yield. [THH]

***0726** Chakravarthy, A.K. ; Lingappa, S. 1985. **Behavioural responses of Adisura atkinsoni Moore to the host plant, Lablab niger Medick, extract.** INSECT SCIENCE AND ITS APPLICATION, v.6(1):79-82. [En] [En Abst] (REP.MB-2501)

The behavioral responses of Adisura larvae to different concentrations of the Lablab niger plant extract was tested under laboratory conditions. The concentrated plant extract did not elicit positive response from Adisura larvae. The first instar Adisura larvae preferred 10% concentration of the extract over higher concentrations (that is more than 10%). First instar Adisura larvae were found more sensitive in discriminating non-host from the host than last instar larvae. Adisura gravid females laid no eggs on blackgram, cowpea, faba bean, pigeonpea and PLS-24, a field bean (L. niger) variety. This study suggests that pigeonpea, cowpea, faba bean, blackgram and soybean are not the primary hosts of A. atkinsoni. [AS]

***0727** Vekaria, M.V. ; Vyas, H.N. 1985. **Chemical control of pod borer complex in greengram, Vigna radiata (L) Wilczek with certain insecticides alone and in combination with miraculan - a plant growth stimulant.** LEGUME RESEARCH, v.8(2):111-113. [En] (A:PS)

Five insecticides alone and in combination with a plant growth stimulant (miraculun) were evaluated against pod borers infesting mungbean. The least number of pods damaged by all three pod borers (Heliothis armigera Hubner, Cydia ptychora Meyr and Maruca testulalis Geyer) was recorded in fenvalerate 0.01% + miraculan followed by fenvalerate 0.01% alone. Pooled data of grain yield also indicated that fenvalerate 0.01% + miraculan gave the highest yield (357 kg/ha) followed by monocrotophos 0.04% + miraculan (831 kg/ha), fenvalerate 0.01% (827 kg/ha), monocrotophos 0.04% (738 kg/ha) and endosulfan 0.07% + miraculan (727 kg/ha). [PLH/THH]

APHIDS

***0728** Nagaraja Rao, K.R. 1959. **The bean aphid control with systemic pesticides.** MADRAS AGRICULTURAL JOURNAL, v.46(11):421-425. [En] (REP.MB-1223)

Three systemic insecticides, viz., demeton, Metasystox and dimefox were tested in controlling bean apnid (Aphis craccivora) on Gliricdia maculata. The pest thrives on Dolichos lablab, Vigna unguiculata, Arachis hypogeane, V. radiata, V. mungo, Medicago sativa, Indigofera sp. and some other leguminous crops. The direct application of demeton and Metasystox at 0.05% on the plants was quite effective in controlling the pest, causing 98 to 99% reduction in the population within 48 h. The drench treatments of both insecticides gave the same results during a week. A marked reduction in population was observed in dimefox treatment, which was placed in the soil at a depth of 15 cm. The reduction reached the 100% level during 2 weeks. [THH]

***0729** Panda, N. ; Raju, A.K. 1972. **Varietal resistance of green gram (Phaseolus aureus Roxb.) to Aphis craccivora (Koch) [Mung beans].** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.42(8):670-673. [En] [En Abst] (REP.MB-0189)

Twenty five varieties of mungbean (Vigna radiata) were screened for resistance to Aphis craccivora (Koch) under field conditions at Bhubaneswar during the winter season of 1969 and the summer and rainy seasons of 1970. The average number of aphids, both nymphs and adults, per plant was used to compare the level of resistance between varieties. The intensity of damage by yellow mosaic virus was also recorded. 'BR 2', 'NP 18', 'Kopergaon' and 'Green (4 n)' were resistant to the aphid, whereas 'Shining', 'Khargaon', 'Baisakhi', 'T 51' 'Kiloga', 'Peru', 'Lincon' and 'Beerkun' were susceptible. 'Angul 3-6' proved moderately resistant to the aphid and to the yellow mosaic virus. an antibiosis study revealed that the fecundity of aphids feeding on resistant varieties was almost half that of the insect feeding on susceptible ones. The nymphal weight was lower and the duration of life cycle longer in insects fed on resistant entries. [AS]

***0730** Hamid, S. ; Shah, M.A. ; Anwar, A.M. 1977. **Some ecological and behavioural studies on Aphis craccivora Koch (Hem.: Aphididae).** COMMONWEALTH INSTITUTE OF BIOLOGICAL CONTROL, TECHNICAL BULLETIN, no.18:99-111. [En] [En Abst] (REP.MB-2738)

Investigations on biology, ecology, behaviour and natural enemies of Aphis craccivora Koch were conducted in Pakistan during 1967-1970. Aphis craccivora exhibited seasonal and crop-wise polymorphism. Anholocyclic infestations were maintained on 9 summer plants, 18 winter and 3 perennials. Of these Arachis hypogaea, Cyamopsis tetragonolobus, Vigna radiata and V. sinensis (summer), Medicago sativa (perennial), and Vicia faba (winter) were important. Host preference was related to reproduction on different plant species. Aphidius absinthii, Aphelinus basalis, Ephedrus sp. nr. cerasicola, Trioxys ? sinensis, Lysiphlebus fabarum and Aphidencyrtus aphidivora parasitised the aphid while two Anthocorids, one Chamaemyiid, one Chrysopid, nine Coccinellids and nine Syrphids preyed on it. Ants, Pheidole sp. and Monomorium indicum, were associated with A. craccivora in 90% of the sites examined. Their symbiotic influence appeared to work in favour of the aphid. [AS/THH]

***0731** Raju, A.K. ; Panda, N. 1983. **Observations on the biology of Aphis craccivora Koch on five varieties of greengram.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.53(9):868-869. [En] (A:PS)

A laboratory study on the possible antibiosis of mungbeans to Aphis craccivora was conducted in India. On a susceptible variety, Shining, the adult aphid could significantly attain higher fecundity, higher body weight, shorter nymphal period and longer duration than the moderately resistant varieties of Angul 3-6 and NP 18 and resistant varieties of Kopergaon and Green 4n. There was no significant difference between Angul 3-6 and NP 18 in respect of oviposition. [THH]

OTHER POLYPHAGOUS INSECTS

*0732 Wolfenbarger, D. ; Sleesman, J.P. 1961. **Resistance to the potato leafhopper in Lima bean lines, interspecific Phaseolus crosses, Phaseolus spp., the cowpea, and the Bonavist bean.** JOURNAL OF ECONOMIC ENTOMOLOGY, v.54:1077-1079. [En] [En Abst] (REP.MB-0580)

Nineteen Lima bean lines were resistant to hopperburn, although the varieties differed in resistance to nymphal infestation. All plants or interspecific crosses of resistant and susceptible species were susceptible to both hopperburn and nymphal infestations. Unidentified Phaseolus species differed in their reaction to both nymphal infestations and hopperburn injury. The Bonavist bean was resistant to hopperburn but susceptible to nymphal infestation. Although cowpea lines exhibited tolerance they were susceptible to nymphal infestations and hopperburn injury. All domestic mungbeans were resistant to nymphal infestation and hopperburn injury. [AS/THH]

*0733 Chaudhary, J.P. ; Sidhu, A.S. ; Ramzan, M. 1970. **Seasonal activity and life history of Kutra hairy caterpillar in the Punjab.** IN: Proceedings [of the] fourth workshop on pulse crops. New Delhi : ICAR. p.204-208 [En] [En Abst] (REP.MB-1459)

MEETING: Workshop on Pulse Crops, 4th -- Ludhiana, India, Apr 7-10, 1970

Studies conducted during 1967 to 1969 revealed that contrary to earlier belief Amsacta moorei Bulter remained active from about the end of June to the middle of October. There were two distinct races: one comprising 25-30% of the population was univoltine while the other had three broods. Eggs hatched in four days during July-August and in six days during September. Larvae molted 4-6 times and became full-grown in 17-30 days. Pupal period was very variable. In case of univoltine race it was about 10.5 months, whereas in case of the multivoltine race, it was 6-35 days in the first two broods and about 9 months in the third brood. Studies on light trap collection revealed that maximum number of moths were attracted during June-July when diapausing pupae of both the races emerged as moths together. About five times more males were attracted to light than the females. [AS]

*0734 Saxena, H.P. ; Kumar, S. ; Prasad, S.K. 1971. **Efficacy of some systemic granular insecticides against galerucid beetle, Madurasia obscurella jacoby infesting kharif pulses.** INDIAN JOURNAL OF ENTOMOLOGY, v.33(4):470-471. [En] (REP.MB-1307)

(NOTE: Also presented at the 3rd Annual Workshop Conference on Pulse Crops, in 1969, under the title: Chemical control of galerucid beetle on pulses, viz., mung, urid, and cowpea)

During kharif 1968, granular systemic insecticides were tested to control galerucid beetle (Madurasia obscurella Jacoby), an important pest of kharif mungbean, blackgram and cowpea in India. Aldicarb, phorate (Thimet 10 G) and disulfoton (Solvirex and Disyston) were applied to soil at the rate of 2 kg/ha, 1.5 kg/ha, 1 kg/ha, and 0.5 kg/ha. The application was done before sowing. The dose of 2 kg/ha of all insecticides tested proved better in all three crops. The results in mungbean and blackgram were significant. In the case of mungbean, phorate at 2 kg/ha recorded 38.4% of damaged leaves as against 84.7% in the control. The same dose of phorate at 2 kg/ha proved most effective in blackgram, the damaged leaves was 36.6% as compared to 68.6% in the control. In cowpea, phorate 2 kg/ha had significantly less damaged leaves than the control

but the difference in the average number of holes was not significant. [THH]

***0735** Pal, S.K. 1972. **A note on leaf weevil Cyrtozemia cognata Marshall (Curculionidae: Coleoptera) infesting Kharif crops in dryland farming.** ANNALS OF ARID ZONE, v.11(1/2):132. [En] (REP.MB-2569)

The adult mungbean weevil is grey. It is 7 mm long and 4 mm wide. It nibbles the leaves and makes round and irregular holes, resulting in poor plant growth. The average population of weevils recorded on each plant was 2-6 and weevils were found hiding in the clods and around debris. The activity of the pest was maximum during morning and evening hours. Results obtained from the application of some insecticides revealed that 0.03% Phosphamidon (two sprays at 10-day interval) was quite effective in controlling the pest. [AS/THH]

***0736** Enyi, B.A.C. 1975. **Effects of defoliation on growth and yield in groundnut (Arachis hypogea), cowpeas (Vigna unguiculata), soyabean (Glycine max) and green gram (Vigna aurens).** ANNALS OF APPLIED BIOLOGY, v.79(1):55-66. [En] [En Abst] (REP.MB-0575)

Defoliation reduced the dry weight of stems, pods, grains and size of individual grains in all four of the legume crops studied and the dry weight of flowering inflorescence stalk in the case of cowpeas and mungbean only. The adverse effect of defoliation was more pronounced when defoliation was complete than when half of the number of leaves were removed. The greatest reduction in grain yield occurred when the plants were defoliated during the early podding stage, the percentage reduction being 59.7, 79.0, 86.4 and 95.3 in groundnut, cowpeas, soybeans and mungbean, respectively, when completely defoliated at this stage and 43.3, 14.0, 42.4 and 46.1, respectively, when only half defoliated. The results show that assimilates produced by the leaves during the early stages of growth are used in the growth of stems and leaves, but the assimilates produced during the reproductive stage are used mainly for the growth of the pods. In groundnut, pod number and grain weight were positively correlated with stem weight. It appears that defoliation reduced pod number by depressing the growth of stems and this in turn reduced the number of flowering nodes. The reasons for the differences between the crops in their response to the defoliation treatments and the practical implications of the findings in relation to pest and disease control and plucking of leaves for human consumption are discussed. [AS]

***0737** Sinha, M.M. ; Yadav, R.P. ; Singh, R. 1975. **Laboratory studies on the effects of some varieties of mung (Phaseolus aureus Roxb.) on the growth and development of Bihar hairy caterpillar (Diacrisia obliqua Walker).** LABDEV JOURNAL OF SCIENCE AND TECHNOLOGY, PART B: LIFE SCIENCE, v.13(3/4):175-178. [En] [En Abst] (REP.MB-2679)

In laboratory studies on nine different varieties of mungbean (Vigna radiata) for their relative suitability to support the growth and development of Diacrisia obliqua Walker during kharif, 1974 at the Agricultural Research Institute, Dholi (Bihar), all the varieties of mungbean showed differential behavior in respect of the growth and developmental pattern of this insect. Among the varieties studied, ML 2 was found to be the most suited food whereas No. 122 the least for the larval growth and development of the insect. In respect of pupal period, all the varieties behaved more or less alike. With

regards to the percentage of adult emergence, however, the variety No. 122 recorded the lowest percentage of emergence while S.S.M. 1 showed the highest. [AS]

*0738 Sinha, M.M. ; Yadav, R.P. ; Kumar, A. 1975. **Outbreak of the Bihar hairy caterpillar, Diacrisia obliqua Walker in North Bihar.** ENTOMOLOGISTS' NEWSLETTER, v.5(10/11):47. [En] (REP.MB-2762)

In early September 1975, an outbreak of Bihar hairy caterpillar, (Diacrisia obliqua Walker) in north Bihar, India, caused severe damage to blackgram, mungbean, soybean, cowpea, sweet potato, til (Sesamum sp.), sunflower, peanut, maize and jute. In a preliminary field trial with 14 insecticides on blackgram, 0.05% dichlorvos, leptophos or quinalphos, 0.04% monocrotophos or phenthoate, 0.06% phosalone, 0.07% endosulfan and 0.01% formothion reduced the larval population considerably. [THH]

*0739 Srivastava, A.S. ; Awasthi, B.K. ; Nigam, P.M. 1975. **Incidence of Myllocerus maculosus Desb., on leguminous crops (Coleoptera: Curculionidae).** LABDEV JOURNAL OF SCIENCE AND TECHNOLOGY, PART B: LIFE SCIENCE, v.13(3/4):215-216. [En] [En Abst] (REP.MB-2680)

A monthly survey to monitor the incidence of adult Myllocerus maculosus Desb. on various leguminous crops was carried out in different localities of Kanpur district. The crops found infested were mungbean, blackgram, cowpea, and soybean. Percentage infestation varied from 23.7-29.4; 19.5-44.0; 26.0-46.0 and 27.0-45.0 in mungbean, soybean, blackgram and cowpea crops, respectively. Peak infestation was recorded in August. [AS]

*0740 Pal, S.K. ; Kushwaha, K.S. 1977. **Relative toxicity of some insecticides to the adults of moong weevil, Cyrtozemia cognata Marshall.** INDIAN JOURNAL OF ENTOMOLOGY, v.39(4):381-383. [En] (REP.MB-2595)

Laboratory tests were conducted in India on the relative toxicity of 6 insecticides to the adults of Cyrtozemia cognata Marshall, a leaf weevil of mungbeans. The toxicity (LC 50) indicated that lindane (gamma HCH) was the most toxic, followed by monocrotophos, dicrotophos, carbaryl, phosphamidon and endosulfan. At the LC 90 level, dicrotophos was the most toxic, followed by carbaryl, lindane, monocrotophos, phosphamidon and endosulfan. [THH]

*0741 Yadav, R.P. ; Singh, R. 1977. **Studies on the larval development of Bihar hairy caterpillar (Diacrisia obliqua Walker) in relation to some host plants at Dholi (North Bihar).** SCIENCE AND CULTURE, v.43(5):233-234. [En] (REP.MB-2597)

In laboratory rearing trials with Bihar hairy caterpillar (Dicrisia obliqua Walker), a polyphagous pest causing severe damage to a variety of crops in India, the survial rate, duration of larval period and larval weight at 6 days and 12 days after hatching were observed on ten different food plants. According to these criteria, til (Sesamum sp.) was the best food plant for larval development, followed by blackgram, sweet potato, soybean, sunflower, cowpea, mungbean, bhant (Clerodendron sp.), peanut and pigeonpea. [THH]

***0742** Mahadevan, N.R. ; Gopalan, M. ; Swamiappan, M. 1978. **Relative incidence of galerucid beetle, Madurasia obscurella Jacoby (Galerucide: coleoptera) on greengram and blackgram varieties.** MADRAS AGRICULTURAL JOURNAL, v.65(11):758-759. [En] (A:PS)

Two randomised block trials were conducted with 21 varieties of mungbean and 9 varieties of blackgram to observe the relative incidence of galerucid beetle (Madurasia obscurella Jacoby) under field conditions in Tamil Nadu, India. The pest damage in mungbean and blackgram ranged from 35.8 to 53.9% and 26.9 to 45.4%, respectively. Mungbean varieties viz., Co 3, ML 6, Co 1, Madiar Mung, and blackgram, C2-48-12 showed significantly less incidence. [THH]

***0743** Singh, O.P. ; Jakhmola, S.S. ; Gangrade, G.A. 1978. **Neue Wirtspflanzen des Ringelbocks, Oberea brevis Swed. (Col., Cerambycidae, Lamiinae) in Indien. = New host plants of the girdle beetle, Oberea brevis Swed. (Col., Cerambycidae, Lamiinea)** ANZEIGER FUR SCHADLINGSKUNDE, PFLANZENSCHUTZ UMWELTSCHUTZ, v.51(6):88-89. [De] [En Abst] (REP.MB-2836)

The girdle beetle, Oberea brevis, is recorded on soybean (Glycine max), beans (Lablab niger), cowpea (Vigna signensis), blackgram (V. mungo) and mungbean (V. radiata) growing in the areas of Uttar Pradesh, and Madhya Pradesh, India. The pest caused up to 36.5% plant mortality. In 1975 and 1976 studies were done to record the host range of O. brevis. The infestation was ascertained by the presence of two parallel girdles, which are made by the female beetles to reduce the moisture content of the plant and to lay the eggs between the girdles. Due to girdling on the plants, the apical parts dry and later drop off and larvae make their tunnels in the lower parts of the plants. Eleven new host plants of O. brevis were recorded. [AS]

