026 0038 0044 0056 0072 0117 0208
0327 0386 0475 0495 0537 0576 0580
0654 0700 0702 0727 0731 0759 0789
0807 0872 0955 0964 0984 1056

INDOLEACETIC ACID
0217 0424 0763

INFLORESCENCES
0190 0309 0362 0366 0383 0408 0425
0428 0814

INHIBITORS
0015 0056 0078 0315 0318 0376 0377
0397 0441 0576 0764 0779 0793
GROWTH
0424

INJURIOUS INSECTS
0162 0275 0374 0539 0552 0556 0563
0565 0567 0573 0574 0575 0580 0587
0591 0615 0623 0724 0900 0901 0906
0916 0928 1055
COLEOPTERA
0145 0231 0232 0236 0237 0238 0243
0244 0245 0276 0285 0358 0468 0473
0474 0481 0509 0605 0606 0614 0617
0618 0619 0621 0625 0667 0709 0711
0898 0907 0908 0909 0913 0914 0915
DIPTERA
0230 0240 0246 0280 0299 0624 0647
0911 0915

HEMIPTERA
0268 0610 0632 0904
HOMOPTERA
0211 0218 0239 0241 0242 0276 0300
0607 0613 0645 0881 0899
LEPIDOPTERA
0234 0451 0609 0620 0622
THYSANOPTERA
0246 0918

INJURIOUS MITES
0233 0903 0905 0912 0915

INSECT BIOLOGY
0230 0233 0244 0586 0605 0606 0609
0611 0614 0616 0617 0618 0619 0620
0625 0897 0899 0901 0905 0907 0909
0913 0914 0930

INSECTICIDES
0241 0300 0349 0612 0615 0623 0645
0711 0731 0743 0759 0910 0917

INTEGRATED CONTROL
0608 0611 0826
DISEASES AND PATHOGENS
0844 0858 0873 0874

INTERCROPPING
0152 0458 0508 0515 0517 0518 0809
0826 0831 0834 0836
ZEA MAYS
0140 0141 0144 0145 0147 0148 0149
0150 0153 0154 0155 0156 0205 0246
0289 0450 0500 0501 0502 0503 0504
0505 0506 0507 0510 0511 0512 0514
0577 0724 0829 0830 0832 0833 0837
0838 0898 0937 0947 1003

IPOMOEA BATATAS
0501

IRAN
0932 0986

IRON
0038 0100 0143 0327 0667 0744 0762
0767 1065
LEAVES
0034 0447 0663
MINERAL DEFICIENCIES
0039 0043 0045 0048 0069 0410 0663
0958
ROOTS
0032 0069 0410 0412 0810

IRRADIATION
0260 0263 0313 0392 0646 0737 0738
0739 0786 0924

IRRIGATION
0104 0108 0109 0110 0120 0368 0387
0389 0465 0571 0797 0808 0812 0818
0992

ISARIOPSIS GRISEOLA
0564 0569
DISEASE CONTROL
CHEMICAL CONTROL
0844
INTEGRATED CONTROL
0844
EPIDEMIOLOGY
0179 0574 0575
ETIOLOGY
0208 0870
INOCULATION
0539
RESISTANCE
0106 0162 0179 0198 0278 0293 0297
0305 0562 0840 0841 0844 0868 0925
0929 0935 0957
SYMPTOMATOLOGY
0868

ISRAEL
0397 0557

ITALY
0089 0168 0264 0406 0418 0433 0555
0720 0732 0850 0858 0866 0867 0886
0887 0926 1049 1066

JAMAICA
0199 0426 0843

JAPAN
0022 0023 0082 0392 0441 0668 0701
0702 0746 0896

JORDAN
0903

KENYA
0054 0110 0122 0211 0323 0476 0493
0596 0613 0647 0662 0703 0718 0809
0871 0899 0929 0934 1048

LABOR
0704 1048

LABORATORY ANIMALS
0668 0974

LABORATORY EXPERIMENTS
0070 0182 0473 0482 0535 0539 0563
0720 0744 0748 0751 0757 0758 0759
0760 0763 0765 0768 0770 0773 0779
0781 0782 0785 0786 0790 0791 0811
0813 0817 0845 0848 0863 0864 0876
0885 0887 0888 0899 0903 0907

LACTOBACILLUS PLANTARUM
0853

LAND PREPARATION
0106 0107 0108 0121 0131 0134 0137
0138 0205 0330 0344

LASPEYRESIA LEGUMINIS
0624

LATIN AMERICA
0339
GERMPLASM
0275 0851
PRODUCTION
0691 1044

LEAF AREA
0051 0105 0329 0365 0387 0421 0430
0460 0478 0493 0740 0741 0747 0750
0832

LEAVES
0006 0007 0008 0010 0012 0013 0019
0022 0023 0031 0051 0055 0059 0082
0096 0175 0363 0364 0365 0367 0368
0375 0378 0379 0381 0382 0386 0392
0393 0397 0400 0405 0423 0429 0431
0436 0438 0439 0723 0726 0728 0730
0733 0734 0735 0736 0737 0738 0739
0743 0747 0748 0749 0750 0751 0769
0770 0771 0788 0789 0791 0797 0890
DISEASES AND PATHOGENS
0090 0171 0174 0434 0539 0540 0549
0561 0570 0598 0859 0862 0878 0882
0886 0937
INJURIOUS INSECTS
0468 0474 0623
MINERALS AND NUTRIENTS
0021 0034 0094 0105 0117 0383 0385
0411 0414 0415 0447 0470 0663 0674
0740 0741 0757 0798 0804 0820 0895
0996

LEBANON
0885

LECTINS
0010 0011 0406 0416 0435 0440 0444
0668 0670 0727 0732 0764 0766 0776
0777 0966 0967 0968 0969 0971 0972
0973 0974 0978 0985 0998

LEGAL ASPECTS
0685

LEGUME CROPS
0831 0892

LEPIDOPTERA
0234 0451 0609 0620 0622

LESOTHO
0936

LIGHT
0012 0026 0029 0030 0031 0054 0329
0368 0377 0392 0400 0402 0560 0729
0730 0733 0734 0775 0789
GROWTH
0375 0381
PHOTOPERIOD
0019