***0744** Gupta, B.M. ; Dabi, R.K. ; Gupta, H.C. ; Sharma, S.K. 1979. **Effect of host plants on the larval development of Diacrisia obliqua Walker.** JOURNAL OF ENTOMOLOGICAL RESEARCH, v.3(2):224-226. [En] [En Abst] (REP.MB-2239)

The effect of ten host plants on the larval development of Diacrisia obliqua Walker was studied. On the basis of percentage of larvae surviving, growth index and weight gained by larvae, sesamum was found to be the most preferred food followed by castor, groundnut, mungbean, moth bean, cowpea, pearl millet, cluster bean, pigeonpea and sun hemp. [AS]

***0745** Parihar, D.R. 1979. **Outbreak of Katra, Amsacta moorei pest in the Rajasthan desert.** ANNALS OF ARID ZONE, v.18(1/2):140-141. [En] (REP.MB-2568)

A serious outbreak of Amsacta moorei occurred in the desert region of Rajasthan, India in 1977. Pearl millet, sesame, cluster bean, moth bean and mungbean were severely damaged. The density of A. moorei on various crops was assessed at 4 ecologically different places. The occurrence of the pest was the highest at Nagaur, where the soils are heavy. The infestation of larvae was maximum on mungbean and moth bean, and minimum on pearl millet at all 4 sites. This unusal outbreak of the pest was ascribed to an earlier onset of the monsoon, which caused wetting of soils during the hottest period of the year. This assisted adult emergence and provided ample of food in the form of weeds. A concomitant increase in reproductive activity must also have existed. [THH]

***0746** Prasad, D. ; Premchand 1980. **Growth and development of Diacrisia obliqua Walker on various food plants.** INDIAN JOURNAL OF ENTOMOLOGY, v.42(4):611-616. [En] [En Abst] (REP.MB-2870)

The effect of nine food plants, viz., cowpea (Vigna unguiculata), groundnut (Arachis hypogaea), sunflower (Helianthus annuus), blackgram (Vigna mungo), cotton (Gossypium spp.), alfalfa (Medicago sativa), sorghum (Sorghum vulgare), velvet bean (Mucuna cochinchinensis) and lantana (Lantana camara), on the growth and development of Diacrisia obliqua Walker was studied. None of the larvae survived on sorghum, velvet bean and lantana. On the basis of larval period, larval survival, larval weight, pupal period, pupal weight and sex-ratio of D. obliqua, sunflower was the most favourable food and cowpea was the least. On the basis of the growth index, six of the remaining food plants could be arranged in order of decreasing suitability. Sunflower, cotton, blackgram, alfalfa, cowpea and groundnut. Thus the food plants which were favourable for larval survival were also suitable for rapid development of the insect. In general, food plants which were the best for the development of the insect produced more females and vice versa. [AS/THH]

***0747** Prasad, D. ; Premchand 1980. **Some observations on moulting behaviour and larval mortality of Diacrisia obliqua Walker on different foods.** INDIAN JOURNAL OF ENTOMOLOGY, v.42(4):826-828. [En] (REP.MB-2869)

Laboratory studies on the molting behaviour and larval mortality of Diacrisia obliqua on cowpea, peanut, sunflower, blackgram, cotton and alfalfa were conducted in India. The insect passed through 6 larval instars on all food plants except sunflower, on which larvae had only 5 instars and pupated earlier. On cotton and alfalfa the 4th and 5th instar were extended by one day. The most of larval mortality was observed in the first week. On cowpea the mortality extended up to 12 days. The highest mortality, 50.77%, was recorded on cotton. [AS]

***0748** Premchand 1981. **Presence of feeding deterrent in velvet bean, Mucuna cochinensis Roxb.** INDIAN JOURNAL OF ENTOMOLOGY, v.43:217-219. [En] (REP.MB-2314)

A study was conducted to assess if the leaves of velvet bean (Mucuna cochinchinesis), on which the larvae of Diacrisia obliqua are unable to survive, contained any chemical acting as a feeding deterrent. It was found that coating leaves of soybean, blackgram and rice bean with extracts from velvet bean leaves reduced the percentage of leaf area consumed by D. obliqua. Chemical analysis of mature velvet bean leaves showed the presence of L-Dopa, lower concentrations of compounds which might be tetrahydroisoquinolines, and large amounts of phenolic material. These compounds probably acted as a feeding deterrent. [THH]

***0749** Vyas, H.N. ; Saxena, H.P. 1982. **Comparative efficacy of some insecticides against galerucid beetle, Madurasia obscurella Jacoby, infesting greengram.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.52(10):689-693. [En] [En Abst] (A:PS)

Seed treatment of mungbean [Vigna radiata (Linn.) Wilczek] with carbofuran 4% proved consistently effective against Madurasia obscurella Jacoby, followed

by disulfoton and phorate @ 1.5 kg a.i./ha as well as seed treatment with 4% of these chemicals. Foliar application with 0.04% monocrotophos also considerably reduced the pest damage. [AS]

***0750** Gupta, P.K. ; Singh, J. 1984. **Biology of Madurasia obscurella Jacoby, an important pest of rainy-season pulses.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.54(10):931-934. [En] [En Abst] (A:PS)

The adult galerucid beetle, Madurasia obscurella Jacoby, was found to feed on the leaves and the grubs on the root nodules and root hairs of mungbean [Vigna radiata (L.) Wilczek], blackgram [Vigna mungo (L.) Hepper], cowpea [Vigna unguiculata (L.) Walp. subsp. cylindrica (L.) Van-Eseltine], pigeonpea [Cajanus cajan (L.) Millsp.] and lablab bean [Lablab purpureus (L.) Sweet]. The incubation period varied from 3 to 5 days both in the laboratory and in the field. There were 3 larval instars. The full-grown whitish larvae measured 3.72 to 4.00 mm long and 0.70 to 0.85 mm across the head. The larval period varied from 17 to 26 days. Pupation took place near the roots of host plants in the soil. The white pupae measured 3.13 to 3.58 mm long and 1.53 to 1.86 mm across the mesothorax. The pupal period ranged from 8 to 14 days. In the field two generations/year were noticed on mungbean. The total life cycle ranged from 32 to 44 days. [AS]

***0751** Krishnaiah, K. ; Ramakrishnan, N. ; Reddy, P.C. 1984. **Further trials on control of Spodoptera litura Fab. by nuclear polyhedrosis virus on black gram and groundnut.** INDIAN JOURNAL OF PLANT PROTECTION, v.12(1):81-83. [En] (REP.MB-2789)

Field trials were carried out in Andhra Pradesh, India during the rabi (cool) season of 1983-84 on the effectiveness of nuclear polyhedrosis virus against the noctuid Spodoptera litura on blackgram (Vigna mungo) and groundnut. The virus applied at 1500 or 750 larval equivalents/ha was found to be as effective as the synthetic pyrethroids cypermethrin and fenvalerate, applied at 50 and 60 g/ha, respectively, in controlling the pest and increasing the yield. [PLH]

***0752** Chauhan, R. ; Dahiya, B. ; Singh, Ram ; Gupta, K.R. 1985. **Occurrence and varietal incidence of tarsonemid mite on green gram at Hissar.** INDIAN JOURNAL OF PLANT PROTECTION, v.12(2):156. [En] (REP.MB-2786)

The relative incidence of Tarsonemus sp. on 30 cultivars of mungbean (Vigna radiata) was assessed in Haryana, India, in 1982-1983. All cultivars were infested. Leaf infestation varied from 32.5% in HG 33 to 70.6% in HG 32, and in the remaining 28 cultivars from 40 to 60%. Population density on leaves did not differ significantly between the cultivars. [THH]

***0753** Chhabra, K.S. ; Kooner, B.S. 1985. **Problem of flower shedding caused by thrips, Megalurothrips distalis (Karny), on summer mungbean, Vigna radiata (L.) Wilczek, and its control.** TROPICAL PEST MANAGEMENT, v.31(3):186-188. [En] [En Abst] (A:PS)

Flower shedding in summer mungbean, Vigna radiata (L.) Wilczek, is a common

feature caused by thrips, Megalurothrips distalis (Karny). Eleven insecticides were tested in field trials for the control of thrips in 1982-1984. All the treatments were significantly better in controlling the thrips, reducing flower shedding, increasing the pod numbers and grain yield, in comparison with the control. Increases in yield compared with the control during trials ranged from 85 to 89% (1982), 26 to 96% (1983) and 5 to 194% (1984). Dimethoate gave the highest increases in yield and profit followed by monocrotophos and endosulfan. [AS]

*0754 Chhabra, K.S. ; Kooner, B.S. 1986. **Comparative efficacy of different insecticides in controlling thrips, Megalurothrips distalis (Karny) on summer mungbean, Vigna radiata (L.) Wilczek.** LEGUME RESEARCH, v.9(1):39-42. [En] [En Abst] (A:PS)

Different doses of malathion, dimethoate, oxydemeton methyl and phosphamidon were tested in five field trials for controlling the thrips, Megalurothrips distalis Karny. Higher doses of malathion at 125 G and the rest of the insecticides at 75 g a.i./ha were significantly more effective in controlling thrips and gave substantially higher yields. Dimethoate fetched the maximum net profit of Rs. 2033/ha followed by phosphamidon (Rs. 1731/ha) malathion (Rs. 1662/ha) and oxydemeton methyl (Rs. 1661/ha). [AS/THH]

STORED PESTS

*0755 Chatterji, S. 1953. **On some preservatives against Bruchid pests of stored mung.** SCIENCE AND CULTURE, v.18(7):333. [En] (REP.MB-1114)

Laboratory trials were carried out for controlling the bruchid pests of stored mungbean with both insecticides and vegetable oils. DDT and benzene hexachloride (1:100,000 parts by weight), copper carbonate (1:200), and sodium fluosilicate (1:1600) were quite successful in controlling the bruchids. All the vegetable oils, namely, castor, coconut and mustard oils at the rate of 225 g per 40 kg grains were very effective. [THH]

*0756 Chatterji, S. 1953. **On the infestation of bruchids in milled and unmilled pulse (mung).** SCIENCE AND CULTURE, v.9:305. [En] (REP.MB-0112)

In a laboratory rearing trial with Bruchus analis, the bruchid grubs were unable to complete their life cycle in broken grains of pulses. The reasons are first; the moisture content gets reduced when the grains are broken after milling and second; there is not enough space for pupation in the broken halves as a result of which most of the bruchid grubs die without reaching the adult stage. [THH]

*0757 Mookherjee, P.B. ; Beri, Y.P. ; Sharma, G.C. ; Kumar, S.S. 1960. **Relative efficacy of different types of jute bags against infestation by Callosobruchus maculatus Fab. in stored 'Mung' (Phaseolus aureus).** INDIAN JOURNAL OF ENTOMOLOGY, v.22:237-238. [En] (REP.MB-0944)

The experiments were conducted in small jute bags which were prepared out of four different jute cloths. The bags were filled with sterilized mungbean and were stitched by a spiral seaming method so as not to give any access to the bruchids for entry from the stitched end. Then the bags were separately put in glass jars in which ten pairs of freshly hatched bruchids were introduced. All the jars were kept at a constant temperature of 30 C. Observations carried out for a period of 7 days showed that a number of eggs were laid on mungbeans which were exposed because of looseness of the weave of jute cloth. These studies showed that bruchid infestation in mungbeans stored in jute bags greatly dependent on the type of jute cloth used. [THH]

***0758** Lin, T. 1964. **Laboratory test of chemicals for Callosobruchus chinensis control.** JOURNAL OF TAIWAN AGRICULTURAL RESEARCH, v.13(2):55-58. [Ch] [Ch Abst] (REP.MB-891)
(NOTE: English summary by Chu, Y.I.)

In a laboratory feeding preference trial of Callosobruchus chinensis, insect infestation was maximum on adzuki bean followed by mungbean and minimum on soybean. Pea and peanut were not infested. Mungbeans coated with bromocyclen, chlorbycyclen, premium malathion, malathion and lindane were tested for controlling the pest. On the basis of residual duration of newly hatched larvae, bromocyclen and chlorbycylen were the best and followed by lindane, malathion and premium malathion. A coating of 0.4 to 0.5 kg of 5% bromocyclen or 5% chlorbycylen on 1000 kg seeds was recommended for controlling the pest. This treatment would also prevent infestation of other stored pests. [THH]

***0759** Borkovec, A.B. ; Nagasawa, S. ; Shinohara, H. 1968. **Sterilization of the adzuki bean weevil, Callosobruchus chinensis, by metepa and hempa.** JOURNAL OF ECONOMIC ENTOMOLOGY, v.61(3):695-698. [En] [En Abst] (REP.MB-0370)

Adzuki bean weevils, Callosobruchus chinensis (L.), were sterilized with metepa by topical application, dipping, contact treatment, and fumigation. These methods are suitable for bioassay of metepa and for testing other candidate chemosterilants. The sterilizing effects were permanent and their intensity increased with time elapsed after treatment. With topical application, the median dose that inhibited oviposition was 29.499 microgram per weevil, the LD50 was 177.79 microgram per female and 117.64 microgram per male, and the median sterilizing dose was 0.940 microgram per weevil. When the weevils were dipped in solutions of metepa, hempa, and a 1:19 mixture of metepa and hempa the concentration-unhatchability regression lines were parallel, indicating a similar action of the 2 chemosterilants. In all experiments both sexes were treated with equal amounts of sterilant. Results were analyzed statistically, and appropriate regression equations were calculated. [AS]

***0760** Jotwani, M.G. ; Bori, Y.P. ; Sircar, P. ; Dishpande, A.D.D. 1968. **Neem seed as a protectant against bruchid Callosobruchus maculatus (Fab.) infesting some leguminous seeds.** IN: Proceedings [of the] second annual workshop conference on pulse crops. New Delhi : ICAR. 2p. [En] (REP.MB-1424)

MEETING: Annual Workshop Conference on Pulse Crops, 2nd -- New Delhi, India, Apr 1-3, 1968

Trials were conducted to test the repellent property of neem seed (Azadirachta indica) against one of the most serious storage pests of leguminous seeds Callosobruchus maculatus. The results showed that seeds of mungbean, chickpea, cowpea and pea were effectively protected from the damage by the bruchid for about 8, 11, 9 and 9 months, respectively, by mixing 100 parts of the leguminous seeds with 1 to 2 parts of crushed neem seed. [THH]

*0761 Thontadarya, T.S. ; Rajagopal, D. 1969. **Dri-die as a grain protectant against the pulse beetle, Callosobruchus analis (Fabricius) (Bruchidae, Coleoptera).** MYSORE JOURNAL OF AGRICULTURAL SCIENCES, v.3(4):477-479. [En] (REP.MB-2596)

Dri-Die, a silica aerogel with a sorptive dust, was tested under laboratory conditions in India at four concentrations for the control of Callosobruchus analis (F.) in mungbean seeds. All adult beetles added to seeds mixed with Dri-Die at 0.04 and 0.03% were dead within 6 h. At 0.02 and 0.01%, all adult beetles were dead within 24 and 72 h, respectively. But at 0.01% a large number of beetles emerged after 23 days and survived. [THH]

*0762 Saxena, H.P. ; Sircar, P. ; Phokela, A. 1970. **Results of investigations on pests of pulses conducted during Rabi 1969.** IN: Proceedings [of the] fourth workshop on pulse crops. New Delhi : Indian Council of Agricultural Research. p.193-196. (REP.MB-1458)

MEETING: Workshop on Pulse Crops, 4th -- Ludhiana, India, Apr 7-10, 1970

Seeds of 131 varieties of cowpea and 104 of mungbeans were screened for Callosobruchus maculatus infestation. Only 24 cowpeas and 29 mungbeans were slightly less attacked by bruchids. None of cowpea and mungbean varieties was resistant to bruchid infestation. [THH]

*0763 Bhattacharya, A.K. ; Pant, N.C. 1971. **Factor inhibiting growth of Trogoderma granarium (Coleoptera: Dermestidae) in lentil and French bean: Suppression by addition of natural diets.** JOURNAL OF STORED PRODUCTS RESEARCH, v.6(4):339-345. [En] [En Abst] (REP.MB-2699)

It is demonstrated that wheat flour suppresses the activity of inhibitors and increases the dietary efficiency of lentil (Lens esculenta Moench.) and French bean (Phaseolus vulgaris L.) for Trogoderma granarium Everts. This antagonism of the inhibitory activity is less marked in mungbean (Vigna radiata Wilczek) and least in semisynthetic glucose-brewer's yeast mixture. Such inhibition of the antagonistic property of natural foods has not been demonstrated before in insects. [AS]

*0764 Camarao, G.C. ; Laigo, F.M. ; Raros, R.S. 1971. **Pest succession in stored mungo, corn and sorghum: some observations.** IN: Proceedings [of the] second annual conference [on] corn, sorghum, soybean, mungo and peanut. College, Laguna : Univ. of the Philippines. p.269-276 [En] (REP.MB-1482)

MEETING: Annual Conference [on] Cron, Sorghum, Soybean, Mungo and Peanut, 2nd -- Laguna, UPCA, Philippines, Mar 22-27, 1971

Six species of insects were found in mungbean at 211 days after storage. Injury to seeds was initiated by Callosobruchus sp. which attained the peak damage at about 131-151 days. Adult numbers of Plodia interpunctella also increased at the same time when adults of Callosobruchus sp. exit holes per seed were highest. Damage and broken seeds allow for faster and easier penetration by larvae of P. interpunctella. The continuing utilization of mungbean by Callosobruchus sp. and P. interpunctella resulted in a suitable physical condition for increasing the secondary pests, Tribolium castaneum and Laemopheous pusillus. Rhizopertha dominica was also found in a small amount. [THH]

***0765** Gibson, K.E. ; Raina, A.K. 1972. **A simple laboratory method of determining seed host preference of Bruchidae.** JOURNAL OF ECONOMIC ENTOMOLOGY, v.65(4):1189-1190. [En] (REP.MB-0296)

A simple laboratory method was developed to determine the oviposition preference of adult females of Callosobruchus chinensis and C. maculatus for mature seed of 17 varieties of blackgram. The method can be used with other host seeds and other insects. [THH]

***0766** Seddiqi, P.M. 1972. **Studies on longevity, oviposition, fecundity and development of Callosobruchus chinesis L. (Coleoptera: Bruchidae).** ZEITSHRIFT FUER ANGEWANDTE ENTOMOLOGIE, v.72(1):66-72. [En] [En De Abst] (REP.MB-2702)

The mean time required for incubation of Callosobruchus eggs was 5.5 days, and the larval and pupal periods varied according to the type of leguminous seeds used in this experiment. On kidney beans (Phaseolus vulgaris) the first instar larva died after hatching. The weevils successfully developed on cowpeas, mungbean and chickpea, but they bred poorly on garden peas. Adults longevity was not affected by the type of food. However, the unmated males and unoviposited females and those with a low rate of oviposition lived longer than the others. Single mating was sufficient for fecundity and production of fertilized eggs, but the number of eggs decreased when all females and males were placed together. The weevils showed a considerable preference for oviposition on cowpeas. Other seeds, in a decreasing order, were mungbean, garden peas and chickpea. The fecundity of the weevil increased when smooth and well-filled seeds were provided for oviposition. In general, the bigger the size of the seed, the greater was the number of eggs laid per seed. Some of our results were different from the data reported by other workers. [AS]

***0767** Shivashankar, G. ; Urs, K.C.D. ; Bhat, M.G. ; Vishwanatha, S.R. 1972. **Study of varietal resistance to Callosobruchus chinensis L. in black gram (Phaseolus mungo).** MYSORE JOURNAL OF AGRICULTURAL SCIENCES, v.6(3):360-362. [En] (REP.MB-1030)

A trial was conducted to confirm the resistance of blackgram variety Sindh Khed (medium seed type) to the pulse beetle, Callosobruchus chinensis L. The trial included two local varieties, viz., Local 1 (bold seed type) and Local 2 (small seed type). From the data on number of eggs laid on the seeds and number of holes made on the seeds by adults, Sindh Khed showed a high degree of resistance towards Callosobruchus chinensis. [THH]

*0768 Gokhale, V.G. 1973. **Developmental compatibility of several pulses in the Bruchidae. 1. Growth and development of Callosobruchus maculatus (Fabricius) on host seeds.** BULLETIN OF GRAIN TECHNOLOGY, v.11(1):28-31. [En] [En Abst] (REP.MB-1703)

The growth and development of Callosobruchus maculatus (F.) was studied on thirteen seed species. On the basis of growth index, moth bean proved to be of maximum food value to the insect followed by mungbean, pigeonpea, cowpea, Bengal gram, chickpea, blackgram, pea and hyacinth bean in descending order. The insect, however, completely failed to develop on soybean, lima bean, French bean and lentil. The implications of these results have been discussed in light of some previous inconsistent reports. A considerable variation in the mean weight of the adults of either sex emerging from the favourable seed species was observed. Similarly an appreciable difference in the mean weight of the adults emerging from different seed-species was also recorded. [AS]

*0769 Rao, H.N.M. ; Ramesh, A.N. ; Kulkarni, S. ; Rao, M.S. 1973. **A survey on storage infestation in Bombay warehouses.** BULLETIN OF GRAIN TECHNOLOGY, v.11(3/4):222-224. [En] (REP.MB-2856)

Twenty four stored pests were found in samples of various agricultural commodities including rice, wheat, pigeonpeas, mungbean, crushed bone and mamda cake from 75 warehouses in Bombay, India. [THH]

*0770 Srivastava, B.K. ; Gokhale, V.G. ; Sharma, M.M. 1973. **Development of Tribolium castaneum (Herbst) (Coleoptera: Tenebrionidae) on the flours of raw and autoclaved pulses and wheat.** JOURNAL OF STORED PRODUCTS RESEARCH, v.9(2):143-145. [En] (REP.MB-2687)

Feeding Tribolium castaneum on mungbean (Vigna radiata), blackgram (V. mungo), kidney bean (Phaseolus vulgaris), moth bean (V. aconitifolia), peas (Pisum sativum), pigeonpea (Cajanus cajan), lentil (Lens culinaris), lablab bean (Dolichos lablab) and wheat (Triticum aestivum) was studied by using autoclaved and raw flours under laboratory conditions in India. The highest number of adults emerged from autoclaved and raw flours was obtained from mungbean, followed by moth bean. [THH]

*0771 Amaritsuth, Wanbhen ; Amaritsuth, Wisuthi ; Knapp, F.W. 1974. **Stored grain insect studies. 1. Susceptibility of the bean and rice weevil to three insecticides. 2. Resistance of mung bean and sorghum seed to laboratory infestations of bean and rice weevil.** THAI JOURNAL OF AGRICULTURAL SCIENCE, v.7(1):63-70. [En] [En Abst] (REP.MB-1863)

Chlorpyrifos was found to be more effective in protecting mungbean and sorghum seed from the bean and rice weevil than malathion and malathion was more effective than DDT. Seed germination was not affected by these treatments. Two varieties of mungbean, Black seed and Golden M-B, were found to be significantly more resistant to the bean weevil than the local variety. Noticeable differences in resistance to rice weevil were found among the sorghum varieties, but only two were significantly less resistant than the common Hegari variety now being grown. [AS]

***0772** Girish, G.K. ; Singh, Karan ; Krishnamurthy, K. 1974. **Studies on the oviposition and development of Callosobruchus maculatus (Fab.) on various stored pulses.** BULLETIN OF GRAIN TECHNOLOGY, v.12(2):113-116. [En] [En Abst] (REP.MB-2855)

The oviposition and development of Callosobruchus maculatus (Fab.) on a few stored pulses were studied. The beetle seemed to be guided in its oviposition on preferences by smoothness of surface of seed coat and size of the grains. Oil treated and dehusked grain were not much preferred for oviposition. Soybean does not seem to be an ideal host for the development of this pest. The soybean, chicken pea and pea were more preferred for oviposition. The development of the larvae was not found better on those grain which were preferred by this beetle for oviposition. [AS]

***0773** Srinath, D. ; Ragunathan, A.N. ; Majumder, S.K. 1974. **Microflora in the pupae of stored product insects.** BULLETIN OF GRAIN TECHNOLOGY, v.12(1):32-35. [En] [En Abst] (REP.MB-2225)

Studies on the pupal microflora of Sitophilus oryzae, L., Tribolium castaneum, Herbst; Trogoderma granarium, Everts, Callosobruchus chinensis, Corcyra cephalonica St., and Ephestia cautella Walker, have been conducted. It was found that none of the pupae were microbiologically sterile. It is concluded that the pupa of stored product insects screened act as a carrier of several toxigenic and saprophytic food spoilage microbes from its larval stage to the freshly emerging adults. [AS]

***0774** Doria, R.C. ; Raros, R.S. 1975. **Varietal resistance of mungo to the bean weevil, Callosobruchus chinensis (Linn.) and some characteristics of field infestation.** PHILIPPINE ENTOMOLOGIST, v.2(6):399-408. [En] [En Abst] (REP.MB-2558)

The oviposition preference and survival of Callosobruchus chinensis (Linn.) on mungbean pods of different stages of maturity were observed. The green stage was least preferred for oviposition, with few surviving eggs, larvae and plenty of adults; the black stage was preferred and with small number of trapped adults. Early harvesting is suggested to minimize infestation. The resistance of 20 varieties and 46 accessions of mungbean against C. chinensis (Linn.) was also evaluated. None of the varieties was resistant to oviposition, but resistance to larval survival was evident with EG Glabrous, EGMG 4 and EGMG 7. The mungbean accession numbers 23, 25 and 325 of UPCA were resistant to oviposition and larval survival. [AS]

***0775** Chaudhary, R.R.P. ; Bhattacharya, A.K. 1976. **Larval development behaviour of Ephestia cautella (Walker) on several food commodities.** BULLETIN OF GRAIN TECHNOLOGY, v.14(1):3-8. [En] [En Abst] (REP.MB-2837)

The almond moth, Ephestia cautella (Walker) was reared on individual food material at 30 [plus or minus] 1 C, 80 [plus or minus] 5 % RH and 12 hour light: 12 hour dark photoperiod. Food materials used for this experiment included wheat (Triticum aestivum L.), maize (Zea mays L.), bajra (Pennisetum typhoideum Pers.), mungbean (Vigna radiata Wilczek), blackgram (V. mungo Hepper), red gram [Cajanus cajan (L) Millsp.], lentil (Lens esculenta Moench.), soybean [Glycine max (L) Merril], bengal gram (Cicer arietinum L.), French bean

(P. vulgaris L.) and cowpea [Vigna sinensis (L.) Walp]. Each food commodity was offered in four different forms: whole grain, whole grain flour, whole grain flour plus 5% brewer's yeast and autoclaved whole grain flour plus 5% brewer's yeast. The average developmental period, percent adult emergence and growth index were computed to compare the dietary effeciency of individual food material. Results showed that larvae were unable to develop on whole blackgram grain and whole lentil grain while on grains of other commodities developmental period was prolonged considerably. Faster development of the larva was observed on flours of all the commodities tested. Addition of 5% brewer's yeast to maize, bajra or mungbean improved the quality of the diet. Similarly, autoclaving of French bean or blackgram flour for 30 minutes at 10 lbs pressure also improved the dietary value of these commodities. It is also established that soybean is susceptible to this pest. [AS]

***0776** Gujar, G.T. 1976. **Studies on the quantitative and qualitative feeding of bruchids, Callosobruchus maculatus (Fabricius) and C. chinensis (Linnaeus).** ENTOMOLOGISTS' NEWSLETTER, v.6(2):23. [En] (REP.MB-2757)

Feeding Callosobruchus maculatus and C. chinensis on mungbean, measured by weight loss of mungbean seeds, was studied at different humidities under laboratory conditions in India. There were three distinct stages of feeding cycle in developing larva of bruchid. The first stage, 12 days in C. maculatus and 9 days in C. chinensis, was marked by very slow feeding. The next stage, lasting for 27 days in C. maculatus and 22 days in C. chinensis, was characterized by very rapid feeding and the highest gain in larval weight. During the final stage, 4 days in C. maculatus and C. chinensis, bruchid weight declined. The rate of feeding measured by regression equation was not very different. Utilization of food varied from 29.92 to 51.10% in C. maculatus under different humidities and 26.0 to 45.6% in C. chinensis. C. maculatus was heavier than C. chinensis, but was less injurious. Significant loss in germination was associated in the first 9 to 12 days after oviposition by both bruchids. [THH]

***0777** Kundra, S. 1976. **Some observations on the biology of Dinarmus vagabundus Timberlake (Pteromalidae: Hymenoptera).** BULLETIN OF GRAIN TECHNOLOGY, v.14(2):126-129. [En] [En Abst] (REP.MB-2840)

Dinarmus vagabundus Timb. is a parasite on the larvae of species of Callosobruchus which attack different edible pulses. The parasite is commonly seen in the infested pulses during the hot months while its activities are slowed down during winter. The copulation lasts for about 15 to 45 seconds before which the male pursues the female for some time till a successful mating occurs. A single male can copulate with as many as 38 females. The copulated female lays its eggs on the surface of the larva by piercing its ovipositor through the seed coat. The unmated individuals live for about double the time as the mated ones. The average life span of the copulated females and males is about 4 days in summer and 8 days in winter. The proportion of males: females is about 1:1 during moderate temperature and relative humidity whereas it approaches 1:2 at higher temperatures. [AS]

***0778** Singh, Y. 1976. **Studies on relative resistance of important pulses to Callosobruchus maculatus (Fabricius) and Callosobruchus chinensis (Linnaeus).** ENTOMOLOGISTS' NEWSLETTER, v.6(2):18-19. [En] (REP.MB-2756)

The effects of 8 varieties each of mungbean, blackgram, pea, cowpea, lentil, chickpea, and pigeonpea on the feeding and development of Callosobruchus maculatus (F.) and C. chinensis (L.) were studied by using whole, decorticated, and autoclaved grains under laboratory conditions in India. C. chinensis preferred cowpea, followed by lentil, pigeonpea, mungbean, chickpea, pea, blackgram and C. maculatus preferred mungbean, followed by cowpea, pigeonpea, chickpea, blackgram, pea, and lentil. No significant difference between bruchid growth and development on the different varieties of the same food plant was observed, although there were significant differences among the different plant species. Mixing lentil flour with mungbean flour had a deleterious effect on the growth and development of C. maculatus, and similarly mixing blackgram flour with mungbean flour affected C. chinensis. Extracts of lentil flour mixed with the preferred mungbean flour did not produce any adverse effect on the growth and development of two beetles. Extracts of blackgram flour had no effect on C. maculatus and only hydrochloric acid extract of blackgram affected C. chinensis. [THH]

***0779** Huque, H. ; Khan, M.A. 1977. **Possibilites de lutte contre "Callosobruchus subinnotatus Pic" (Bruchidae) au moyen de rayons gamma. = Possibilities of controlling Callosobruchus subinnotatus Pic. (Bruchidae) by gamma rays** FOOD IRRADIATION, v.42(1):202-206. [Fr] [En] (REP.MB-1502)
(NOTE: English translated by Prof. M.J. Li)

The eggs and larvae of Callosobruchus subinotatus irradiated with gamma rays of 2.5 to 20 kR. No eggs hatched after irradiation at 3 kR. All larvae were dead in 7 days after irradiation at 5 kR. A dose of 20 kR reduced emergence of adults by 99.17%. The sterilization of adult males and females can be obtained with a dose of 5 kR. [THH]

***0780** Gujar, G.T. ; Yadav, T.D. 1978. **Feeding of Callosobruchus maculatuts (Fab.) and Callosobruchus chinensis (Linn.) in green gram.** INDIAN JOURNAL OF ENTOMOLOGY, v.40(2):108-112. [En] [En Abst] (REP.MB-2547)

Qualitative and quantitative feeding by developing stages of Callosobruchus maculatus (Fab.) and Callosobruchus chinensis (Linn.) were estimated on mungbean seed at 30, 50, 70, and 90% relative humidity at a constant temperature of 27 [plus or minus] 1.5 C. The feeding as loss in weight of seed progressed in three stages corresponding with early, mid and late stages of development. The relative humidity significantly affected the feeding besides sex and type of species. The ratio of food eaten by C. maculatus to C. chinensis was 1.45:1.00 and the corresponding ratio of emerged adult weight was 1.60:1.00. The weight loss in seed ranged from 55.6 to 60.0% for C. maculatus and 30.2 to 55.7 for C. chinensis. The loss in protein was from 44.5 to 66.3% by C. maculatus and 17.0 to 53.5% by C. chinensis. [AS]

***0781** Verma, B.K. ; Pandey, G.P. 1978. **Treatment of stored greengram seed with edible oils for protection from Callosobruchus maculatus (Fabr.).** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.48(2):72-75. [En] [En Abst] (REP.MB-2173)

The fecundity of Callosobruchus maculatus (Fabr.) was inhibited when stored seed of mungbean was treated with the oils of coconut, mustard, groundnut, sesame and sunflower @ 0.3 parts/100 parts (w/w). Oviposition was completely

inhibited when coconut and mustard oils were used, and very few eggs were found in mungbean seeds treated with groundnut, sesame and sunflower oils. The development of adult population of the pulse beetle was prevented at least for 5 months, and the germination or viability of the treated seeds was not affected. Coconut oil was the best protectant, followed by mustard, groundnut and sesame oils. [AS]

***0782** Janardan, K.G. 1980. **A stochastic model for the study of oviposition evolution of the pest Callosobruchus maculatus on mung beans, Phaseolus aureus.** MATHEMATICAL BIOSCIENCES, v.50(3/4):231-238. [En] [En Abst] (REP.MB-2739)

Mitchell (1975) experimentally investigated the oviposition behavior of bruchid beetles on mungbean. A stochastic model was developed to study the oviposition tactics of the bean weevils on beans. This model identifies an avoidance probability that is invariant among weevils, and explains the nuances in egg laying behavior of different weevils by varying the rate parameter [lambda] alone. [AS]

***0783** Singh, Y. ; Saxena, H.P. ; Singh, K.M. 1980. **Exploration of resistance to pulse beetles. 4. Influence of black gram flour on the growth and development of Callosobruchus chinensis Linnaeus.** INDIAN JOURNAL OF ENTOMOLOGY, v.42(4):690-695. [En] [En Abst] (REP.MB-2282)

Callosobruchus chinensis Linn. was reared for the first time on the flour of pulse filled in the gelatin capsules. It was observed that increasing the levels of blackgram flour in the flour mixture of mungbean considerably prolonged the developmental period. The combined larval and pupal development took 38.5 days in the flour mixture of mungbean and blackgram (1:0.6), as against 19.36 days in the mungbean flour alone. With further increase in the level of blackgram flour, not a single larva could complete its development. Other life processes, viz., adult emergence, fecundity and weight of both the larva and adult beetle were impaired with the increase in the levels of blackgram content in the food mixtures. There was significant difference in the response due to mixing of blackgram flour upto the ratio of 1:0.05 which is apparent from the variations in the growth indices. A positive correlation existed between increasing proportions of mungbean flour and the growth index of C. chinensis, whereas, a negative correlation was established between the developmental period and the growth index of this pulse beetle in different levels of blackgram flour in the food mixture. Thus, it has been clearly demonstrated that blackgram is completely unsuitable for C. chinensis and there is some chemical factor which is responsible for the inhibition of growth and development of the pest. [AS]