LIMAX MAXIMUS
0604

LIRIOMYZA
0624

LIRIOMYZA HUIDOBRENSIS
0901

LIRIOMYZA TRIFOLII
0240 0917

LYCOPERSICUM ESCULENTUM
0515

LYGUS HESPERUS
0268 0269 0632

LYGUS LINEOLARIS
0616 0904

MACROPHOMINA PHASEOLI
DISEASE CONTROL
CHEMICAL CONTROL
0557
RESISTANCE
0278 0294 0297
SYMPTOMATOLOGY
0877

MAGNESIUM
0100 0138 0143 0391 0468 0481 0709
0805 0810 1065
PLANT ASSIMILATION
0036 0111 0325 0463 0474 0721

MALAWI
0091 0124 0155 0340 0341 0503 0687
0912 0936

MANGANESE
0042 0090 0100 0101 0107 0138 0143
0412 0468 0762

MANIHOT ESCULENTA
0141 0501

MANURES
0092 0114 0115 0116 0805 0815

MAPS
0001 0128

MARKETING
0337 0342 0344 0348 0356 0685 0689
0691 0697 0699 0700 0701 0702 0703
0706 0707 1002 1048 1050 1051

MARUCA TESTULALIS
INSECT CONTROL
BIOLOGICAL CONTROL
0612
PLANT INJURIES
0622

MATHEMATICAL MODEL
0484 0517 0546

MATURATION
0067 0130 0358 0419 0472 0482 0933
0938 0951 0952 1066

MAURITIUS
0529 0536

MECHANICAL PERTURBATION
0059

MECHANIZATION
0131 0149 0484 0492 0512

MELOIDOGYNE ARENARIA
0220

MELOIDOGYNE CHITWOODI
0223

MELOIDOGYNE HAPLA
0223

MELOIDOGYNE INCOGNITA
0205 0221
RESISTANCE
0220 0639

MELOIDOGYNE JAVANICA
0463
NEMATODE CONTROL
0603
RESISTANCE
0220

METABOLISM
0024 0371 0730 0748 0767 0790

METHIONINE
0324 0720

MEXICO
0001 0120 0154 0163 0210 0244 0251
0331 0358 0366 0394 0406 0442 0443
0462 0471 0487 0577 0579 0594 0621
0625 0650 0669 0674 0689 0700 0702
0779 0822 0928 0929 0941

MICROBIOLOGY
0541

MICRONUTRIENTS
0034 0036 0038 0039 0040 0042 0043
0044 0045 0047 0069 0099 0100 0101
0107 0111 0124 0138 0143 0279 0325
0327 0336 0391 0409 0410 0411 0447
0463 0468 0469 0473 0474 0481 0509
0652 0663 0667 0682 0709 0721 0744
0762 0767 0805 0810 0817 0819 0820
0958 1065

MIGDOLUS
0237

MINERAL CONTENT
0046 0085 0099 0100 0101 0106 0107
0111 0113 0122 0138 0143 0225 0319
0331 0409 0412 0463 0467 0473 0476
0478 0479 0481 0509 0672 0676 0681
0709 0764 1065 1069
LEAVES
0415 0447 0468 0474 0663 0674 0741
0743 0757
PODS
0460 0674
SEED
0996

MINERAL DEFICIENCIES
0032 0039 0043 0045 0048 0069 0410
0414 0415 0473 0509 0663 0741 0802
0813 0819 0958

MINERALS AND NUTRIENTS
0035 0050 0062 0385 0388 0402 0652
0745 0895
ALUMINIUM
0810
BORON
0336 0409 0468 0474 0682
CALCIUM
0036 0042 0073 0094 0100 0111 0138
0143 0217 0325 0391 0413 0463 0468
0481 0709 0721 0805 0810 1065
COPPER
0143 0468 0667
IRON
0034 0038 0039 0043 0045 0048 0069
0100 0143 0327 0410 0412 0447 0663
0667 0744 0762 0767 0810 0958 1065

MAGNESIUM
0036 0100 0111 0138 0143 0325 0391
0463 0468 0474 0481 0709 0721 0805
0810 1065
MANGANESE
0042 0099 0100 0101 0107 0138 0143
0412 0468 0762
MOLYBDENUM
0336 0411 0682
NITROGEN
0021 0037 0042 0046 0092 0093 0095
0100 0101 0103 0113 0117 0122 0124
0125 0138 0143 0144 0148 0233 0325
0327 0328 0329 0330 0331 0334 0336
0383 0420 0448 0449 0450 0451 0454
0460 0461 0464 0465 0467 0468 0470
0475 0476 0478 0479 0481 0490 0497
0519 0674 0676 0679 0681 0682 0742
0764 0798 0804 0805 0806 0809 0835
0848 0990 0992 0994 0996 1000
OXIGEN
0817
PHOSPHORUS
0077 0085 0105 0111 0112 0279 0414
0415 0463 0469 0481 0493 0497 0500
0807 0810 0813 0815
POTASSIUM
0036 0093 0100 0103 0113 0124 0125
0138 0143 0325 0336 0391 0450 0451
0453 0454 0463 0464 0468 0470 0481
0682 0709 0740 0741 0757 0805 0806
0809 0810 0979 0992 1000 1065
ZINC
0038 0040 0044 0047 0100 0101 0138
0143 0327 0468 0473 0474 0481 0509
0667 0709 0762 0810 0817 0819 0820

MITOCHONDRIA
0390

MOLYBDENUM
0336 0411 0682

MORPHOGENESIS
0753

MOZAMBIQUE
0936

MUCOR
0185

MULCHING
0492

MUTATION
0260 0263 0626 0646 0658 0664 0732
0924 0958 0961 0993

MYCORRHIZAE
0325 0463 0889 0988

MYCOSES
0005 0106 0107 0143 0162 0180 0183
0184 0185 0186 0188 0189 0190 0191
0192 0193 0195 0196 0197 0198 0199
0200 0201 0202 0203 0204 0205 0206
0270 0273 0274 0278 0285 0290 0291
0293 0294 0297 0301 0305 0374 0477
0552 0553 0554 0555 0556 0557 0558
0559 0560 0562 0565 0566 0567 0568
0569 0571 0573 0576 0577 0578 0579
0580 0581 0582 0583 0584 0585 0587
0588 0590 0591 0640 0644 0661 0722
0765 0818 0841 0844 0854 0856 0857
0858 0860 0861 0864 0865 0867 0870
0871 0872 0873 0874 0875 0876 0677
0893 0925 0944 0948 0957 0960
EPIDEMIOLOGY
0179 0207 0572 0574 0575 0586 0866
0868
INOCULATION
0539 0589 0878
ISOLATION
0182 0187 0208 0563 0863
LEAVES
0090 0539 0561 0570 0859 0862 0878
SEED
0161 0194 0282 0286 0524 0639 0869
TEMPERATURE
0123 0564 0928

NEMATODES
0205 0220 0221 0222 0223 0463 0639
0818 0889 0890 0891
NEMATODE CONTROL
0603

NETHERLANDS
0032 0045 0069 0074 0075 0385 0410
0447 0744 0796 0928 0940 0995

NEW ZEALAND
0041 0170 0236 0852

NEZARA VIRIDULA
PLANT INJURIES
0610

NICARAGUA
0497 0521 0715 0826 0838 0943 1002

NITRITE
0896

NITROGEN
0021 0042 0046 0092 0138 0233 0327
0328 0329 0330 0334 0478 0519 0676
0679 0681 0764 0990 0994
FERTILIZERS
0093 0095 0100 0101 0103 0113 0117
0122 0124 0125 0143 0144 0148 0331
0336 0448 0449 0450 0451 0454 0457

0460 0461 0464 0465 0467 0468 0470
0475 0476 0481 0490 0497 0674 0798
0805 0806 0809 0992 1000
NUTRIENT UPTAKE
0037 0325 0420 0804 0835 0848
PLANT ASSIMILATION
0325 0420 0479 0742 0804 0848 0996
PROTEIN CONTENT
0331 0682
TRANSLOCATION
0383 0479 0479