***0784** Singh, Y. ; Saxena, H.P. ; Singh, K.M. 1980. **Exploration of resistance to pulse beetles. 6. Resistance factors.** INDIAN JOURNAL OF ENTOMOLOGY, v.42(4):701-712. [En] [En Abst] (REP.MB-2283)

Among the various extracts of blackgram, only 0.05 N HCl extract inhibited the growth and development of Callosobruchus chinensis Linn. On the other hand, extracts of blackgram, viz., water, 50% alcohol, absolute alcohol, acetone and also 0.05 N HCl failed to cause any adverse effect on the growth and development of Callosobruchus maculatus Fab. Lentil extracts also did not cause any inhibitory effect on the growth and development of both C. chinensis and C.

maculatus. It was demonstrated that the HCl extract of blackgram contained some growth inhibitor which could be further exploited for incorporating resistance in pulses like mungbean against C. chinensis. [AS]

*0785 Pandey, G.P. ; Doharey, R.B. ; Varma, B.K. 1981. **Efficacy of some vegetable oils for protecting greengram against the attack of Callosobruchus maculatus (Fabr.).** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.51(12):910-912. [En] [En Abst] (A:PS)

The seeds of mungbean [Vigna radiata (Linn.) Wilczek] could be protected against Callosobruchus maculatus (Fabr.) for 5-6 months by treating them with the oils of sal (Shorea robusta), cotton seed and rice bran at 0.3 and 0.5% concentrations (W/W). The rancidity measured in terms of alcoholic acidity and FFA did not increase significantly in treated seeds, nor was their viability affected. [AS]

*0786 Talekar, N.S. ; Lin, Y.H. 1981. **Two sources with differing modes of resistance to Callosobruchus chinensis in mungbean.** JOURNAL OF ECONOMIC ENTOMOLOGY, v.74(5):639-642. [En] [En Abst] (AVRDC/JP/64) (REP.MB-2288)

Field and laboratory experiments with mungbean, Vigna radiata (L.) Wilczek, led to the identification of two sources with different modes of resistance to Callosobruchus chinensis (L.). Mungbean accession 2011 was least damaged when the insect infestation occurred in the field, whereas in the laboratory experiment with seeds, accession 2164 was highly resistant. Hairiness of the pod in the case of the former and seed coat hardness or possibly antibiosis in the latter are believed to be the causes of the resistance. [AS]

*0787 Singh, D.P. ; Sharma, S.S. 1982. **Studies on grain damage and germination loss caused by Callosobruchus maculatus Fab. in different varieties of moong and mash during storage.** BULLETIN OF GRAIN TECHNOLOGY, v.20(1):20-24. [En] [En Abst] (REP.MB-2526)

Studies under fluctuating laboratory conditions indicated that the grain damage and loss of germination due to Callosobruchus maculatus Fab. was significantly higher in mungbean varieties (ML 5, G 65 and Shining Moong No.1) than that in blackgram varieties (T 9 and Mash 1-1). The range of damaged grains varied from 42.53 to 57.77% and 7.97 to 10.20% in mungbean and blackgram varieties, respectively, while the loss in germination varied from 47.53 to 70.60% in mungbean varieties and 14.13 to 19.76% in blackgram varieties after five months of storage. [AS]

*0788 Doharey, R.B. ; Katiyar, R.N. ; Singh, K.M. 1983. **Ecotoxicological studies on pulse beetles infesting green gram. 2. Studies on the qualitative losses caused by pulse beetles in green gram, Vigna radiata (L.) Wilczek.** BULLETIN OF GRAIN TECHNOLOGY, v.21(2):110-114. [En] [En Abst] (REP.MB-2886)

The qualitative losses in mungbean PS 16 variety caused by Callosobruchus chinensis L. and Callosobruchus maculatus F. during storage were evaluated. The protein content of the mungbean variety PS 16 ranged from 22.15 to 32.34% in the control, 22.15 to 47.14% in the seeds infested by C. chinensis and 22.15 to

57.55% in the seeds infested by C. maculatus after initial to 120 days storage period. The increase of protein content in the infested samples was postulated due to increase in uric acid, insect fragments respiration loss of carbohydrates. Free fat acidity ranged from 56.02 to 67.63 mg, 56.02 to 139.18 mg and 56.02 to 145.45 mg of KOH/100g seeds and alcoholic soluble acidity 0.0925 to 0.1400 mg, 0.0925 to 0.3050 mg and 0.0925 to 0.4100 mg of H2SO4/100g seeds in control and seeds infested by C. chinensis and C. maculatus, respectively, after initial to 120 days storage period. However, both the acidities were recorded higher in the infested samples than the control, probably due to breakdown of fats by lipolytic enzymes secreted by insects and other biochemical changes. The seeds infested by C. maculatus showed high acidity as compared with C. chinensis. [AS]

***0789** Epino, P.B. ; Morallo-Rejesus, B. 1983. **Physico-chemical properties of mungbean (Vigna radiata (L) Wilczek) seeds in relation to weevil resistance.** PHILIPPINE ENTOMOLOGIST, v.5(5-6):607-620. (A:PS)

The physical characteristics and chemical components of mungbean seeds were correlated with varietal susceptibility. Hard, big and heavy seeds were more preferred by the weevil (Callosobruchus chinensis) for oviposition. Heavy seeds were also more susceptible to weevil damage. The resistant accession had a lower percentage of fat and starch but a higher percentage of protein than the susceptible counterpart. [AS]

***0790** Rajapakse, R.H.S. ; Kulasekera, V.L. ; Charles, S.K. 1983. **Laboratory studies on the rate of development and oviposition of Callosobruchus chinensis L. on different varieties of green gram (Phaseolus aureus Roxb.).** BEITRAEGE ZUR TROPISCHEN LANDWIRTSCHAFT VETERINAERMEDIZIN, v.21(3):347-353. [En] [En De Fr Es Ru Abst] (REP.MB-2692)

Callosobruchus chinensis L. (Coleoptera: Bruchidae) attacks mungbean (Vigna radiata Wilczek). The influence was studied of the temperature, relative humidity, and host plant variety on its development and oviposition. The egg period was shortest at 70% relative humidity and longest at 30%. The percentage hatch exceeded 80% between 20 C and 30 C, whereas no eggs hatched at 40 C. The highest hatch rate (more than 90%) was observed at 70% relative humidity, the lowest at 90%. The mean developmental period was shortest at 30 C and 70% relative humidity. Most beetles emerged at 25 C. Out of the varieties tested, Utong I, H 101, and CES 87 were found to be relatively resistant to beetle damage (lower development of adults with prolonged developmental periods), whereas MI 3, Local CV 1 and Type 51 were highly susceptible. Under experimental conditions, the highest number of eggs were laid on the first day. [AS]

***0791** Doharey, R.B. ; Katiyar, R.N. ; Singh, K.M. 1984. **Ecotoxicological studies on pulse beetles infesting green gram. 7. Effect of moisture content on the efficacy of edible oils for the protection of green gram Vigna radiata (L.) Wilczek against pulse beetles.** INDIAN JOURNAL OF ENTOMOLOGY, v.46(3):370-372. [En] (REP.MB-2864)

Mungbean seeds with moisture content of 9.6, 10.8 and 12.8% were treated with 1.0% concentration of edible oils and malathion at 0.001% to control the emergence of Callosobruchus chinensis and C. maculatus. Coconut, peanut,

mustard, rice bran, sesame, sunflower and taramira (Eruca sativa) oils and malathion were effective at 9.6 and 10.8% moisture contents and safflower oil at 9.6% moisture content. [THH]

***0792** Pranata, R.I. 1984. **Possibility of using turmeric (Cucuma longa L.) for controlling storage insects.** BIOTROP NEWSLETTER, no.45:3. [En] (A:PS)

Turmeric powder was tested for controlling the storage pest Callosobruchus maculatus on mungbean in Indonesia. The adult females were more tolerant than adult males. LD 50 and LD 99.99 for males were 0.01 ppm and 1.5 ppm, respectively, and for females 0.05 ppm and 4.1 ppm. Turmeric extract was 5-10 times less toxic to the pest than synthetic insecticides and was 100-1000 times more toxic than other insecticides of plant origin such as neem extract or black pepper. [THH]

***0793** Sharma, A.K. ; Srivastava, R.C. 1984. **Effect of groundnut oil on the embryonic development of Callosobruchus chinensis L.** BULLETIN OF GRAIN TECHNOLOGY, v.22(3):221-224. [En] [En Abst] (REP.MB-2780)

On seeds of mungbean [Vigna radiata (L) Wilczek], treated with groundnut oil (8 ml/kg), the density eggs laid by C. chinensis was reduced by 90%. 90% of the eggs, however, affixed on oil treated seeds died within 48 h as a result of coagulation of protoplasmic contents in the embryo. In the remaining 10% eggs, the initiation of embryonic development could be observed upto certain extent but the embryo died thereafter. [AS]

***0794** Watanabe, N. 1984. **Comparative studies on ecology of the Adzuki bean weevil, Callosobruchus chinensis (L.) and the cowpea weevil, C. maculatus (F.) (Coleoptera: Bruchidae). 1. Effect of seed size on creeping of females into the pile.** JAPANESE JOURNAL OF APPLIED ENTOMOLOGY AND ZOOLOGY, v.28(4):223-228. [Ja] [En Abst] (REP.MB-2704)

Legume seeds (25 ml) were placed in a test tube (2.2 cm in diameter) and five of the adults were released in the tube. After all the adults had died, the number of eggs deposited on the surface of seeds were counted. This test was done with seeds of four species having different sizes in descending order: Pisum sativum, large Vigna angularis, V. unguiculata, normal V. angularis, small V. radiata. In P. sativum both species of beetle (C. chinensis and C. maculatus) distributed their eggs evenly on each seed. While in the pulses having relatively smaller size of seed, C. maculatus could deposit their eggs much deeper than C. chinensis. The measurement of the length, width and thickness of the body indicated that C. maculatus had apparently a slimmer and flatter body than C. chinensis. This might enable C. maculatus to creep into the grain pile more easily than C. chinensis. [AS]

***0795** Hu, T. ; Tsai, L.T. ; Fu, Y.K. ; Shen, M.L. 1985. **Utilization of gamma ray for insect pest control of bagged mungbean and adzuki bean.** PLANT PROTECTION BULLETIN (R.O.C.), v.27(1):63-68. [Ch] [En Abst] (A:PS)

The mungbean and adzuki bean packed in polyethylene bag were irradiated by gamma rays at the dose of 100 Gy (10 Krad) and stored for 3 months in an

incubator at 25 [plus or minus] 2 C. The number of cowpea weevils (Callosobruchus chinensis L.) per bag, no. of riddled seeds per 100 seeds, and no. of eggs of the weevil per 30 seeds in the irradiated bags were significantly less than those in the untreated ones. The cooking quality and mungbean sprouts produced from the beans treated at 100 Gy were not different from the untreated. [AS]

*0796 Sujatha, A. ; Punnaiah, K.C. 1985. **Effect of coating stored seed of greengram with vegetable oils on the development of pulse beetle.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.55(7):475-477. [En] [En Abst] (REP.MB-2888)

Stored seed of mungbean [Vigna radiata (Linn.) Wilczek] could be effectively protected from the pulse beetle, Callosobruchus chinensis (Linn.), when the seed was treated with 0.25% concentration of the oils of sesamum (Sesamum indicum Linn.), capol (cottonseed oil), oilpalm (Elaeis guineensis Jacq.) and neem (Azadirachta indica A. Juss.). When the oils of groundnut (Arachis hypogaea Linn.) and coconut (Cocos nucifera Linn.) were used, the effective concentration was found to be 0.5%. All the oils recorded lesser infestation at 0.125% than the control. The groundnut or coconut oil at 0.5% and gingelly sesamum, capol, oilpalm or neem oil at 0.25% were found to be effective in protecting the mungbean against the pulse beetle. [AS]

*0797 Chandrakantha, J. ; Mathavan, S. 1986. **Changes in developmental rates and biomass energy in Callosobruchus maculatus (F.) (Coleoptera: Bruchidae) reared on different foods and temperatures.** JOURNAL OF STORED PRODUCTS RESEARCH, v.22(2):71-75. [En] [En Abst] (REP.MB-2860)

The developmental rates and corresponding changes in the biomass of life stages of Callosobruchus maculatus were studied as functions of food type and temperature. The growth rate of C. maculatus was faster when reared on stored seeds of Vigna unguiculata (cowpea) followed by V. radiata (mungbean) and Dolichos lablab (lablab bean). Larval periods were longer when C. maculatus was reared on D. lablab than when reared on V. radiata and V. unguiculata. Survival and the growth response of C. maculatus were observed at 20-35 C and were the greatest at 30 C and the least at 35 C. Cowpea, V. unguiculata, and environmental temperature of 30 C appear to be the optimal factors of those studied for the build up of C. maculatus populations. [AS]

*0798 Slamet, M. ; Sosromarsono, S. ; Wardojo, S. ; Koswara, J. 1986. **Biology of the southern cowpea weevil Callosobruchus chinensis (L), (Coleoptera: Bruchidae) on mungbean.** AGRIKAM: BULETIN PENELITIAN PERTANIAN MAROS (MAROS AGRICULTURAL RESEARCH BULLETIN), v.1(1):22-26. [In] [En] [En Abst] (REP.MB-2839)

The biology of Callosobruchus chinensis was studied using the mungbean cultivar Bhakti. The temperature during the study ranged from 24.6 to 30.8 C and the relative humidity from 67.8 to 82.6%. The results showed that a pair laid an average of 73.2 eggs, with a maximum of 142 eggs. The eggs' hatchability was 86.5% and the mortality of larvae, pupae and adults in the seed was less than 3% each. The life cycle of C. chinensis ranged from 21 to 31 days with an average of 22.9 days. The duration of egg, larvae, pupae and imago in seed was 4.5, 12.2, 5.9, and 4.9 days, respectively. Lifespan of mated

insects ranged from 5 to 10 days for females and 5 to 8 days for males. However, lifespan of non-mated insects was between 9 and 21 days for females, and between 5 and 12 days for males. The larval stage consisted of four instars each lasting 2.3, 2.7, 3.7 and 4.9 days, respectively. [AS]

***0799** Fujii, K. ; Miyazaki, S. 1987. **Infestation resistance of wild legumes (Vigna sublobata) to adzuki bean weevil, Callosobruchus chinensis (L.) (Coleoptera: Bruchidae) and its relationship with cytogenetic classification.** APPLIED ENTOMOLOGY AND ZOOLOGY, v.22(2):229-230. [En] (A:PS)

The ability to infest various species of beans in genus Vigna by adzuki weevil (Callosobruchus chinensis) was discussed. The present study supports the results of previous cytogentic studies which suggested the existence of two groups within wild Vigna species, V. mungo var. silvestris (Syn. V. sublobata, race I), and V. radiata var. sublobata (Syn. V. sublobata, race II), the supposed progenitors of V. mungo and V. radiata, respectively. In view of the immediate deaths of bean weevil larvae upon feeding, the feeding deterrent in V. mungo and V. sublobata race I seems not to be due to the lack of nutritional elements for C. chinensis but rather to the existence of some toxic chemicals. Further studies with other bean weevils are required. [THH]

***0800** Thanthianga, C. ; Mitchell, R. 1987. **Vibrations mediate prudent resource exploitation by competing larvae of the bruchid bean weevil Callosobruchus maculatus.** ENTOMOLOGIA EXPERIMENTALIS ET APPLICATA, v.44(1):15-21. [En] [En Abst] (A:PS)

Larvae of the bean weevil C. maculatus feeding in a single bean apparently respond to vibrations from each other's chewing: one larva feeds normally, the other is inhibited. If the burrows of the larvae intersect, the inhibited larva dies. If the dominant larva pupates or dies without the burrows intersecting, the inhibited larvae then feeds and matures if enough food remains. Since females add second eggs to the largest beans after most beans carry a single egg, competition is most common in the largest available beans, precisely where inhibited larvae can benefit from avoiding a contest. [AS]

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A Bibliography

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Foreword

Less than thirty years ago, serious agricultural researchers could maintain contact with nearly all of the significant contributors in their field of interest. Research literature was also manageable and it was not uncommon to see a stock of white cards on an investigator's desk which held summaries of the most pertinent literature of the period. Currently, in any one field, there may be 300-500 researchers, and each month in the field of agro-biology there is generated more than a 2 meter long shelf of scientific literature.

This information explosion is both wonderful and frustrating. In sophisticated places of research, information retrieval is aided by computers; but even so, in-depth search of the actual literature must be made. In many parts of the world, literature search is a major constraint for researchers. Libraries may be far away, inadequate or difficult to access.

Bibliographies are often a great boon to investigators in developing countries. They provide a measure of awareness and currency of information, at least to the date of publication. It is to this aim that the AVRDC bibliography series is dedicated. Your suggestions as to how we may better serve the vegetable researchers in the humid tropics would be most welcome.

George A. Marlowe
Director General

EXPLANTORY NOTE

SAMPLE ENTRY

Document No. — Author — Year — Title

*0001 Asian Vegetable Research and Development Center. 1974. The mungbean. ASIAN VEGETABLE RESEARCH AND DEVELOPMENT CENTER, ANNUAL REPORT, 1973:10-22. [En] (S542.A8 1973)

Language — Call Number — Source

Abstract

In the last half of 1972 until the end of 1973, the AVRDC mungbean program was concentrated on collecting as many cultivars as possible from world sources, then to screen.... [PLH]

Abstractor/Translator

LANGUAGE CODES

Ch - Chinese	**Hi** - Hindi	**Nl** - Dutch (Flemish)
De - German	**In** - Indonesian	**Ru** - Russian
En - English	**It** - Italian	**Th** - Thai
Es - Spanish	**Ja** - Japanese	
Fr - French	**Ko** - Korean	

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DISEASES AND INSECT PESTS - GENERAL

***0001** Asian Vegetable Research and Development Center. 1974. **The mungbean.** ASIAN VEGETABLE RESEARCH AND DEVELOPMENT CENTER, ANNUAL REPORT, 1973:10-22. [En] (S542.A8 1973)

In the last half of 1972 until the end of 1973, the AVRDC mungbean program was concentrated on collecting as many cultivars as possible from world sources, then to screen this collection for response to population density, day-length and other climatic variations and for resistance to insect and disease attack. In addition, the basic physiology of this crop was studied to understand better critera for selection of the breeding materials. A brief description of the status of breeding program was included. [PLH]

***0002** Asian Vegetable Research and Development Center. 1975. **Mungbean.** ASIAN VEGETABLE RESEARCH AND DEVELOPMENT CENTER, ANNUAL REPORT, 1974:29-51. [En] (S542.A8 1974)

In 1974, the world collection of mungbean germplasm was increased by 546 cultivars and totaled 2,362 accessions at the end of the year. This germplasm was shared with 24 scientists in 15 different countries. A cultivar from Taiwan, Tainan 1, produced a yield of 2.46 t/ha in a yield trial at AVRDC. Twenty cultivars produced a mean yield of 1.86 t/ha or about triple that obtained by most farmers in Southeast Asia. The most significant findings in 1974 were the identification of sources or resistance to several important mungbean diseases. Three cultivars were consistently resistant to Cercospora leaf spot. V. 1140 was determined to be immune to powdery mildew (Erysiphe polygoni). More than 350 F3 seeds were collected from an interspecific cross between mungbean and rice bean. [PLH]

***0003** Asian Vegetable Research and Development Center. 1976. **Sprouts of energy: 1975 mungbean highlights.** ASIAN VEGETABLE RESEARCH AND DEVELOPMENT CENTER, PROGRESS REPORT, 1975:25-30. [En] (S542.A8p 1975)

In 1975, mungbean germplasm collection contained almost 4,000 entries at the end of the year. V 2184 had an average yield of 1800 kg/ha. Ten cultivars were found to be resistant to Cercospora leaf spot, and another six were resistant to Rhizoctonia sp., Pythius sp. and Fusarium sp. V 1735 was the least infested by beanfly. Beanfly control in mungbean was successfully attained by applying carbofuran G at 2 kg a.i./ha to soil at planting or by spraying Hostathion weekly at 0.25 kg a.i./ha. [PLH]

***0004** Asian Vegetable Research and Development Center. 1977. **Mungbean.** ASIAN VEGETABLE RESEARCH AND DEVELOPMENT CENTER, PROGRESS REPORT, 1976:61-67. [En] (S542.A8p 1976)

In a series of field screenings using artificial inoculation, 12 cultivars were resistant to powdery mildew, 17 cultivars were resistant to Cercospora leaf spot, and 23 cultivars were resistant to MMV. BCM at 1.5 g a.i./l and benomyl at 0.6 g a.i./l provided the best protection from Cercospora leaf spot in a summer planting of a highly susceptible cultivar under artificially

enhanced epiphytotic conditions. Only 16 mungbean cultivars were identified as relatively resistant to beanfly (Ophiomyia phaseoli) in a series of 8 screenings. Another 13 mungbean cultivars were consistently free of infestation from cowpea aphids (Aphis craccivora) in successive testing involving 100 entries. Several insecticides were evaluated for control of beanfly on mungbean. Carbofuran and DDT provided the best control in a spring screening. [PLH]

***0005** Asian Vegetable Research and Development Center. 1978. **Mungbean.** ASIAN VEGETABLE RESEARCH AND DEVELOPMENT CENTER, PROGRESS REPORT, 1977:45-53, 63-64, 66. [En] (S542.A8p 1977)

In 1979, a total of 552 crosses were made from 80 parental lines to combine high yield potential and uniform maturity of various Philippine cultivars with disease-resistant lines from India. One AVRDC breeding line, VC 1089-B-29-3B-2-B, had a yield of 3.18 t/ha in a replicated advanced yield trial in the summer season. To screen the mungbean germplasm collection for resistance to disease, only 6 accessions were resistant to Cercospora leaf spot, 16 to powdery mildew, and 4 to both Cercospora leaf spot and powdery mildew. For resistance to insect pests, 61 accessions were rated as highly resistant to beanfly, 50 to pod borers, and 11 to cowpea weevil. [PLH]

***0006** Cowell, R. 1978. **The 1st international mungbean symposium.** Shanhua : AVRDC. 262p. [En] (SB205.M8I5)

MEETING: International Symposium on Mungbean, 1st -- Los Banos, Philippines, Aug 16-19, 1977

This proceedings contains 54 papers presented at the First International Symposium on Mungbean held on August 16-19, 1977 at the University of the Philippines, Los Banos. [THH]

***0007** Asian Vegetable Research and Development Center. 1979. **Mungbean.** ASIAN VEGETABLE RESEARCH AND DEVELOPMENT CENTER, PROGRESS REPORT, 1978:71-91, 120-123, 141-143. [En] (S542.A8p 1978)

In the evaluation of genetic variability of 29 agronomic characters from 68 promising mungbean varieties, the correlation indicates that taller accessions of later maturity and longer petiole length are likely to produce higher yield in the autumn at AVRDC. For disease resistance screening, 19 breeding lines were highly resistant to powdery mildew, but none showed resistance to Cercospora leaf spot. A total of 745 accessions were screened for damping-off and root disease complex. None was resistant to both disease. The application of fungicide increased yield by 303 kg/ha, plant height by 7 cm and delayed maturity by 1.3 days. Viable F1 seeds were obtained when mungbean was used as the female and blackgram as the male. Mungbean response to various environment factors, including cold temperature on early growth, varietal screening for drought tolerance and flood tolerance were studied. In insect pests resistance screening, 22 accessions were moderate relative resistance to beanflies, and 231 accessions were rated as MRR to pod borer. Also seasonal incidence of insect pest on mungbean at AVRDC was observed during 1975 to 1978. Seed treatment formulations of carbofuran and triazophos gave good control of beanfly. [PLH]

*0008 Idris, M.Z.A. 1980. **Diseases and pests of some field crops in Sarawak [Abst.].** IN: The second southeast Asian symposium on plant diseases in the tropics; Program and abstracts. [En] (REP.MB-2744)

MEETING: Southeast Asian Symposium on Plant Diseases in the Tropics, 2nd -- Bangkok, Thailand, Oct 20-26, 1980

Some major diseases and pests of rice, maize, groundnut, soybean and mungbean are discussed. Among the diseases, Helminthosporium maydis in maize and Cercospora spp. in groundnut, soybean and mungbean were prevalent. Some of the important pests were stem borers caused by Chilotraea polychrysa and Tryporyza incertulas in rice, Ostrinia salientalis in maize, pod borers caused by Etiella zinckenella in mungbean and leaf rollers caused by Lamprosema diemenalis in groundnut. [AS]

*0009 Abu Bakar, A.K.B. 1981. **Pest and disease problems of mungbean in West Malaysia.** MALAYSIAN AGRICULTURAL JOURNAL, v.53(1):29-33. [En] [En Abst] (A:PS)

Twenty-three insect pests and seven diseases have been recorded on the mungbean in West Malaysia. The beanfly, Ophiomyia phaseoli Tryon, and the pod borer, Maruca testulalis Geyer, are among the most destructive pests. The two most important diseases are leaf spot, Cercospora canescens Ellis & Martin, and leaf blight, Rhizoctonia solani Kuhn (=Thanatephorus cucumeris (Fr) Donk). VC 1163-2-2-6-2B, one of the top yielders, is among 18 accessions identified as resistant to Cercospora leaf spot. Apart from fungus disease two virus infections have also been noted. [AS]

*0010 Asian Vegetable Research and Development Center. 1981. **Mungbean.** ASIAN VEGETABLE RESEARCH AND DEVELOPMENT CENTER, PROGRESS REPORT, 1979:42-55, 70, 76. [En] (S542.A8p 1979)

The mungbean germplasm collection increased by 59 samples to 4986 in 1979. Mean yield of all cultivars over the 3 years were 1.81, 1.23 and 1.07 t/ha for summer, spring and autumn, respectively. Five breeding lines proved highly resistant to powdery mildew or Cercospora leaf spot or both. All 287 accessions and 89 breeding lines were tested for resistance to the root-knot nematode, Meloidogyne incognita. V 1133, V 2744 and V 2179 proved to be resistant in two screening trials. The resistance mechanism in mungbean against powdery mildew is affected by daylength. This disease is more serious under short-day conditions. Inheritance study on leaflet number showed that this character is controlled by a single complete recessive gene. Also, purple hypocotyl color proved to be dominant over green, lobed leaf-shape over entire, black pod color over tan, and green seed-coat over yellow. The best beanfly control and highest yields were obtained by spraying omethoate at 0.5 kg a.i./ha at 3, 10, 17, 24 and 31 days after emergence. V 2184 was intercropped with each of 59 different crops in the autumn trials. Intercropping significantly reduced beanfly infestation of mungbean. [PLH]

*0011 Asian Vegetable Research and Development Center. 1981. **Mungbean.** ASIAN VEGETABLE RESEARCH AND DEVELOPMENT CENTER, PROGRESS REPORT, 1980:40-50, 69-71, 75-78. [En] (S542.A8p 1980)

Five breeding lines showed high levels of resistance to both Cercospora leaf spot (CLS) and powdery mildew (PM), and an additional six breeding lines were identified with high levels of resistance to either CLS or PM. VC 1560 Sel.A shows even greater PM resistance than that of its resistant source of parent V 2773. VC 1160-2B-14-2-2B-2-2B produced not only a final CLS severity rating less than that of its resistant parent but also a lower rate of CLS increase. Mungbean intercropped with jute had the lowest beanfly infestation and the highest yield. Both mungbean seed yield and plant growth were significantly reduced in those soils previously planted with Chinese cabbage and mungbean. [PLH]

*0012 Asian Vegetable Research and Development Center. 1982. **Mungbean.** ASIAN VEGETABLE RESEARCH AND DEVELOPMENT CENTER, PROGRESS REPORT, 1981:23-28, 40-42, 52-53. [En] (S542.A8p 1981)

Eleven advanced AVRDC mungbean breeding lines demonstrated moderate to high levels of resistance to both Cercospora leaf spot and powdery mildew. The residual effects of the fumigation and Rhizobium inoculation were significant in a subsequent mungbean crop in the spring. Yield from the previously fumigated plots was more than five-fold that of the non-fumigated plots. A total of 25 F3 mungbean selections, out of a population of 295, was infested with an average of only 15 beanflies/100 plants in a fall screening for beanfly resistance. Results of spacing studies suggest that optimal spacing for relatively short plant types is 25 cm between rows, and from 10 to 20 cm within rows. [PLH]

*0013 Prasad, B.N. ; Mathur, S.N. 1983. **Effect of Metasystox and Cuman-L on seed germination, reducing sugar content and amylase activity in Vigna mungo (L.) Hepper.** INDIAN JOURNAL OF PLANT PHYSIOLOGY, v.26(2):209-213. (A:PS)

Effect of Metasystox (a systemic insecticide) and Cuman-L (Ziram based organic fungicide) on seed germination, reducing sugar content and on amylase activity was studied. Metasystox at 0.5, 0.08, 0.10 and 0.15% inhibited seed germination. Treatments of Metasystox also inhibited reducing sugar content and amylase activity. The treatments of Cuman-L, on the other hand, had no or little effect on seed germination, reducing sugar content and amylase activity. [AS]

*0014 Asian Vegetable Research and Development Center. 1984. **Mungbean.** ASIAN VEGETABLE RESEARCH AND DEVELOPMENT CENTER, PROGRESS REPORT, 1982:143-170, 287-288, 305-306. [En] (S542.A8p 1982)

In 1982, 116 single or multiple crosses were made among predominatly AVRDC selections with high yield potential, higher levels of resistance to disease, and uniform maturity. Thirty-nine additional crosses were made to incorporate resistance to beanfly and to study inheritance of Cercospora leaf spot (CLS) and powdery midlew (PM) resistance. Among the 120 breeding lines and 52 accessions that were evaluated across 3 seasons, 9 breeding lines were consistently rated highly resistant to both CLS and PM. For controlling the mungbean root disease complex, plant survival was only found in the Basamid W.P. treatment, but these plants were weak and stunted. Growth and yield of multiple leaflet and lobate leaflet mungbeans were studied. [PLH]

***0015** Asian Vegetable Research and Development Center. 1985. **Mungbean.** ASIAN VEGETABLE RESEARCH AND DEVELOPMENT CENTER, PROGRESS REPORT, 1983:173-206, 327-330, 370-373. [En] (S542.A8p 1983)

A total of 176 single or multiple crosses were made. An additional light single crosses were made to incorporate beanfly resistance, and four backcrosses were made to study the inheritance of resistance to Cercospora leaf spot. Eight AVRDC breeding lines outyielded the highest yielding check cultivar V 3476, which produced an average of 2.01 t/ha. High yielding AVRDC lines showed better disease resistance and larger seed size than did V 3476. The average yield of 22 entries under no-management conditions was 0.96 t/ha, compared to 2.20 t/ha under proper management. Of the 238 breeding lines and 17 accessions evaluated over 3 seasons, 6 breeding lines and one accession (V 4281) were consistently rated as highly resistant to Cercospora leaf spot and powdery mildew. Flowering was delayed under a 16 hour photoperiod by 0 to 30 days. Segregations in F2 and backcross generations seemed to confirm that the lobate leaflet character is controlled by a single incompletely dominant gene. [PLH]

***0016** Prasad, B.N. 1985. **Effect of Metasystox and Cuman-L on nitrogenase activity in root nodules of Phaseolus mungo.** INDIAN JOURNAL OF PLANT PHYSIOLOGY, v.28(2):204-206. [En] [En Abst] (A:PS)

Effects of spraying Metasystox (0.05, 0.08, 0.10 and 0.15%) and Cuman-L (0.25, 0.50, 0.75 and 1.00%) were studied on in vivo nitrogenase activity in detached root nodules of blackgram. The enzyme activity was inhibited by 20% with 0.15% of Metasystox spray on the 7th day after spraying. The plants, however, showed remarkable recovery. On the other hand, treatments of Cuman-L had little or no effect on the enzyme activity. [AS]

***0017** Asian Vegetable Research and Development Center. 1987. **Mungbean.** ASIAN VEGETABLE RESEARCH AND DEVELOPMENT CENTER, PROGRESS REPORT, 1984:165-199, 305-307. (S542.A8p 1984)

A total of 119 mungbean and 65 blackgram accessions were received from Pakistan. Sixty-one mungbean accessions from Pakistan were found to be moderately resistant to powdery mildew (PM). Selections with yield potential of 3 t/ha and resistance to Cercospora leaf spot (CLS) and PM were identified. A 2-year study confirmed that genotypes with a yield of more than 1 t/ha under minimum input are available. Majority of AVRDC breeding lines were less sensitive to photoperiod. Five lines had high yield potential combined with high level of resistance to CLS or PM. A total of 222 accessions were screened for resistance to beanflies. V 1160, a Vigna radiata var glabratum, was the least damaged entry. A total of 113 lines, interspecific hybrids and parents, were screened for resistance to Callosobruchus chinensis. V 4997 was selected to confirm its resistance to bruchid. A total of 19 accessions were tested for their reaction to the unknown mungbean virus isolates. All of them were susceptible. The unknown virus is not BCMV or a strain of it. The host range of the isolates was restricted to leguminous crops. All 117 entries, 48 advance lines, 64 lines and accessions previously reported as resistant and 5 susceptible checks were screened in greenhouse for resistance to PM. A total of 29 accessions and 26 lines were immune. [THH]

DISEASES AND INSECT PESTS - BIBLIOGRAPHIES

***0018** Cook, A.A. 1978. **Black gram (urd bean): Phaseolus mungo L.** IN: Diseases of tropical and subtropical vegetables and other plants. New York : Hafner Press. p.53-54 (SB608.V4C66)

Fourteen references on blackgram diseases are presented. [THH]

***0019** Cook, A.A. 1978. **Mung bean: Phaseolus aureus L.** IN: Diseases of tropical and subtropical vegetables and other plants. New York : Hafner Press. p.245-246 (SB608.V4C66)

Eighteen references on mungbean diseases are presented. [THH]

***0020** Universiti Pertanian Malaysia. 1979. **Symposium legumes in the tropics: a bibliography.** Serdang, Selangor : Universiti Pertanian Malaysia. xii, 70p. [En] (REF.Z5074.L4U5)

A bibliography contains 1029 references on soybean, groundnuts, winged bean, mungbean (198) and yard long bean. Most of them are available at AVRDC Library. [THH]

***0021** Venkatesan, V. 1985. **Selected references on diseases of Vigna radiata in India, 1979-85.** Patancheru PO, A.P. : ICRISAT Library. 21p. [En] (SMIC-LS-88) (REP.MB-2858)