NITROGEN DIOXIDE
0022 0420

NITROGEN FIXATION
0037 0042 0046 0092 0122 0156 0275
0277 0327 0328 0329 0330 0332 0333
0334 0335 0336 0383 0452 0461 0476
0478 0499 0635 0653 0677 0678 0681
0682 0683 0716 0724 0928 0990 0993
0994 0996 0997 0999

NITROGEN-FIXING BACTERIA
0328 0334 0997

NODULATION
0027 0277 0326 0333 0335 0673 0675
0677 0678 0680 0683 0993 0995 0998
HERBICIDES
0499
MINERALS AND NUTRIENTS
0042 0046 0122 0327 0329 0330 0461
0467 0476 0478 0479 0493 0679 0681
0990 0994 0996 1000

NOXIOUS ANIMALS
0145 0162 0205 0211 0218 0221 0222
0230 0231 0232 0233 0234 0236 0237
0238 0239 0240 0241 0242 0243 0244
0245 0246 0268 0275 0276 0280 0285
0299 0300 0358 0374 0451 0463 0468
0473 0474 0481 0509 0539 0552 0556
0563 0565 0567 0573 0574 0575 0580
0587 0591 0603 0604 0605 0606 0607
0609 0610 0613 0614 0615 0617 0618
0619 0620 0621 0622 0623 0624 0625
0632 0639 0645 0647 0667 0709 0711
0724 0818 0881 0889 0890 0891 0898
0899 0900 0901 0903 0904 0905 0906
0907 0908 0909 0911 0912 0913 0914
0915 0916 0918 1055

NUCLEIC ACIDS
0011 0023 0033 0033 0061 0061 0064
0064 0253 0253 0264 0264 0384 0384
0406 0406 0549 0549 0628

NUTRIENT SOLUTION
0034 0036 0043 0045 0047 0048 0233
0410 0412 0413 0414 0415 0429 0585
0663 0679 0740 0741 0742 0757 0813
0817

NUTRIENT TRANSPORT
0032 0044 0328 0372 0373 0382 0391
0404 0413 0479 0721 0757 0996

NUTRIENT UPTAKE
0036 0037 0040 0041 0044 0073 0094
0111 0325 0409 0410 0413 0420 0453
0463 0473 0474 0509 0721 0744 0745
0757 0804 0820 0835 0848

NUTRITIONAL REQUIREMENTS
0038 0091 0092 0093 0094 0095 0096
0099 0100 0101 0103 0105 0107 0111
0112 0113 0114 0115 0116 0117 0118
0122 0124 0125 0144 0148 0205 0331
0336 0448 0449 0450 0451 0453 0454
0460 0461 0463 0465 0467 0468 0469
0470 0474 0475 0476 0481 0490 0493
0497 0500 0652 0674 0682 0724 0783
0798 0805 0806 0807 0809 0815 0820
0992 1000

NUTRITIVE VALUE
0275 0313 0319 0320 0321 0322 0323
0324 0432 0458 0667 0672 0712 0760
0764 0928 0974 0979 0982 0985 1069

OOTHECA
0246

OPHIOMYA PHASEOLI
0910

OPHIOMYIA PHASEOLI
INSECT CONTROL
0246 0647
CHEMICAL CONTROL
0608
INTEGRATED CONTROL
0608
PLANT INJURIES
0611
RESISTANCE
0246 0280 0647 0927 0935 0936

OPHIOMYIA SPENCERELLA
0647

ORGANOLEPTIC PROPERTIES
0313 0321 0669 1050 1056 1062 1066
1067 1070

OSMOTIC POTENTIAL
0041 0387 0466 0737 0747

OUTCROSSING
0260 0630

OVARIES
0075 0366

OVIPOSITION
0606 0900

OVULES
0075 0366

OXYGEN
0050 0062 0385 0402

OZONE
0022 0060 0896 0913
AIR POLLUTION
0229 0420 0894
PLANT INJURIES
0181 0227 0894

PACKAGING
0356 0712

PALATABILITY
0106 0317 1066 1067

PANAMA
0105

PARAGUAY
0627

PATHOGENICITY
0168 0176 0182 0187 0191 0202 0205
0535 0538 0547 0570 0584 0597 0599
0868 0875 0888

PEANUT MOTTLE VIRUS
0287

PENICILLIUM
DISEASE CONTROL
0185

PERU
0251 0286 0624 0646 0928 0942 0943
1002 1003 1042 1043

PEST CONTROL
0184 0185 0189 0192 0193 0209 0215
0240 0241 0242 0245 0246 0283 0300
0344 0515 0542 0543 0544 0552 0554
0555 0557 0561 0565 0567 0568 0571
0576 0578 0582 0583 0586 0590 0594
0601 0603 0604 0616 0623 0624 0641
0711 0724 0818 0826 0844 0850 0853
0856 0858 0861 0865 0866 0867 0871
0873 0874 0879 0885 0902 0904 0905
0910 0911 0914 0918 1055

PETIOLES
0059 0749

PH
0042 0043 0045 0279 0480 0783 0793
0815 0876 0994 1072
AGRICULTURAL LIME
0118

PHAKOPSORA PACHYRHIZI
0202

PHASEOLLIN
0002 0006 0087 0204 0236 0261 0437
0717 0768 0774 0847

PHASEOLUS ACUTIFOLIUS
0001 0003 0249 0271 0358 0360 0387
0466 0518 0649 0651 0655 0662 0797
0800 0801 0920 0921 0954 0963 0965
0974

PHASEOLUS COCCINEUS
0001 0003 0206 0249 0272 0280 0322
0358 0360 0520 0634 0718 0801 0921
0927 0965

PHASEOLUS FILIFORMIS
0665 0666

PHASEOLUS LUNATUS
0003 0071 0249 0252 0360 0718 0755
0801 0920 0921

PHASEOLUS METACALFEI
0445

PHASEOLUS POLYANTHUS
0360 0520

PHASEOLUS POLYSTACHYUS
0445

PHENOL CONTENT
0076 0435 0710 0722 0761 0764 0777
0976 0980 1054

PHILIPPINES
0321 0477 0856 0918

PHOSPHORUS
0077 0085 0093 0100 0101 0103 0105
0112 0113 0115 0124 0125 0138 0143
0144 0279 0331 0336 0448 0450 0451
0454 0457 0464 0468 0469 0470 0475
0476 0481 0493 0497 0500 0682 0805
0806 0807 0809 0810 0815 0992 1000
1065
MINERAL DEFICIENCIES
0414 0415 0802 0813

NUTRIENT UPTAKE
0111 0325 0463
PLANT ASSIMILATION
0111 0325 0463

PHOTOPERIOD
0019 0098 0127 0379 0382 0455 0472
0482 0801 0928

PHOTOSYNTHESIS
0017 0020 0021 0022 0029 0030 0031
0055 0365 0368 0372 0377 0378 0380
0384 0385 0388 0391 0395 0397 0401
0402 0404 0414 0415 0729 0730 0733
0737 0738 0740 0741 0750 0933