Ninety-two references on diseases of Vigna radiata were collected from Review of Plant Pathology, 1979-1985. Most of them are available at the AVRDC Library. [THH]

***0022** Venkatesan, V. 1985. **Selected references on diseases of Vigna mungo in India, 1979-85.** Patancheru PO, A.P. : ICRISAT Library. 12p. [En] (SMIC-LS-90) (REP.MB-2857)

Fifty-eight references on diseases of Vigna mungo were assembled from Review of Plant Pathology, 1979-1985. Most of them are available at the AVRDC Library. [THH]

***0023** Khare, M.N. ; Agrawal, S.C. ; Jain, A.C. ; Bhale, M.S. [n.d.]. **An annotated bibliography of mungbean and uridbean diseases.** Sehore, M.P. : Jawaharial Nehru Agricultural University. ii, 78p. [En] (REF.Z5074.M8K45)

A bibliography contains 338 references with abstracts of mungbean and blackgram diseases. Most of them are available at AVRDC Library. [THH]

DISEASES - GENERAL

***0024** South Carolina Agriculture Experiment Station. 1923. **Plant diseases: plant disease survey.** IN: South Carolina Agriculture Experiment Station Report, 1922. Dillon : South Carolina Agricultural Experiment Station. p.46 [En] (REP.MB-0059)

Two plant diseases were reported: a bacterial disease of English peas reported from Dillon County, and an unidentified disease of mungbean. [THH]

***0025** Vasudeva, R.S. 1956. **Round the year with plant diseases.** INDIAN FARMING, v.6(7):45-56. [En] (REP.MB-2542)

Important diseases and their control measures are described for mungbean (Vigna radiata), blackgram (Vigna mungo), and other crops, on a calendar basis. [GF]

***0026** Litzenberger, S.C. ; Stevenson, J.A. 1957. **A preliminary list of Nicaraguan plant diseases.** PLANT DISEASE REPORTER, Supl.243:3-19. [En] (A:PS)

Three fungal diseases, viz., Erysiphe polygoni, Fusarium oxysporum, Phyllosticta phaseolina, and a yellow leaf mottling viral disease on mungbean were recorded. [THH]

***0027** Williams, F.J. 1967. **Important and new diseases of pulse crops seen in 1966.** IN: Proceedings [of] annual workshop conference on pulse crops. New Delhi : Indian Council of Agricultural Research. 3 leaves [En] (REP.MB-1714)

MEETING: Annual Workshop Conference on Pulse Crops, 1st -- New Delhi, India, Feb, 1967

Mungbean and blackgram were both damaged by yellow mosaic disease. There was considerable variation in susceptibility among cultivars. Some of the blackgram cultivars that were resistant to yellow mosaic were severely damaged by leaf crinkle disease. Bacterial blight caused some damage in these trials. Powdery mildew was very severe in mungbean and blackgram. Rust was serious in blackgram at Coimbatore. [THH]

***0028** Chohan, J.S. 1968. **Disease problems in pulse crops.** IN: Proceedings [of the] second annual workshop conference on pulse crops. New Delhi : Indian Council of Agricultural Research. 15p. [En] (REP.MB-1416)

MEETING: Annual Workshop Conference on Pulse Crops, 2nd -- New Delhi, India, Apr 1-3, 1968

The major diseases of pulse crops, including mungbean (Phaseolus aureus syn. Vigna radiata) and blackgram (Phaseolus mungo syn. Vigna mungo) caused by fungi, bacteria, virus, and nematode are described. The factors influencing the

disease development and their control measures are also discussed. [GF]

*0029 Kaiser, W.J. ; Danesh, D. ; Okhovat, M. ; Mossahebi, G.H. 1968. **Diseases of pulse crops (edible legumes) in Iran.** PLANT DISEASE REPORTER, v.52(9):687-691. [En] [En Abst] (REP.MB-0513)

Diseases are a constant threat and often a limiting factor in the cultivation of pulse crops in Iran. In the drier areas diseases caused by viruses and root rot fungi were seen most frequently and were of greatest economic importance, while foliar diseases were usually confined to the wetter regions of the country. The diseases of beans, broadbeans, chickpeas, cowpeas, lentils, mungbeans, and peas that occur in Iran are listed and some observations on their importance and distribution within the country are made. Mungbean mosaic virus, an aphid-transmitted, seedborne virus, is one of the most important and widespread virus diseases in Iran. Yields from infected plants were decreased 31 to 75%. A crown rot of mungbean incited by Rhizoctonia solani caused 4 to 57% mortality in young plantings. [AS]

*0030 Raychaudhuri, S.P. 1968. **Diseases of pulses, pose a challenge to plant pathologists, breeders.** INDIAN FARMING, v.17(1):39-43. [En] (REP.MB-0125)

Bean rust caused by Uromyces phaseoli var. typica is widely distributed in India. The disease has been reported on mungbean, blackgram, cowpea, and French bean. Yellow mosaic diseases, characterized by blight yellow patches on the leaves interspersed with green areas are common in mungbean, blackgram, and soybeans, which is transmitted by whitefly (Bemisia tabaci). [THH]

*0031 Chopra, S.L. ; Pruthi, S.P. 1971. **Effect of plantvax on the chemical composition of black-gram (Phaseolus mungo Roxb.).** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.41(4):345-349. [En] (REP.MB-0102)

Seeds of blackgram (Vigna mungo Hepper) were treated with Plantvax fungicide (2,3-dihydro-5-Carboxanilido-6-methyl 1,4-oxathiin 4,4-dioxide) at the rates of 50, 100, 150, 200, 250, and 300 g per 45 kg of seeds, in different pots. Also, plants from untreated seeds were sprayed with solutions containing 0.00, 0.10, 0.15, 0.20, 0.25, 0.30, and 0.35% Plantvax. Seed treatment with Plantvax had no effect on the nitrogen content of the leaves. But Plantvax as a foliar spray decreased it. When compared with the control, the plants that received seed treatment had less phosphorus and more sulphur and magnesium. [AS]

*0032 Paul, B. ; Thapar, V.K. ; Singh, Rattan 1973. **Effect of systemic fungitoxicants on ureide metabolism in germinating seeds.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.43(7):662-666. [En] [En Abst] (REP.MB-0729)

The effect of systemic fungitoxicants actidione, Vitavax and benomyl on ureide metabolism of germinating seeds of groundnut (Arachis hypogaea L.), soybean (Glycine max (L.) Merr.), mungbean (Vigna radiata Wilczek) and blackgram (V. mungo Hepper) was investigated. The fungitoxicants were found to inhibit germination, length of the radicles, allantoin and allantoic acid contents, and allantoinase activity of these seeds. The maximum effect was

exerted by acridione, followed by Vitavax and benomyl. However, with time the inhibitions mentioned above decreased. Allantoin and allantoic acid were not present in groundnut. [AS]

***0033** Vidhyasekaran, P. ; Kandasamy, D. 1973. **Carbohydrate metabolism of Phaseolus aureus infected with obligate and facultative parasites.** INDIAN PHYTOPATHOLOGY, v.25(1):48-54. [En] [En Abst] (REP.MB-0197)

The carbohydrate metabolism of Vigna radiata infected by the rust, powdery mildew, mosaic and Cercospora was studied. The effect of these pathogens individually and in association with one another on the starch and sugar content was assessed. While mosaic and rust infection did not alter the starch content, Cercospora and powdery mildew infection depleted it. Association of Cercospora with powdery mildew resulted in the maximum damage on the starch content. The mosaic and rust diseases caused the most severe reduction in sugar content. Wherever rust disease occurred in combination with other diseases, the reduction in sugar content was marked. Both mosaic and rust incidence did not affect the phosphorylase activity while both Cercospora and powdery mildew infection increased its activity. Maximum enzyme activity was observed in the powdery mildew plus Cercospora combined infection. While virus infection did not affect the amylase activity, all the fungal infections induced the amylase activity. Cercospora individually or in combination with other pathogens induced the amylase activity to a great extent. [AS]

***0034** Williams, R.J. 1973. **Plant pathology in the grain legume improvement program at IITA.** IN: Proceedings of the first IITA grain legume improvement workshop. Ibadan : International Institute of Tropical Agriculture. p.261-268. [En] [En Abst] (REP.MB-1156)

MEETING: IITA Grain Legume Improvement Workshop, 1st -- Ibadan, Nigeria, Oct 29-Nov 2, 1973

Rhizoctonia web-blight was extremely severe on most mungbean varieties grown at IITA. Most varieties also developed a blight-yellow virus symptom. [THH]

***0035** Quebral, F.C. 1974. **Some diseases of legume (Mungo, peanut and soybeans) in the Philippines and their control.** IN: Palada, M.C. IRRI multiple cropping training course: v.4. Los Banos : The International Rice Research Institute. 7p. [En] (REP.MB-0701)

The important diseases of mungbean, peanut, and soybean in the Philippines are powdery mildew, Cercospora leaf spot, mosaic, peanut leaf spot, bacterial pustules, and damping off. The causal organisms, symptoms, and control measures are described. [GF]

***0036** Sen Gupta, P.K. 1974. **Diseases of major pulse crops in India.** PANS: PEST ARTICLES AND NEWS SUMMARIES, v.20(4):409-415. [En] [En Abst] (REP.MB-0528)

The major pulse crops in India are gram, pigeonpea, blackgram, mungbean,

lentil and peas. Gram, pigeonpeas and pea are attacked by several diseases some of which cause considerable crop damage. Gram is affected mainly by wilt (Fusarium oxysporum f. sp. ciceri Matuo and Sato), blight (Mycosphaerella pinodes B. and Blox) and rust (Uromyces ciceris-arietinii (Grogn.) Jacz. & Boy.). The main diseases of pigeonpea are wilt (Fusarium oxysporum f. sp. udum (Butler) Snyd. and Hans.), and sterility mosaic. Powdery mildew (Erysiphe polygoni DC) and rust (Uromyces vicia-fabae (Pers.) Schroet.) are the most important pea diseases. Some diseases of minor importance are described. Details are given of the symptoms, distribution and control of the diseases with particular reference to those of economic importance. Several minor diseases of lentil, mungbean and blackgram are included. [AS]

*0037 Rangaswami, G. 1975. **Diseases of pulses: black gram and green gram.** IN: Diseases of crop plants in India. (2nd ed.) New Delhi : Prentice-Hall of India. p.268-269 (REP.MB-1042)

Fungal and viral diseases of blackgram and mungbean are listed. [THH]

*0038 Arjunan, G. ; Vidhyasekaran, P. ; Kolandaisamy, S. 1976. **How to combat diseases of greengram.** FARMER AND PARLIAMENT, v.12(12):17-18,24. [En] (REP.MB-1653)

Yellow mosaic, leaf crinkle, bacterial leaf spot, halo blight, powdery mildew, root rot, rust, and leaf spot are the most important mungbean diseases in India. The symptoms, method of spread of the disease, and effective control measures are described. [THH]

*0039 Grewal, J.S. 1978. **Diseases of mungbean in India.** IN: The 1st International Mungbean Symposium. Shanhua, Tainan : AVRDC. p.165-168 [En] (SB205.M8I5)

MEETING: International Symposium on Mungbean, 1st -- Los Banos, Philippines, Aug 16-19, 1977

Yellow mosaic, leaf crinkle, Cercospora leaf spot, powdery mildew, root rot, bacterial leaf spot, and halo blight are the most important diseases of mungbean in India. Symptoms, disease transmission, host range and control of the diseases are described. As the result of resistance screening, L 24-2-1, 15227 remained free from infection by yellow mosaic, LM 162 was graded as resistant to Cercospora leaf spot, L 29-13-2 remained free from powdery mildew, LM 220 and MS 9385 were found resistant to Macrophomina phaseoli, and P 476, P 5[illegible], PLM 501, and Jalgaon 781 were reported to be resistant to bacterial leaf spot. [THH]

*0040 Yang, C.Y. 1978. **Mungbean diseases and control.** IN: The 1st International Mungbean Symposium. Shanhua, Tainan : AVRDC. p.141-146 [En] (SB205.M8I5)

MEETING: International Symposium on Mungbean, 1st -- Los Banos, Philippines, Aug 16-19, 1977

Mungbean diseases caused by fungi, bacteria, nematodes, viruses, and mycoplasma and their control are reviewed. [THH]

***0041** Iwaki, M. 1979. **Virus and mycoplasma diseases of leguminous crops in Indonesia.** REVIEW OF PLANT PROTECTION RESEARCH, v.11:88-96. [En] (A:PS)

Ten viruses and one mycoplasma-like disease of leguminous crops in Indonesia are described. Mungbean was infected by bean yellow mosaic virus and mungbean mosaic virus. [THH]

***0042** Chinsawangwatanakul, A. ; Surin, P. 1980. **Mungbean diseases in Thailand [Abst.].** IN: The second southeast Asian symposium on plant diseases in the tropics; Program and abstracts. Bangkok : Faculty of Agriculture, Kasetsart University. p.80 [En] (REP.MB-2745)

MEETING: Southeast Asian Symposium on Plant Diseases in the Tropics, 2nd -- Bangkok, Thailand, Oct 20-26, 1980

Two kinds of mungbean are commonly grown in Thailand, Vigna radiata and Vigna mungo. Vigna radiata is grown in larger quantities acerages than Vigna mungo. The major mungbean-producing area in Thailand is the central region. Mungbean is grown both in the wet and dry seasons. Diseases of Vigna radiata are more commonly reported. Cercospora leaf spot (Cercospora canescens Ellis & Martin) is more destructive in the wet season, powdery mildew (Oidium sp.) is important in the dry season. In the wet season, damping off (Pythium sp., Sclerotium sp.), Pythium blight, flower and pod rot (Choanephora sp.), and anthracnose (Colletotrichum sp.) are commonly found. Charcoal rot (Rhizoctonia bataticola Taub) is observed at various growth stages of mungbean under water stress. On sandy loam soils in some areas of U-thai thani and Lopburi Province, root-knot nematode (Meloidogyne incognita) attacks mungbean which is grown after a corn planting with abundant weeds. In 1977, mungbean yellow mosaic virus invaded over 1,600 hectares of Vigna radiata in Kampang Phet Province and caused complete yield losses as reported by the local authority. Minor diseases, i.e., witches'broom, iron deficiency, and a few unknown diseases were also reported. [AS]

***0043** Thind, B.S. 1982. **Control of Cercospora leaf spot, bacterial leaf spot and leaf reddening of mung bean by a common spraying schedule.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.12(1):129. [En] (REP.MB-2643)

Among the leaf diseases of mungbean, bacterial leaf spot (BLS), Cercopsora leaf spot (CLS), and leaf reddening are of great economic importance and cause heavy losses to the crops. Five chemicals were tried for 3 years at two different locations. Two sprays of Streptocycline + Bavistin followed by 2 sprays of Streptocycline + Bliotox at an interval of 10 days effectively controlled BLS, CLS and leaf reddening of mungbean. [THH]

***0044** Nawaz, R.M.S. ; Narayanasamy, P. 1983. **Interaction on powdery mildew and leaf crinkle virus of black gram.** MADRAS AGRICULTURAL JOURNAL, v.70(7):487-488. [En] (A:PS)

There was no difference in the development of powdery mildew between control and leaf crinkle virus infected plants. [THH]

*0045 Chatrath, M.S. ; Gupta, J.P. ; Chiranjeevi, V. 1984. **Uptake and distribution of carbendazim in urd bean (Vigna mungo (L.) Hepper) following seed treatment.** JOURNAL OF NUCLEAR AGRICULTURE AND BIOLOGY, v.13(3):74-77. [En] [En Abst] (REP.MB-2626)

Direct evidence of uptake and translocation of carbendazim in blackgram (Vigna mungo) was obtained using both non-labelled and 14C-labelled carbendazim. The chemical moved unaltered into the above ground tissue from the seed and could be detected in plants only upto 30 days. There was high accumulation of 14C-carbendazim in cotyledons of 7-day old seedlings as compared to hypocotyl and other aerial parts. [AS]

*0046 Singh, P.P. ; Thind, B.S. 1984. **Interaction between Xanthomonas campestris pv. vignaeradiatae (Sabet et al.) Dye, and Cercospora canescens Ell. et Mart. on mungbean in relation to disease development.** PHYTOPATHOLOGIA MEDITERRANEA, v.23(1):75-76. [En] (REP.MB-2707)

On one-month-old mungbeans cv. ML 5 grown in pots, the disease intensity of Cercospora canescens was higher than that of Xanthomonas campestris when both pathogens were inoculated either simultaneously or one after the other. Total sugars, total phenols and protein content were higher in leaves infected with the bacterium alone than other treatments which included inoculation with C. canescens. Protease activity was higher in treatments which included inoculation with the fungus, whereas cellulase activity was similar in all treatments. C. canescens produced, both in vivo and in vitro, a toxin thought to be cercosporia. [THH]

*0047 Thurston, H.D. 1984. **Mungbeans.** IN: Thurston, H.D. Tropical plant diseases. St. Paul, MN : American Phytopathological Society. p.101 [En] (SB605.T7T49)

There are a large number of pathogens which attack mungbean and blackgram in tropical and subtropical Asia. The most important diseases of mungbean and blackgram are fungi such as Uromyces appendiculatus (rust), Erysiphe polygoni (powdery mildew), Cercospora canescens and C. cruenta (leaf spots), bacteria such as Pseudomonas phaseolicola (halo blight), and several viruses of which mungbean yellow mosaic virus is the most important. [THH]

*0048 Ventura, W. ; Watanabe, I. ; Komada, H. ; Nishio, M. ; de la Cruz, A. ; Castillo, M.B. 1984. **Soil sickness caused by continuous cropping of upland rice, mungbean, and other crops.** IRRI RESEARCH PAPER SERIES, no.99:1-13. [En] (A:PS)