PHYTIC ACID
1054

PHYTIC ACID CONTENT
0077 0085 0435 0669

PHYTOALEXINS
0002 0006 0087 0204 0236 0253 0261
0437 0717 0774 0847 0855

PHYTOHEMAGGLUTININS
0006 0007 0008 0010 0011 0083 0089
0256 0264 0406 0435 0444 0670 0732
0764 0766 0776 0777 0966 0967 0972
0973 0985

PHYTOSEIULUS PERSIMILIS
0905

PLANT AGE
0033 0391 0487 0725

PLANT ANATOMY
0004 0006 0007 0008 0009 0010 0012
0013 0021 0028 0031 0049 0053 0062
0064 0066 0069 0071 0073 0075 0081
0126 0129 0225 0256 0306 0308 0309
0362 0363 0364 0365 0366 0367 0368
0373 0375 0378 0379 0381 0382 0383
0385 0386 0390 0392 0393 0394 0395
0397 0398 0399 0400 0403 0405 0408
0410 0411 0413 0414 0415 0417 0418
0420 0423 0424 0425 0428 0429 0431
0433 0434 0436 0438 0439 0442 0443
0447 0460 0463 0468 0470 0474 0479
0481 0491 0539 0540 0549 0561 0570
0598 0623 0658 0663 0665 0674 0715
0721 0723 0724 0725 0726 0728 0730
0733 0734 0735 0736 0737 0738 0739
0740 0741 0742 0743 0746 0747 0748
0749 0750 0751 0753 0754 0755 0756
0757 0763 0766 0769 0770 0771 0772
0774 0777 0779 0780 0783 0784 0788
0789 0790 0791 0792 0797 0798 0804
0810 0814 0820 0854 0859 0862 0878
0882 0886 0887 0890 0895 0896 0900
0955 0980 0996 1052 1053 1058 1072

PLANT ARCHITECTURE
0009 0057 0291 0297 0298 0303 0933
0949 0952

PLANT ASSIMILATION
0017 0022 0030 0036 0041 0044 0065
0073 0094 0111 0325 0387 0409 0410
0413 0420 0453 0463 0473 0474 0479
0721 0733 0739 0742 0743 0744 0745
0756 0757 0772 0773 0786 0804 0820
0835 0848 0996 1063 1071

PLANT BREEDING
0086 0106 0107 0255 0282 0283 0288
0292 0303 0306 0307 0308 0629 0630
0631 0635 0637 0643 0651 0716 0803
0813 0873 0932 0934 0936 0941 0942
0948 0959 1005 1046
CROSSBREEDING
0252 0254 0257 0266 0267 0271 0280
0284 0290 0295 0296 0299 0301 0455
0638 0649 0654 0659 0660 0661 0664
0755 0880 0950 0954 0955 0963 0976
HYBRIDIZING
0003 0252 0271 0272 0275 0445 0634
0649 0655 0662 0665 0666 0732 0755
0923 0928 0958 0963 0965
MUTATION
0260 0263 0626 0646 0658 0664 0732
0924 0961
SELECTION
0254 0267 0274 0280 0290 0291 0296
0301 0305 0659 0661 0947 0949 0953
0955 0956 0958 0962

PLANT DEVELOPMENT
0028 0034 0035 0038 0042 0046 0048
0051 0058 0059 0060 0061 0067 0073
0081 0095 0102 0104 0105 0106 0107
0117 0118 0121 0122 0123 0130 0138
0228 0306 0325 0327 0335 0358 0375
0381 0391 0399 0420 0421 0424 0427
0428 0430 0452 0462 0467 0472 0478
0480 0482 0492 0493 0497 0499 0588
0589 0596 0737 0750 0752 0753 0755
0757 0799 0810 0889 0830 0906 0952
1066

PLANT FERTILITY
0025 0263 0649 0665 0965

PLANT HABIT
0098 0282 0303 0455 0495 0504 0506
0525 0532 0646 0654 0658 0674 0802
0832 0838 0840 0895 0917 0921 0924
0926 0947 0952

PLANT INJURIES
0181 0185 0193 0227 0234 0235 0237
0299 0553 0604 0610 0611 0613 0616
0622 0624 0905 0906 0914 0916
AIR POLLUTION
0894
TEMPERATURE
0016

PLANT INTRODUCTION
0839

PLANT NUTRITION
0036 0046 0048 0411 0412 0414 0415
0740 0741 0767

PLANT PHYSIOLOGICAL DISORDERS
0016 0047 0171 0224 0225 0226 0227
0229 0819 0894 0895

PLANT PHYSIOLOGICAL PROCESSES
0018 0023 0027 0033 0221 0279 0370
0400 0487 0725 0731 0734 0735 0747
ABSCISSION
0025 0051 0057 0102 0366 0408 0425
0428
NUTRIENT TRANSPORT
0032 0044 0328 0372 0373 0382 0391
0404 0413 0479 0721 0757 0996
PHOTOSYNTHESIS
0017 0020 0021 0022 0029 0030 0031
0055 0365 0368 0377 0378 0384 0385
0388 0391 0395 0397 0401 0402 0414
0415 0729 0730 0737 0738 0740 0741
0750
PLANT ASSIMILATION
0036 0041 0065 0094 0111 0325 0387
0409 0410 0420 0453 0463 0473 0474
0479 0721 0733 0739 0742 0743 0744
0745 0756 0757 0772 0773 0786 0804
0820 0835 0848 0996 1063 1071
PLANT RESPIRATION
0028 0050 0390 0396

PLANT PIGMENTS
0016 0031 0033 0038 0055 0082 0129
0367 0415 0421 0730 0740 0741 0747
0767 0796 0894

PLANT REPRODUCTION
0025 0630

PLANT RESPIRATION
0028 0050 0384 0390 0396

PLANT TISSUES
0099 0101 0113
DISEASES AND PATHOGENS
0107 0887
ENZYMES
0053

PLANT TOXINS
0170 0537 0849 0852 0973

PLANTING
0126 0128 0129 0130 0137 0148 0154
0529 0533 0812 0816 0822 0841 0906
0947 0981
SPACING
0132 0145 0152 0153 0246 0389 0457
0483 0493 0494 0495 0496 0497 0498
0501 0502 0504 0507 0508 0510 0511
0513 0724 0821 0824 0833 0837 1003

POD CHARACTERS
0630

PODDING
0020 0025 0057 0102 0383 0389 0419
0422 0425 0428 0467 0471 0491 0613
0630 0898

PODS
0017 0025 0071 0129 0408 0425 0460
0674 0715 0725 0743 0955
DISEASES AND PATHOGENS
0174 0859 0862
INJURIOUS INSECTS
0622 0900

POLAND
0757 0924

POLLEN
0025 0308 0362 0814

POLLINATION
0260 0933

POLYPLOIDY
0665 0666 0958 0965

POTASSIUM
0093 0100 0103 0113 0124 0125 0138
0143 0336 0450 0451 0454 0457 0464
0468 0470 0481 0682 0709 0740 0805
0806 0809 0810 0946 0979 0992 1000
1065
MINERAL DEFICIENCIES
0741
NUTRIENT UPTAKE
0036 0325 0453 0463 0757

PLANT ASSIMILATION
0036 0325 0453 0463 0757
TRANSLOCATION
0391 0391

PRATYLENCHUS
0890

PREDATORS AND PARASITES
0196 0243 0244 0607 0618 0619 0621
0625 0905 0908 0917

PRICES
0346 0689 0692 0693 0694 0703 0838
1050 1051

PROCESSED PRODUCTS
0351 0355 0443 0709 0712 0713 0714
0782 0975 0977 1056 1059 1060 1061
1062 1063 1064 1065 1068 1069 1070
1071 1072

PROCESSING
0064 0351 0352 0355 0356 0435 0671
0712 0713 0714 0715 0754 0760 0770
0975 0977 0982 0984 1052 1053 1059
1060 1061 1063 1064 1065 1066 1067
1068 1069 1070 1071

PRODUCTION
0091 0340 0342 0343 0345 0347 0348
0685 0689 0691 0699 0700 0701 0702
0707 0716 0729 0831 0834 1001 1006
1007 1008 1009 1010 1011 1012 1013
1014 1015 1016 1017 1018 1019 1020
1021 1022 1023 1024 1025 1026 1027
1028 1029 1030 1031 1032 1033 1034
1035 1036 1037 1038 1039 1040 1041
1042 1043 1044 1045 1047 1051

PRODUCTIVITY
0716 0804

PROPAGATION
0248 0275 0720 0921 0928

PROTEIN CONTENT
0022 0061 0080 0085 0088 0256 0263
0313 0318 0319 0322 0323 0331 0357
0405 0411 0415 0441 0442 0443 0444
0598 0672 0682 0720 0728 0762 0775
0778 0794 0896 0959 0976 0979 0981
0986 0987 1001 1069 1070
SEED
0311 0350 0432 0435 0626 0970

PROTEINS
0007 0026 0064 0081 0086 0087 0188
0206 0256 0261 0264 0266 0304 0316
0384 0407 0447 0598 0671 0756 0886
0969 0982 1063

AMINO ACIDS
0080 0318 0322 0324 0405 0432 0445
0775 0986
ANALYSIS
0005 0080 0083 0088 0361 0404 0431
0434 0436 0444 0445 0723 0725 0746
0761 0764 0771 0774 0775 0779 0780
0781 0785 0790 0795 0986
DIGESTIBILITY
0076 0324 0432 0667 0760 0768 0979
0980 0985 0986 1054

PSEUDOMONAS FLUORESCENS
0541

PSEUDOMONAS SYRINGAE PV. PHASEOLICOLA
0106 0177 0179 0278 0302 0536 0537
0540 0542 0543 0544 0549 0550 0551
0648 0845 0847 0849 0850 0851 0852
0925 0935 0945 1049

PSEUDOMONAS SYRINGAE PV. SYRINGAE
0170 0542 0544 0545 0546 0551 0848
0853

PSEUDOMONAS SYRINGAE PV. TABACI
0545

PSEUDOPLUSIA INCLUDENS
0622

PUERTO RICO
0445 0524 0823 0881 0932 1065

PYTHIUM
0205 0577

PYTHIUM ULTIMUM
DISEASE CONTROL
0554
CHEMICAL CONTROL
0858
INTEGRATED CONTROL
0858

RACES
0183 0197 0199 0270 0537 0540 0547
0550 0584 0597 0599 0851 0858 0863
0875 0880 0888 0945

RADIATION
0367 0368 0380 0452 0745 0791 0898

RAINFALL
0480 0481 0505 0804 0822 0829 0838
0859

RAMULARIA PHASEOLI
0574 0575 0872

RELATIVE HUMIDITY
0734 0738 0828 0898 1054

RELAY CROPS
0151 0155 0505 0838 0947

RESEARCH
0070 0473 0482 0535 0539 0563 0716
0720 0744 0748 0751 0757 0758 0759
0760 0763 0765 0770 0773 0779 0781
0782 0785 0786 0790 0791 0803 0804
0811 0813 0817 0845 0848 0863 0864
0876 0885 0887 0888 0899 0903 0907
0975 1049

RHIZOBIUM
0092 0125 0277 0326 0327 0329 0332
0335 0461 0527 0673 0675 0677 0992
0994 0996 0998
INOCULATION
0330 0336 0460 0674 0676 0990 0991
1000
STRAINS
0328 0330 0331 0333 0334 0554 0676
0680 0990 0995

RHIZOBIUM LEGUMINOSARUM
NODULATION
0678 0996
STRAINS
0678

RHIZOBIUM PHASEOLI
0332
INOCULATION
0330 0460 0674 0676 0679 0990 0991
1000
NODULATION
0329 0330 0335 0673 0675 0990 0993
1000
STRAINS
0330 0331 0333 0334 0676 0990 0995
0999

RHIZOCTONIA SOLANI
0123 0187 0194 0205 0558 0577 0588
DISEASE CONTROL
0185 0554 0555
CHEMICAL CONTROL
0552 0586
DISEASE TRANSMISSION
0552
EPIDEMIOLOGY
0586
ETIOLOGY
0182
INOCULATION
0589
RESISTANCE
0161 0203 0204 0278 0285 0636 0639
0927 0937 1004

RHIZOPUS
0185

RHIZOPUS STOLONIFER
0194

RHIZOSPHERE
0045 0477 0744 0992 0997

RNA
0728 0756 0922 0923

ROOTING
0056 0072 0387 0414 0415 0429 0462
0749 0816 0817 0963

ROOTS
0004 0014 0028 0032 0049 0056 0069
0073 0306 0364 0373 0394 0398 0399
0410 0411 0412 0413 0420 0460 0463
0721 0742 0747 0750 0753 0757 0810
0890 0896

ROTATIONAL CROPS
0142 0143 0146 0509 0519 0558 0805
0826 0835
ZEA MAYS
0092 0205

RUBIDIUM
0382

RWANDA
0280 0339 0527 0935 1058

SACCHARUM OFFICINARUM
0141 0152 0508 0836

SALINITY
0036 0401 0465 0992
GROWTH
0427

SAP
0479

SAUDI ARABIA
0854

SCLEROTIUM ROLFSII
0187 0196 0581
ETIOLOGY
0860
RESISTANCE
0579

SEED
0010 0025 0081 0129 0158 0260 0317
0353 0361 0376 0431 0445 0446 0658
0669 0792 0924 0949 0962 0996 1060
1061
AMINO ACIDS
0432
DISEASES AND PATHOGENS
0161 0194 0259 0282 0524 0561 0639
0869 0953 0961
GENETICS
0086 0087 0304
GERMINATION
0065 0068 0070 0263 0349 0398
INJURIOUS INSECTS
0299 0711
MARKETING
0356
PROTEIN CONTENT
0311 0350 0432 0435 0626 0970
STORAGE
0350 0710 0711 1050 1052 1072
YIELDS
0098 0161 0165 0286 0303 0524 0561