Continuous monoculture reduced the growth and yield of rice, mungbean, and cowpea. Growth inhibition began with the second crop and increased with succeeding crops. Crop performance tended to improve slightly after extremely poor cropping seasons. No soil sickness was observed in the rice-mungbean rotation. Detrimental effects of continuous cropping were more apparent at

early growth stages in mungbean and cowpea and in later growth in upland rice. Chemical analysis of soil indicated nutrient status was not the direct cause of soil sickness. Root residue was a source of infection to the next crop in the monoculture. Sterilizing the sick soil and/or root residue removed the sickness, indicating that it is caused by microorganisms. Nematodes were found in significant numbers in mungbean and cowpea, and an inoculation study suggested that nematodes increase the effect of soil sickness on leguminous plants. Inoculation and fungicidal treatments suggest that fungi were not the primary cause of soil sickness. Chloropicrin fumigation alleviated soil sickness most effectively for both upland rice and mungbean. Soil sickness in annual upland crops also can be avoided by proper crop rotation. [AS/THH]

***0049** Wang, T.C. 1984. **[Mungbean diseases in Taiwan, I and II].** PESTICIDE WORLD, no.13:13-15; no.14:23-24. [Ch] (A:PS)

Mungbean (Vigna radiata) is grown under a wide variety of soil and climate conditions, and more than thirty diseases have been reported on this crop. The severity and prevalence of mungbean diseases are closely associated with environmental conditions such as temperature, humidity, and host reactions. Therefore, some mungbean diseases are geographically limited, whereas others are distributed widely. Only seventeen mungbean diseases which were incited by pathogenic fungi, bacteria, nematodes, viruses and mycoplasma have been found in Taiwan. Usually, not all diseases of mungbean occur every year and in every locality; however, it is not unusual to find fields with several diseases present. The diseases which are frequently found in the field are described. [AS]

DISEASE RESISTANCE AND RESISTANT VARIETIES
- Germplasm Evaluation for Disease Resistance

***0050** Chohan, J.S. ; Kalia, N.R. 1967. **Virus diseases of Phaseolus mungo L., and their control through resistant varieties in Punjab.** IN: Proceedings [of the] first annual workshop conference on pulse crops. New Delhi : Indian Council of Agricultural Research. 3 leaves (REP.MB-1715)

MEETING: Annual Workshop Conference on Pulse Crops, 1st -- New Delhi, India, Feb, 1967

Three strains of blackgram, namely, M 1, M 1-1 and M 2 were tested for resistance against yellow mosaic of mungbean and the curly top virus diseases. The results showed that the strains M 1 and M 1-1 were highly resistant to yellow mosaic but highly susceptible to curly top and strain M 2 was highly resistant to curly top but fairly susceptible to yellow mosaic. [THH]

***0051** Amin, K.S. ; Grewal, J.S. ; Verma, A. ; Williams, F.J. 1968. **Screening of mung and urid genetic stock for disease resistance.** IN: Proceedings [of the] second annual workshop conference on pulse crops. New Delhi : Indian Council of Agricultural Research. 2p. [En] (REP.MB-1417)

MEETING: Annual Workshop Conference on Pulse Crops -- New Delhi, India, Apr 1-3, 1968

Yellow mosaic, leaf crinkle, tip necrosis and three leaf spots caused by fungi and bacteria are the most damaging of blackgram and mungbean in India. All of 310 collections of blackgram and 681 collections of mungbean were screened for resistance. No single line of blackgram or mungbean was resistant to all diseases. However, three lines each of blackgram and mungbean showed promise for disease resistance. They need to be further tested under glass house conditions for disease resistance. [THH]

*0052 Cortado, R.V. 1970. **Response of improved mungo varieties to four diseases.** IN: Proceedings of the first national pest control conference of the Philippines. Iloilo City : The Philippine Phytopathological Society. [En] [En Abst] (REP.MB-1297)

MEETING: National Pest Control Conference, 1st -- Iloilo City, Philippines, May 5-8, 1970

(NOTE: Abstract presented at the 7th Annual Meeting of the Philippine Phytopathological Society, May 5-8, 1970)

Seven improved varieties of mungbean (MG 50-10A, MG 55-3, MG 59-6, MG 60, MG 61-2, CES 14, and BPI Glabrous #3) were tested for resistance to 4 most common diseases in Cagayan valley, viz., Cercospora leaf spot, powdery mildew, mosaic, and root knot. Except in root knot, the test plants were subjected to natural inoculation in the field. Disease ratings revealed that none of the 7 improved varieties of mungbean are resistant to Cercospora leaf spot, root knot, and powdery mildew. These varieties, however, reacted differently to mosaic. Based on infection percentage, all the MG varieties showed higher degree of mosaic resistance than BPI Glabrous #3. Except MG 55-3 the tested MGs were more resistant than CES 14. No significant differences in mosaic resistance among the MG varieties were obtained. CES 14 was more resistant to mosaic than BPI Glabrous #3; the latter was the most susceptible. [AS]

*0053 Khatri, H.L. ; Bhatia, D.S. ; Chohan, J.S. 1971. **Brief account of work done on diseases of kharif pulse crops at Department of Botany and Plant Pathology, P.A.U. Ludhiana during 1970-71.** IN: Proceedings [of the] fifth workshop on pulse crops. New Delhi : Indian Council of Agricultural Research. p.112-114. [En] (REP.MB-0914)

MEETING: Workshop on Pulse Crops, 5th -- Hissar, India, Mar 18-20, 1971

About 920 varieties of mungbean and 469 varieties of blackgram were screened under natural conditions for their resistance/susceptibility to Cercospora leaf spot, bacterial blight, and yellow mosaic. Resistant varieties of both mungbean and blackgram against the diseases are listed. [THH]

*0054 Adcock, R.E. 1972. **Screening for root-knot nematode resistance in mungbeans.** Ann Arbor, Mi : University Microfilms International. vi, 45 leaves (Thesis - Ph.D.) (SB205.M8A3)

The objective of this study was to develop a rapid and reliable method for screening mungbean accessions for reaction to southern root-knot nematode and to identify nematode resistant germplasm to use in developing resistant varieties. Nineteen field-tested entries were included in the 156 accessions in these tests. The screening was conducted in a 12 x 13 lattice design. The

analysis of variance indicated a significant difference at the 5% level for entries in mean gall indices. The six least galled entries fell within the first range of Duncan's New Multiple Range Test, but had gall indices from 3.8 to 4.3 on the 1-to-5 gall indices. All except the 3.8 scoring entry were fully within the severely galled category. A serious problem of high mortality from fungal infection in mungbean seedlings existed throughout the study. Many variations in technique were used, attempting to control the high level of fungal infection in mungbean seedlings. No combination of precautions against fungi gave consistent results. Seedlings grown in plastic growth pouches with distilled water suffered no losses. The growth pouch should be used in further screening as a preliminary method from which the least susceptible accessions could be selected for more extensive testing. [AS]

***0055** Nene, Y.L. ; Srivastava, S.K. ; Naresh, J.S. 1972. **Evaluation of blackgram (Phaseolus mungo Roxb.) and greengram (Phaseolus aureus Roxb.) varieties and germplasms for resistance to yellow-mosaic virus of green-gram.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.42(3):251-254. [En] [En Abst] (REP.MB-0206)

Fifty-two germplasms and 15 varieties of blackgram (Vigna mungo) and 198 germplasms and 17 varieties of mungbean (V. radiata) were evaluated for mungbean yellow mosaic virus. The varieties were planted in randomized-block design, and the germplasms in rows alternated with susceptible controls, viz., 'No. 55', 'Khargaon 3' or 'Gwalior 18' in blackgram, and 'Jalgaon 781' in mungbean. Artificial screening of promising material was done at the pre-flowering stage by covering the rows with muslin-cloth cages of 60 cm x 90 cm x 120 cm and releasing 300 viruliferous whiteflies in each cage. In blackgram, resistant reaction was represented by a restricted and spotty pattern of yellow area on leaf (necrotic mottle) and susceptible reaction by yellow diffused area, later covering the entire lamina (yellow mottle). In mungbean such a distinction was not observed. In blackgram a selection from the variety 'D 6-7' was found highly resistant. In mungbean none of the material tested was found resistant. [AS]

***0056** Deshkar, M.V. ; Khare, M.N. ; Joshi, L.K. 1973. **Paper towel method: a rapid technique for testing susceptibility to Rhizoctonia bataticola (Taub.) But.** JNKVV RESEARCH JOURNAL, v.7(4):300-301. [En] (REP.MB-1967)

A new, simple, rapid technique was developed for screening mungbean varieties for resistance to Rhizoctonia bataticola by bringing one surface of a sterilized paper towel in contact with a previously prepared suspension of R. bataticola. Surface-sterilized seeds of mungbean are then dipped in the inoculum suspension and placed on the paper towel which is then transferred to a moist chamber and kept for three days at 25-28 C. Healthy germinated seeds may be transferred to pots containing infested soil for further screening. [THH]

***0057** Dey, S.K. ; Singh, D.R. 1973. **Resistance test of mung (Phaseolus aureus L.) against yellow mosaic in Uttar Pradesh.** INDIAN JOURNAL OF FARM SCIENCE, v.1(1):113. [En] (REP.MB-2445)

In all, 496 varieties of mungbean were screened in the field and glass house. Only 2 cultivars, viz., P 364-68 and P 366-68 were found to be resistant to yellow mosaic virus. [THH]

*0058 Narayanasamy, P. ; Jaganathan, T. 1973. **Sources of resistance to black gram virus diseases.** MADRAS AGRICULTURAL JOURNAL, v.60(9/12):1836-1838. [En] (REP.MB-0430)

Over 60 varieties of blackgram were screened for resistance to blackgram leaf crinkle virus (BLCV) and blackgram sterility mosaic virus (BSMV). Karaikal, Mattikalai, Palladan, Parvathipuram, BR 16 and BR 68 were highly resistance to BLCV. Karaikal, P 58, P 4 and P 47 were free from BSMV. M2, one of five Co 1 mutants, showed more resistance to BLCV and BSMV than Co 1. [THH]

*0059 Nene, Y.L. ; Rathi, Y.P.S. 1973. **A brief report on the plant pathology work on kharif pulses at Pantnagar during 1972-73.** IN: Proceedings [of the] ninth workshop of all Indian coordinated research project on pulses (Kharif pulses). New Delhi : Indian Council of Agrciultural Research. p.173-175. [En] (REP.MB-1462)

MEETING: Workshop of All Indian Coordinated Research Project on Pulses (Kharif Pulses), 9th -- New Delhi, India, Jun 7-9, 1973

About 405 germplasms of mungbean from Ludhiana were screened in the field. Not a single line was free from yellow mosaic and Cercospora leaf spot (CLS). Only fourteen lines showed tolerance with yellow mottle reaction and 12 lines were found tolerant to CLS. A promising blackgram selection US-9 showed uniform maturity in 75 days, hairy brown pods, and all leaves shedding at maturity. The plant type is erect like T-9 or UPU-1 and virus tolerant. [THH]

*0060 Deshkar, M.V. ; Khare, M.N. ; Singh, L. 1974. **Evaluation of varieties of mung (Phaseolus aureus Roxb.) for their resistance to Rhizoctonia bataticola (Taub.) Butler by paper towel method.** JNKVV RESEARCH JOURNAL, v.8(1):60-62. [En] (REP.MB-1334)

One hundred sixty three varieties of mungbean (Vigna radiata) were evaluated for their resistance to Rhizoctonia bataticola (Taub.) Butler by paper towel method. None of the varieties evaluated were resistant or moderately resistant. Only one variety, 11160(a), was moderately susceptible (10-30% mortality) and the rest were susceptible. [THH]

*0061 Kannaiyan, S. ; Venkatarao, A. ; Rajagopalan, C.K. ; Ramasamy, K. ; Annappan, R.S. 1974. **Varietal resistance of greengram to powdery mildew, rust and leaf spot diseases.** FARM AND FACTORY, v.8(6):33-34. [En] (REP.MB-2669)

Seventeen varieties of mungbean were screened for resistance to powdery mildew, rust, and Cercospora leaf spot under natural conditions during the 1973 summer season (Feb.-March). It was interesting to note that the variety CO 1 showed less infection for all three diseases. The variety Kabargan recorded the lowest disease incidence for rust, and Cercospora leaf spot, but was highly susceptible to powdery mildew. [THH]

*0062 Singh, Kuldip ; Virmani, S.S. ; Chohan, J.S. 1974. **Field screening of urid (Phaseolus mungo) varieties against maturity wilt phase of the dry root rot disease caused by Macrophomina phaseolina in the Punjab.** INDIAN JOURNAL

OF MYCOLOGY AND PLANT PATHOLOGY, v.3:194-195. [En] (REP.MB-2409)

Dry root rot caused by Macrophomina phaseoli is one of the serious diseases of blackgram in the Punjab. The disease manifests at the time of crop maturity when the whole plant dries, the pods shrivel, grains poorly formed and reducing the yield as well as quality. During kharif 1972, 91 lines of blackgram were sown in heavily infested soil with M. phaseoli. Only one variety, BR 68, had great potential showing freedom from the disease. [THH]

***0063** Sivaprakasam, K. ; Pillayarsamy, K. ; Arajamani ; Souminirajagoplan, C.K. 1974. **Evaluation of black gram (Phaseolus mungo L.) and green gram (P. aureus Roxb.) varieties for resistance to yellow mosaic virus of green gram.** MADRAS AGRICULTURAL JOURNAL, v.61(10/12):1021-1022. [En] (REP.MB-0520)

Mungbean varieties, N 122, PS 16, and blackgram, Mash 64, Mash 1-1, and G 31 showed less susceptibility to mungbean yellow mosaic virus in two field experiments at Madurai, Tamil Nadu, India. [THH]

***0064** Ahmad, M. 1975. **Screening of mungbean (Vigna radiata) and urdbean (V. mungo) germplasms for resistance to yellow mosaic virus.** JOURNAL OF AGRICULTURAL RESEARCH, v.13(1):349-354. (REP.MB-1566)

In the varietal screening studies, 157 cultivars of mungbean (123 exotic+34 indigenous) and 118 of blackgram (92 exotic+26 indigenous) were tested for genetic resistance to yellow mosaic virus during the summers of 1972 and 1974 under natural conditions. The severely infected plants were recorded and grouped into 5 categories, viz., 0-10%, 11-30%, 31-50%, 51-70% and 71-100%. No variety of mungbean could be found resistant; only 6 local collections showed some tolerance. In the case of blackgram, 17 exotic and 8 indigenous types were highly resistant and 50% of the total material was fairly tolerant. A great scope exists for varietal improvement in blackgram through hybridization. [AS]

***0065** Gill, K.S. ; Sandhu, T.S. ; Singh, Kuldip ; Brar, J.S. 1975. **Evaluation of mungbean (Vigna radiata L. Wilczek) germplasm.** CROP IMPROVEMENT, v.2(1&2):99-104. [En] [En Abst] (REP.MB-2446)

Four hundred and thirty-five strains of mungbean originating from 14 countries were evaluated in a replicated trial for days to flower, days to maturity, plant height, primary and secondary branches, clusters per plant, pods per plant, pod length, seeds per pod, 100-seed weight, grain yield, protein content, yellow mosaic virus, Cercospora leaf spot and bacterial blight disease. Agronomic characters of 21 (5%) top yielding lines indicated that they possessed more number of pods per plant, more number of seeds per pod and medium seed size. Protein percentage ranged from 16.20 to 29.30 in the germplasm screened. Two strains, 15229 and L 24-2, were resistant to both yellow mosaic virus and bacterial blight; 15229 was also resistant to Cercospora leaf spot disesase. [AS]

***0066** Jadhav, M.R. ; Sharma, B.L. 1975. **Field reaction of urid (Phaseolus mungo L.) varieties to yellow mosaic virus.** JNKVV RESEARCH JOURNAL, v.9(3&4):169. [En] (A:PS)

Twelve varieties of blackgram were evaluated for resistance to the mungbean yellow mosaic virus for two consecutive kharif seasons of 1972 and 1973. Only three varieties, Mash 48, Selection 1, and L35-5, were free from infection and other 3 varieties, UPAU 2, 338/3, and B 76 appeared to be fairly resistant. [THH]

***0067** Mew, I.P.C. ; Wang, T.C. ; Mew, T.W. 1975. **Inoculum production and evaluation of mungbean varieties for resistance to Cercospora canescens.** PLANT DISEASE REPORTER, v.59(5):397-401. [En] [En Abst] (AVRDC/JP/5) (REP.MB-368)

Leaf spot caused by Cercospora canescens is a major disease of mungbean in most of Southeast Asia. In cultural studies, using different media, the pathogen produced conidia readily, but not abundantly, on potato-dextrose agar. Carrot leaf juice-oatmeal agar was best for sporulation, followed next by mungbean leaf juice-oatmeal agar. Between 15 and 28 C, the number of conidia formed was positively correlated with temperature, and their production was promoted by light. When a spore suspension (2000 conidia/ml) was sprayed on susceptible varieties at different stages of growth, the plants showed no difference in response up to the flowering stage, but lesion severity increased sharply from the flowering stage onward. Three of 200 accessions were consistently resistant to Cercospora leaf spot throughout 3 consecutive screening periods: fall 1973, spring 1974, and summer 1974. [AS]

***0068** Haware, M.P. ; Pavgi, M.S. 1976. **Field reaction of blackgram and greengram to angular black-spot.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.46(6):280-282. [En] [En Abst] (REP.MB-1260)