SEED CHARACTERS
0052 0065 0068 0098 0129 0158 0161
0165 0259 0263 0282 0286 0303 0311
0317 0356 0435 0524 0525 0639 0658
0716 0840 0921 0933 0939 0949 0953
0961 0962 0970 1050 1060 1061

SEED COAT
0018 0066 0071 0075 0126 0363 0395
0443 0658 0769 0772 0792 0980 1073

SEED COLOR
0052 0065 0066 0106 0129 0161 0165
0286 0317 0524 0657 0658 0840 0953
0961 0962 1073

SEED HARDENING
0353 0354 0792 0935 1052 1072

SEED PRODUCTION
0159 0520 0521 0629 0813 0935 0942

SEED TREATMENT
0215 0623 0858 0867 0873 1003

SEED VIGOR
0065 0066 0070 0349 0418 0433 0481
0552

SEEDLING
0049 0051 0063 0072 0203 0399 0403
0419 0467 0491 0613 0638 0753 0786
0789 1053

SEEDS
0008 0018 0024 0052 0062 0064 0066
0071 0075 0081 0089 0126 0225 0256
0363 0390 0395 0417 0418 0423 0433
0439 0442 0443 0481 0491 0658 0743
0746 0748 0754 0755 0756 0763 0766
0768 0769 0771 0772 0774 0777 0779
0780 0783 0784 0790 0792 0854 0900
0980 1052 1053 1058 1072

SELECTION
0067 0097 0119 0120 0269 0277 0279
0286 0287 0289 0293 0294 0297 0298
0471 0506 0520 0527 0530 0536 0579
0587 0636 0640 0644 0648 0653 0802
0839 0937 0938 0940 0946 0952 0960
PLANT BREEDING
0254 0267 0274 0280 0290 0291 0296
0301 0305 0650 0661 0947 0949 0953
0955 0956 0958 0962

SEROLOGY
0542 0602

SHADING
0151 0329 0452 0789 0898

SHOOTS
0016 0046 0056 0138 0172 0460 0747
0753 0810

SILICON
0585

SIMULATION MODELS
0804

SLUGS
0604 1004

SNAP BEANS
0005 0020 0038 0040 0062 0065 0066
0068 0070 0081 0103 0110 0113 0117
0129 0133 0140 0146 0175 0192 0193
0200 0205 0221 0222 0226 0231 0232
0240 0265 0294 0308 0327 0344 0351
0355 0356 0409 0421 0431 0465 0467
0468 0474 0475 0480 0492 0495 0498
0499 0532 0549 0554 0561 0563 0566
0572 0582 0585 0609 0639 0654 0683
0685 0693 0709 0731 0734 0758 0765
0791 0796 0807 0823 0845 0848 0862
0865 0872 0879 0881 0892 0908 0912
0918 0928 0932 0948 0955 0992 1038
1039 1040 1041 1042 1043 1048 1050
1056 1059 1062 1064 1066 1067

SOCIOECONOMIC ASPECTS
0690 0696

SODIUM
0036 0709 0740 0741 1065

SOIL AMENDMENTS
0040 0603 0724 0743

SOIL ANALYSIS
0104 0449 0819

SOIL COMPACTION
0049 0106 0107 0121 0799 0810 0811
0816 0817

SOIL FERTILITY
0104 0106 0205 0519 0752 0810 0835

SOIL MOISTURE
0078 0102 0111 0123 0456 0459 0477
0811

SOIL REQUIREMENTS
0040 0104 0106 0109 0205 0519 0603
0724 0743 0752 0810 0835

SOILS
0131 0806 0810 0811

SOLAR RADIATION
0353 0368 0452 0898

SOLUBLE CARBOHYDRATES
0022 0030 0075 0398 0420 0443 0722
0784

SOMALIA
0705 0934

SORGHUM VULGARE
0141 0144

SOUTH AFRICA
0372 0429 0439 0508 0699 0700 0749
0770 0828 0845 0853

SPACING
0246 0389 0501 0724 0824 0831
YIELDS
0127 0132 0145 0152 0153 0457 0483
0493 0494 0495 0496 0497 0498 0502
0504 0507 0508 0510 0511 0513 0821
0830 0832 0833 0837 1003

SPAIN
0034 0035 0228 0314 0411 0460 0983

SPODOPTERA FRUGIPERDA
0451 0620

STAKING AND TRELLISING
0527

STAMENS
0025 0308 0362 0814

STARCH CONTENT
0030 0313 0352 0415 0443 0787 0977
0984 1070
PODS
0725
SEED
0350

STATISTICAL ANALYSIS
0119 0498 0517 0708 0958 0981

STATISTICAL DATA
0685 0689 0691 0699 0700 0701 0702
0706 0707 1001 1006 1007 1008 1009
1010 1011 1012 1013 1014 1015 1016
1017 1018 1019 1020 1021 1022 1023
1024 1025 1026 1027 1028 1029 1030
1031 1032 1033 1034 1035 1036 1037
1038 1039 1040 1041 1042 1043 1044
1047

STEMS
0403
GROWTH
0424
MINERALS AND NUTRIENTS
0411
TRANSLOCATION
0743

STERILITY
0664

STOMATA
0055 0365 0370 0375 0379 0380 0386
0387 0733 0734 0735 0737 0738 0747
0750

STORAGE
0052 0310 0313 0350 0442 0521 0697
0710 1050 1056 1066 1072
INJURIOUS INSECTS
0709 0711
TEMPERATURE
1052 1053 1054 1062

STORED GRAIN PESTS
0304 0606 0711 1055

SUCROSE
0022 0030 0075 0784

SUGAR CONTENT
0313 0350 0353 0420 0443 0769 0984

SULFUR DIOXIDE
0060 0421 0733 0894

SULPHUR
0124 0318 0460 0895 0979

SWAZILAND
0936

SWEDEN
0416 0985

SWITZERLAND
0204 0440

SYMBIOSIS
0476 0493 0573
NODULATION
0326 0333 0335 0499 0673 0675 0677
0680 0683 0995 0996
MINERALS AND NUTRIENTS
0042 0046 0327 0329 0330 0461 0467
0476 0478 0479 0493 0679 0681 0990
PHOSPHORUS
0476 0493 1000

TANNIN CONTENT
0076 0435 0710 0761 0764 0777 0976
0980 1054

TANZANIA
0091 0156 0246 0307 0342 0343 0344
0510 0526 0597 0612 0690 0705 0735
0830 0910 0929 0936 0960 1068

TAXONOMY
0719 0724

TECHNOLOGICAL PACKAGE
0339 0698 0715 0839

TECHNOLOGY
0251 0275 0283 0285 0289 0337 0338
0339 0522 0526 0532 0629 0697 0698
0715 1002 1051 1058

TECHNOLOGY EVALUATION
0289 0338 0523 0525 0526 0532 0697
0935 0942 1002 1003 1004 1058

TEMPERATURE
0062 0077 0308 0329 0407 0417 0438
0455 0479 0482 0564 0605 0617 0638
0663 0678 0734 0779 0828 0892 0898
0951 0985 0991 1052 1053 1054 1062
1063 1070 1071
GROWTH
0048 0123 0462 0478
PHOTOSYNTHESIS
0377 0388 0404
PLANT INJURIES
0016
YIELDS
0822 0928 0963

TETRANYCHUS
0915

TETRANYCHUS URTICAE
0233 0903 0905 0912

THAILAND
0706

THRESHING
0486

THYSANOPTERA
0246 0612 0918

TILLAGE
0490 0492 0521 0571 0816 0826

TIMING
0108 0110 0113 0126 0128 0129 0130
0137 0148 0152 0246 0283 0311 0354
0501 0511 0529 0533 0669 0724 0798
0812 0822 0823 0824 0832 0841 0906
0935 0947 0976 0981 0982 0985 1053
1057 1058 1063 1066 1068 1071

TISSUE CULTURE
0063 0248 0416 0540 0556 0563 0720
0751 0920 0958

TOBACCO MOSAIC VIRUS
DISEASE TRANSMISSION
0213
ETIOLOGY
0213
RESISTANCE
0213

TOBACCO NECROSIS VIRUS
0598 0886

TOBACCO RING SPOT VIRUS
DISEASE TRANSMISSION
0213
ETIOLOGY
0213
RESISTANCE
0213

TOXICITY
0228
HERBICIDES
0828
MINERALS AND NUTRIENTS
0409 0412 0469 0652

TRADE
0344 0348 0685 0689 0691 0697 0699
0700 0701 0702 0703 0706 1048

TRANSFER OF TECHNOLOGY
0251 0275 0283 0285 0337 0339 0522
0525 0629 0688 0695 0698 0928 0934
0935 0936 0942 0943 1002 1003 1004
1005 1046

TRANSLOCATION
0041 0044 0047 0094 0372 0373 0382
0383 0388 0389 0391 0391 0404 0410
0413 0471 0479 0479 0743 0745 0759

TRANSPIRATION
0370 0382 0733 0734 0735 0737 0740
0741 0747

TRANSPLANTING
0487

TRIALEURODES VAPORARIORUM
0930

TRICHODERMA HARZIANUM
0555 0557 0858

TRITICUM
0154

TROPISMS
0368 0403

TRYPSIN
0441 0761 0777 0779 0785 0790 0794
0974 0980 0985

TRYPTOPHANE
0442

TURKEY
0702 1042 1043

UGANDA
0339 0705 0711 0805 0870 0934

UNITED KINGDOM
0003 0005 0017 0033 0051 0065 0066
0195 0206 0253 0369 0371 0374 0380
0424 0423 0438 0478 0479 0549 0556
0563 0573 0591 0722 0734 0765 0768
0790 0799 0855 0969 0971 0973

UROMYCES PHASEOLI
0186 0188 0199 0201 0560 0569 0570
0584 0862 0863
DISEASE CONTROL
0576 0578 0582
CHEMICAL CONTROL
0189 0192 0193 0568 0583 0844 0856
0865 0871
INTEGRATED CONTROL
0844
DISEASE TRANSMISSION
0857
EPIDEMIOLOGY
0572 0575 0866
ETIOLOGY
0183 0559
INOCULATION
0539 0878
RESISTANCE
0162 0180 0197 0273 0286 0293 0297
0524 0553 0572 0585 0661 0840 0841
0844 0878 0925 0929 0932 0935 0944
0948 0957
SYMPTOMATOLOGY
0866

USA
0002 0006 0007 0008 0009 0010 0011
0012 0014 0019 0020 0021 0024 0025
0027 0028 0029 0030 0037 0039 0040
0043 0048 0049 0053 0055 0057 0059
0060 0061 0062 0070 0071 0077 0080
0083 0084 0085 0087 0088 0090 0099
0100 0101 0106 0107 0108 0109 0113
0119 0121 0123 0126 0129 0130 0131
0133 0134 0137 0138 0139 0140 0142
0143 0145 0146 0160 0165 0171 0172
0173 0174 0175 0178 0179 0180 0181
0184 0189 0190 0192 0193 0197 0200
0201 0202 0203 0205 0207 0209 0221
0222 0223 0224 0225 0226 0227 0229
0230 0231 0232 0240 0243 0252 0254
0255 0256 0257 0258 0259 0260 0261
0266 0267 0268 0269 0270 0274 0287
0288 0290 0291 0295 0296 0297 0298
0299 0301 0302 0304 0305 0308 0309
0310 0312 0315 0317 0320 0322 0335
0351 0355 0356 0361 0363 0364 0368
0370 0373 0377 0379 0387 0389 0393
0401 0402 0407 0421 0425 0431 0435
0436 0444 0452 0455 0466 0467 0468
0472 0474 0480 0482 0484 0485 0488
0490 0491 0492 0499 0509 0515 0517
0518 0519 0532 0539 0540 0542 0543
0544 0546 0547 0548 0551 0558 0562
0564 0566 0567 0571 0572 0581 0582
0583 0586 0588 0589 0590 0595 0600
0601 0602 0605 0609 0615 0616 0617
0618 0619 0623 0626 0630 0631 0632
0635 0637 0638 0639 0641 0644 0651
0662 0663 0664 0671 0672 0677 0679
0680 0689 0700 0701 0702 0706 0710
0712 0713 0714 0733 0738 0740 0741
0743 0745 0752 0753 0755 0758 0760
0761 0763 0767 0772 0773 0774 0778
0781 0791 0792 0804 0812 0813 0814
0816 0817 0818 0832 0847 0848 0849
0857 0861 0862 0865 0868 0884 0889
0892 0893 0894 0895 0902 0904 0905
0907 0908 0913 0914 0915 0916 0917

0925 0932 0944 0948 0949 0950 0958
0963 0966 0967 0968 0972 0974 0975
0976 0977 0978 0982 0992 0994 0998
1042 1043 1050 1054 1055 1057 1059
1060 1064 1067 1069 1070 1071 1072
1073

USES
0671 0699

VAGINULUS PLEBEIUS
0604

VANADIUM
0412

VARIETAL MIXTURES
0518 0572 0934 0935

VECTORS
0211 0215 0238 0881

VENEZUELA
0093 0162 0164 0169 0196 0212 0300
0319 0454 0530 0531 0535 0553 0645
0700 0842 0952 0970 1042 1043

VIGNA UNGUICULATA
0831

VIROSES
0106 0162 0179 0180 0209 0210 0211
0212 0213 0214 0215 0216 0217 0218
0219 0247 0259 0281 0285 0286 0287
0292 0302 0434 0524 0593 0594 0595
0596 0597 0598 0599 0600 0601 0602
0641 0661 0841 0846 0879 0880 0881
0882 0883 0884 0885 0886 0887 0888
0925 0926 0928 0944 0950 0953 0959
0961 1049

VIRUS INHIBITION
0195

VITAMIN CONTENT
0073 0319 0709

WATER ABSORPTION
0065 0387 0756 0772 0773 0786 0935
0981 1063 1071

WATER CONTENT
0052 0088 0090 0319 0350 0357 0435
0764 0791 0792 1052 1053 1057 1072

WATER REQUIREMENTS
0104 0462 0508 0735 0737 0808

WATER STRESS
0035 0119 0207 0306 0368 0378 0387
0466 0471 0477 0735 0747 0791 0814

WEEDING
0133 0135 0136 0137 0152 0485 0488
0489 0490 0497 0501 0511 0825 0827

WEEDS
0135 0137 0139 0827
HERBICIDES
0136 0488 0499

WHETZELINIA SCLEROTIORUM
0090 0206
DISEASE CONTROL
0571
CHEMICAL CONTROL
0184 0590 0818 0861
INTEGRATED CONTROL
0874
RESISTANCE
0180 0190 0274 0301 0637 0644 0944
SYMPTOMATOLOGY
0861

XANTHOMONAS CAMPESTRIS PV. PHASEOLI
0106 0107 0169 0171 0172 0173 0174
0176 0178 0180 0181 0285 0472 0524
0535 0536 0539 0542 0543 0547 0551
0575 0637 0648 0661 0840 0844 0846
0853 0927 0929 0935 0944 0954 0956
1004

XANTHOMONAS PHASEOLI VAR. FUSCANS
0535
DISEASE CONTROL
0543
RESISTANCE
0106 0180 0181 0637
SYMPTOMATOLOGY
0543

YEMEN
0533

YIELD COMPONENTS
0009 0020 0057 0067 0096 0102 0110
0117 0130 0132 0151 0221 0262 0303
0336 0358 0422 0426 0428 0430 0449
0451 0457 0459 0463 0475 0480 0481
0488 0493 0494 0495 0496 0500 0506
0510 0529 0569 0583 0588 0589 0610
0613 0654 0799 0808 0822 0823 0827
0843 0846 0952 0959 0963 0964 0992

YIELDS
0009 0020 0038 0039 0057 0060 0067
0093 0096 0098 0099 0100 0101 0102
0103 0105 0106 0107 0108 0110 0111
0112 0113 0114 0115 0116 0117 0120
0121 0122 0127 0128 0130 0131 0132
0135 0137 0138 0140 0141 0142 0145
0146 0148 0151 0152 0153 0154 0160
0161 0162 0163 0164 0165 0166 0189

0198 0205 0210 0215 0218 0221 0242
0247 0258 0262 0266 0273 0275 0277
0284 0286 0303 0306 0330 0331 0336
0338 0340 0358 0409 0422 0426 0430
0448 0452 0453 0454 0457 0458 0459
0460 0464 0465 0467 0468 0469 0470
0471 0473 0474 0475 0476 0480 0481
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0494 0495 0496 0497 0498 0500 0502
0503 0504 0506 0507 0508 0510 0511
0513 0522 0523 0524 0525 0526 0527
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0674 0676 0697 0699 0707 0716 0799
0800 0802 0803 0805 0806 0807 0808
0809 0812 0816 0820 0821 0822 0823
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0889 0910 0917 0928 0933 0935 0936
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0964 0990 0992 1000 1001 1003 1006
1007 1008 1009 1010 1011 1012 1013
1014 1015 1016 1017 1018 1019 1020
1021 1022 1023 1024 1025 1026 1027
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1042 1043 1045 1051

ZABROTES SUBFASCIATUS
0900
INSECT CONTROL
0245
CHEMICAL CONTROL
1055
RESISTANCE
0276 0930

ZAIRE
0929 0935

ZAMBIA
0091 0159 0219 0345 0640 0878 0936

ZEA MAYS
0092 0151
INTERCROPPING
0140 0141 0144 0145 0147 0148 0149
0150 0153 0154 0155 0156 0205 0246
0269 0450 0500 0501 0502 0503 0504
0505 0506 0507 0510 0511 0512 0514
0577 0724 0829 0830 0832 0833 0837
0838 0898 0937 0947 1003

ZIMBABWE
0091 0125 0157 0167 0265 0346 0347
0348 0660 0936

ZINC
0038 0040 0044 0047 0100 0101 0138
0143 0327 0468 0473 0474 0481 0509
0667 0709 0762 0810 0817 0819 0820

SPECIALIZED INFORMATION CENTERS

Gerardo Häbich, PhD, Coordinator Training and Communications
Jorge López S., Information Specialist, Supervisor of Specialized Information Centers
Marlene Cardenas, Bibliographer
Sabu S. George, B.Sc.(Ag.).M.A., Information Specialist-Cassava (as of June, 1987)
Francy González V., Ing.Agr., Information Specialist-Beans
Keyttel Gutiérrez de Prieto, Typesetting
Mariano Mejía M., BA, Information Specialist-Tropical Pastures
Lynn Menéndez Z., Information Specialist, Editing and Translation
Margarita Rosa Roa R., Information Input
Carlos Saa C., AS, Programmer
Nathalie Sima P., Proofreader

BEAN PROGRAM

Douglas Pachico, PhD, Economics, Program Leader
David Allen, PhD, Plant Pathology, Regional Coordinator, Southern African Bean Project (stationed in Arusha, Tanzania)
Stephen Beebe, PhD, Plant Breeding
Cesar Cardona, PhD, Entomology
Jeremy H.C. Davis, PhD, Plant Breeding (stationed in Butare, Rwanda)
Krista C. Dessert, MS, Nutrition, Great Lakes Bean Project (stationed in Rubona, Rwanda)
Michael Dessert, PhD, Plant Breeding, Regional Coordinator, Great Lakes Bean Project (stationed in Rubona, Rwanda)
Guillermo E. Gálvez, PhD, Plant Pathology, Regional Coordinator, Central America Bean Project (stationed in San José, Costa Rica)
Willi Graf, MS, Agronomy, Great Lakes Bean Project (stationed in Rubona, Rwanda)
Theodora C. van Herpen, MS, Economics
Judith Kipe-Nolt, PhD, Microbiology
Roger Kirkby, PhD, Agronomy, Regional Coordinator, East African Bean Project (stationed in Adis Abeba, Ethiopia)
Julia L. Kornegay, PhD, Plant Breeding
Francisco J. Morales, PhD, Virology
Silvio H. Orozco, MS, Agronomy, Central America Bean Project (stationed in Guatemala City, Guatemala)
Marcial Pastor-Corrales, PhD, Plant Pathology
Veronique Schmit, MS, Associate Expert, FAO
Shree P. Singh, PhD, Plant Breeding
Barry Smithson, PhD, Plant Breeding, Southern Africa Bean Project (stationed in Arusha, Tanzania)
Michael D. Thung, PhD, Agronomy (stationed at CNPAF, Goiania, Brazil)
Joseph M. Tohme, PhD, Plant Breeding (Posdoctoral Fellow)
Peter Trutmann, PhD, Plant Pathology, Great Lakes Bean Project (stationed in Rubona, Rwanda) Joachim Voss, PhD, Anthropology, Great Lakes Bean Project (stationed in Rubona, Rwanda)
Oswaldo Voysest, PhD, Agronomy Jeffrey White, PhD, Plant Physiology
Jonathan Woolley, PhD, Agronomy, Cropping Systems
Charles Wortmann, PhD, Agonomy (stationed in Kampala, Uganda)