Thirteen varieties each of blackgram (Vigna mungo) and mungbean (Vigna radiata) were tested in the field for resistance to angular black-spot disease caused by Protomycopsis patelii Pavgi and Thirumalachar. Only 2 varieties of blackgram were highly resistant. 3 mungbean were immune, 6 highly resistant, and 2 moderately susceptible. [AS]

***0069** Rath, G.C. ; Mishra, D. 1976. **Varietal reaction of Phaseolus aureus to Sclerotium rolfsii.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.5(2):216. [En] (REP.MB-2428)

In pot trials with 20 varieties of mungbean, only No.305 showed resistance to Sclerotium rolfsii. [THH]

***0070** Singh, D.V. ; Singh, R.R. ; Mishra, A.N. 1976. **Search for sources of resistance to powdery mildew in black-gram.** CURRENT SCIENCE, v.45(17):641. [En] (REP.MB-1037)

The results of field and glass house testing of 306 varieties and strains of blackgram under epiphytotic conditions for three years (1972, 1973 and 1974) are reported. [THH]

*0071 Singh, D.V. ; Mishra, A.N. 1976. **Varietal resistance of green gram (Phaseolus aureus) to Cercospora leaf spot.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.5:207. [En] (REP.MB-2412)

The results of field testing of 730 mungbean varieties for resistance to Cercospora leaf spot are presented. Only 9 varieties were found to be resistant. [THH]

*0072 Sivaprakasam, K. ; Pillayarsami, K. ; Rajamani, A. ; Rajagopalan, C.K. 1976. **Note on the evaluation of black gram (Phaseolus mungo L.) and green gram (P. aureus Roxb.) varieties for resistance to powdery mildew (Erysiphe polygoni DC.).** MADRAS AGRICULTURAL JOURNAL, v.63(2):139-140. [En] (REP.MB-1996)

Powdery mildew, caused by Erysiphe polygoni, is a major disease of mungbean and blackgram in Tamil Nadu. Twenty-two varieties of mungbean and 13 varieties of blackgram were tested for their reaction to this disease under field conditions in 1973. None of the varieties of mungbean and blackgram were resistant to the disease. S 9, CO 1, and PS 7 of mungbean and CO 1 of blackgram were less susceptible. [THH]

*0073 Vidhyasekaran, P. ; Arjunan, G. ; Ranganathan, K. 1976. **Field tolerance of some greengram types to yellow mosaic.** MADRAS AGRICULTURAL JOURNAL, v.63(1):54-55. [En] (REP.MB-1997)

Germplasm collections maintained at Tamil Nadu Agricultural University were screened for yellow mosaic resistance during March-May 1974, when there was severe natural incidence of the disease. The types which showed resistance were grown in different seasons at three different localities. Only two varieties, LM 220, and PLS 274 were free from the disease in all six seasons in the three places. However, when these two were tested under greenhouse conditions, they were susceptible (10 and 15% incidence, respectively) to the disease. [THH]

*0074 Vidhyasekaran, P. ; Arjunan, G. ; Ranganathan, K. 1976. **Field tolerance of some blackgram varieties to root rot disease caused by (Macrophomina phaseolina).** MADRAS AGRICULTURAL JOURNAL, v.63(3):176-178. [En] (REP.MB-1770)

Germplasm collections of blackgram maintained at Tamil Nadu Agricultural University were screened for the root rot disease caused by Macrophomina phaseolina. The trials were conducted at three localities in different seasons. The present studies reveal that the field tolerance of blackgram varieties varies from season to season and locality to locality. [THH]

*0075 Virmani, S.S. ; Singh, K.B. ; Singh, Kuldip 1976. **Note on the screening of greengram germplasm against yellow-mosaic virus disease in India.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.46(5):243-245. [En] (REP.MB-1165)

All 620 lines of mungbean collected from 14 countries were screened for resistance to mungbean yellow mosaic virus at the farms of the Punjab Agric. Univ. at Ludhiana (in 1972 and 1973) and Gurdaspur (in 1973). The results of field screening done at Ludhiana during the wet season of 1972 indicated that 3

lines were resistant, 14 moderately resistant, and 18 moderately susceptible. A screening test in the wet season of 1973 showed that out of 620 lines, 9 cultivars were free, 48 were resistant and 52 were moderately resistant, while at Gurdaspur the frequency of these classes was 31, 42, and 33, respectively. [THH]

*0076 Chand, J.N. ; Yadav, O.P. ; Yadav, H.C. 1977. **Reaction of genetic stocks of mung bean to bacterial blight (Xanthomonas phaseoli).** INDIAN PHYTOPATHOLOGY, v.30(4):565. [En] (REP.MB-2089)

In all 105 different lines of mungbean were screened against bacterial leaf spot under natural infection conditions during kharif 1975. Of these 15 were found to be highly resistant and 75 resistant. Next season (kharif 1976) one-month-old plants of these lines were artificially inoculated with a suspension of 48 hours old bacterial culture of Xanthomonas phaseoli. Of the 90 mungbean lines tested, none was immune, only ML 8, ML 10 and Jalgaon 781 were highly resistant. [THH]

*0077 Elec, J.V. ; Santos, I.S. 1977. **Screening for induced mutants in mungbean (Vigna radiata) resistant to powdery mildew (Erysiphe polygoni) [Abst.].** IN: Induced mutations against plant diseases; Proceedings. Vienna : International Atomic Energy Agency. p.291 [En] (SB123.S96 1977)

MEETING: Symposium on the Use of Induced Mutation for Improving Diseases Resistance in Crop Plants -- Vienna, Austria, Jan 31-Feb 4, 1977

A procedure for screening for resistance to powdery mildew (Erysiphe polygoni D.C.) in mungbean (Vigna radiata (L.) Wilczek) was established prior to commencing a mutation breeding program. Screening procedures were evaluated using a resistance check (Acc. No.306) and a susceptibility check (MG 50-10A). Seven-day-old seedlings were inoculated with powdery mildew and evaluated three weeks later on a 0-5 rating scale. Attempts were also made to select tolerant plants by selecting infected plants which had the capacity to produce at least one pod with at least one seed. Differences in infectivity between experiments were corrected by a weighted scale reading based on the resistance and susceptibility checks. No specific races of Erysiphe polygoni have been identified as yet, but this pathogen has been shown to infect a wide range of other species, Hibiscus esculentus (okra), Capsicum sp. (pepper), Solanum esculentum (eggplant), Euphorbia herta L., and Helotropium indicum L. Preliminary screening of approximately 10,000 M2 plants following gamma irradiation has not yet revealed any confirmed resistant or tolerant mutants. [AS]

*0078 Pandya, B.P. ; Singh, D.P. ; Sharma, B.L. 1977. **Screening of mungbean [Vigna radiata (L.) Wilczek] germplasm for field resistance to yellow mosaic virus.** TROPICAL GRAIN LEGUME BULLETIN, v.7:13-14. [En] (REP.MB-1757)

During kharif, 248 lines of mungbean together with a susceptible check, Hybrid 45, were grown at the Crop Center of G. B. Pant University of Agriculture and Technology. Out of 248 lines screened for field resistance to mungbean yellow mosaic virus (MYMV), only one, Tarai Local, was resistant, 21 were moderately resistant and the rest were tolerant or susceptible. All the lines resistant or moderately resistant to MYMV are viny or semi-viny plant

types. [THH]

*0079 Vidhyasekaran, P. ; Arjunan, G. ; Ranganathan, K. 1977. **Resistance in some mung varieties against root rot.** INDIAN PHYTOPATHOLOGY, v.30(3):404. [En] (REP.MB-1974)

Numerous germplasms of mungbean maintained at Tamil Nadu Agricultural University were screened for root rot caused by Macrophomina phaseoli in 1974, when there was severe natural incidence of the disease. Nineteen types of them showed field tolerance and these types were tested at three different locations for 10 seasons over four years. Most of the field tolerant types became susceptible in one or other season. Only two types, LM 220 and MS 9385, were free from the diseases in all the seasons and locations. They can be utilized as genetic stock to breed for disease resistance. [THH]

*0080 Utikar, P.G. ; Deshmukh, R.B. ; More, B.B. 1978. **Field reaction of black gram (Vigna mungo (L.) Wilczek) germplasm to powdery mildew.** TROPICAL GRAIN LEGUME BULLETIN, no.13/14:30-31. [En] (REP.MB-2149)

Eighty-seven lines of blackgram were screened for their field reaction to powdery mildew. Sixteen lines were found to be resistant. Among them, line P 163, P 22, P 178, P 177, P 157, P 161, P 20(B), P 20(A), 338/3 and P 134 showed disease severity between 0.87 and 4.28% and may serve as a genetic source of resistance to powdery mildew. [THH]

*0081 Chaudhary, G.G. ; Mathur, A.K. ; Tyagi, R.N.S. 1981. **Reaction of moong cultivars to yellow mosaic virus of moong (Phaseolus aureus) in Rajasthan.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.11(2):273-274. [En] (REP.MB-2610)

Out of 198 lines of mungbean were screened for yellow mosaic resistance, only 19 varieties showed resistance to the disease. [THH]

*0082 Gurha, S.N. 1981. **Screening blackgram germplasm types for leaf blight disease (Macrophomina phaseolina) resistance.** MADRAS AGRICULTURAL JOURNAL, v.68(10):692. [En] (A:PS)

Reactions of 102 blackgram varieties to the leaf blight disease (Macrophomina phaseolina) were observed under field conditions. Seven varieties, viz., PLU 241, PLU 137, PLU 130, PLU 1038, 1/1, 7386/3 and 22/3 showed tolerant reactions. Under artifical inoculation, only PLU 241, PLU 137 and 1/1 showed tolerant reactions. [THH]

*0083 Hossain, I. ; Shaikh, M.A.Q. ; Khan, A.A. 1981. **Field screening of mungbean (Vigna radiata (L.) Wilczek) germplasm for resistance to Cercospora leaf spot in Bangladesh.** SABRAO JOURNAL, v.13(2):180-182. [En] [En Abst] (REP.MB-2342)

One hundred and thirty strains of mungbean (Vigna radiata (L.) Wilczek)

germplasm of local, exotic, and mutant origin were screened under natural field conditions against Cercospora leaf spot. Only a single entry, MB-53, was highly resistant and two entries, e.g., MB-114 and MB-140, were intermediate in both the growing seasons. Accession MB-117 showed resistance in 1978-79 but appeared to be susceptible in 1979-80. These resistant/intermediate lines are of exotic origin and are being used in hybridization programs for developing resistant cultivars. [AS]

*0084 Jalaluddin, M. ; Shaikh, M.A.Q. 1981. **Evaluation of mungbean (Vigna radiata (L.) Wilczek) germplasm for resistance to mungbean yellow mosaic virus.** SABRAO JOURNAL, v.13(1):61-68. [En] [En Abst] (A:PS)

Yellow mosaic is the most damaging disease of mungbean in Bangladesh. Its eradication or control is complicated owing to its transmission by the whitefly. Development of resistant strains of the crop seemed most desirable. One hundred and sixty-eight accessions of local, exotic and mutant origin were screened under field conditions for identifying sources of resistance. Using a disease severity index (D.S.I.) based on percentages of leaflets and leaf areas infected, the accessions screened were graded into six disease reaction classes. One highly resistant strain MB 53 was identified in Sri Lanka, together with four resistant (three induced mutants from Bangladesh and one Indian cultivar) and three moderately resistant (one induced mutant from Bangladesh, one Indian and one Australian) strains. The resistance of the strains, however, needs to be confirmed by controlled glasshouse tests. [AS]

*0085 Marimuthu, T. ; Sivaprakasam, K. 1981. **Varietal reaction of green gram (Vigna radiata (L.) Wilczek) to leaf spot and powdery mildew.** PULSE CROPS NEWSLETTER, v.1(4):55. [En] (A:PS)

Two hundred lines of mungbean were screened for Cercospora leaf spot and powdery mildew resistance under natural conditions of infection for 3 consecutive years from kharif and rabi 1978 onwards. All lines tested were sown in double rows of 15 cm length with a spacing of 30 x 10 cm in between the rows of highly susceptible variety CO 3 or Hyb 12-4. The results indicated that the lines ML 3, ML 5, ML 12. AVRDC 1387, AVRDC 3404, and AVRDC 3478 were resistant to Cercospora leaf spot, while ML 3 alone was found to possess resistance to both Cercospora leaf spot and powdery mildew. The line ML 3 is also reported to be resistant to rust caused by Uromyces appendiculatus. [THH]

*0086 Mathur, A.K. ; Tyagi, R.N.S. ; Bhatnagar, L.G. 1981. **Evaluation of urad varieties for susceptibility to powdery mildew.** PULSE CROPS NEWSLETTER, v.1(3):59. [En] (A:PS)

Powdery mildew (Erysiphe polygoni) is one of the most important diseases of blackgram in Rajasthan. The reaction of 39 blackgram varieties to powdery mildew was studied. They were sown in two replications for 3 consecutive years. Results of 3 years revealed that only one variety 6203-1 was free both under epiphytotic and artificial conditions and all others differed in their susceptibility to the disease. [THH]

*0087 Singh, D.P. ; Sharma, B.L. 1981. **Evaluation of mungbean germplasm.**

MADRAS AGRICULTURAL JOURNAL, v.68(5):289-295. [En] [En Abst] (A:PS)

Eighty-five and 72 lines of mungbean germplasm were evaluated in 1978 and 1979, respectively. Lam GG 127 and CC 1 were the earliest maturing lines. The highest number of pods were recorded in LM 294-1 (118.6) and ML 5 (130.4) in 1978 and 1979, respectively. LM 294-1 also gave the highest yield (24.59 g) in 1978. EC 162000-1 had the highest number of seeds/pod (12.1) and gave the highest yield (25.50 gm) in 1979. The lines 11/99, 11/395 and 16-303-20-3-g were resistant to MYMV (mungbean yellow mosaic virus) and CLS (Cercospora leaf spot). The positive and significant correlations of plant/height with pods/plant, yield/plant and of pods/plant with yield/plant were observed in both years. The MYMV and CLS reactions had negative and significant correlations with yield, and pods/plant in both years. [AS]

*0088 Gurha, S.N. ; Misra, D.P. ; Kamthan, K.P. 1982. **Studies on some aspects of yellow mosaic disease of black gram [Vigna mungo (L.) Hepper].** MADRAS AGRICULTURAL JOURNAL, v.69(7):435-438. [En] [En Abst] (A:PS)

Out of 281 cultivars of blackgram observed for their reaction to yellow mosaic disease (YMV) under natural conditions of epiphytotics, 15 cvs. remained free from infection, 11 cvs. were tolerant, 20 cvs. were moderately tolerant, 33 cvs. were susceptible, and 202 cvs. were highly susceptible. The studies revealed that a major setback to pod bearing, maturity and yield in blackgram occurred at 25% infection intensity of YMV. Therefore, the use of parent material even with 25% YMV infection should be discouraged in the hybridization program. [AS]

*0089 Chand, P. ; Varma, J.P. 1983. **Effect of yellow mosaic on growth components and yield of mungbean and urdbean.** HARYANA AGRICULTURAL UNIVERSITY JOURNAL OF RESEARCH, v.13(1):98-102. [En] [En Abst] (REP.MB-2577)

Screening of varieties of mungbean and blackgram against yellow mosaic disease under natural conditions of infection in the field and after artificial inoculation in the glasshouse was done at Hissar. Yellow mosaic disease reduced height upto 38.2%, fresh weight of shoot upto 28.5%, and loss in yield per plant upto 66.6%, and loss in 1000-seed weight upto 25.7%. Shape, size and appearance of pods and seeds of diseased plants were also considerably distorted. However, the germinability of seeds was apparently unaffected due to yellow mosaic. [AS]

*0090 Jadhav, M.R. ; Sharma, B.L. 1983. **Field reaction of mung (Vigna radiata L.) Wilczek varieties to Cercospora leaf spot in northern M.P.** LEGUME RESEARCH, v.6(2):99-100. [En] (A:PS)

Twenty-seven varieties of mungbean were screened for resistance to Cercospora leaf spot. Nine varieties were found resistant, and 10 varieties were proved moderately resistant. [THH]

*0091 Khandar, R.R. ; Bhatnagar, M.K. ; Rawal, P.P. 1983. **Evaluation of some commercial varieties of mungbean (Vigna radiata Wilc.) against the leaf spot caused by Cercospora canescens Ellis and Martin.** AGRICULTURAL SCIENCE

DIGEST, v.3(3/4):182-184. [En] [En Abst] (REP.MB-2656)

Twenty-nine varieties of Mungbean (Vigna radiata Wilc.) were screened against Cercospora canescens Ellis & Martin at Udaipur under artificial and natural conditions. None of the varieties was immune, resistant or even moderately resistant. Five varieties, viz., Local, ML-9, Vargha, ML-4, and RRS Pusa were moderately susceptible and other varieties were graded either susceptible or highly susceptible. [AS]

*0092 Singh, R.N. ; Nene, Y.L. ; Srivastava, S.K. 1983. **Evaluation of urdbean and mungbean genotypes for resistance to bean common mosaic virus and losses caused by the disease.** LEGUME RESEARCH, v.6(2):69-73. [En] [En Abst] (A:PS)

Bean common mosaic virus (BCMV) infection in blackgram cultivar Mash 41-13, under field conditions, affected various yield contributory characters adversely and resulted in yield reduction of 69.14%. The plants raised in the glasshouse from infected seeds of cultivar UPU-2, under conditions favoring disease development, failed to produce grains. Sap-inoculation with BCMV produced severe disease in 66.07% of the blackgram genotypes as against 2.77% in mungbean. A-6, PLU-584, T-27 and 1-4-2-2 have been identified as tolerant blackgram material. Mungbean lines L-293 and 55-1 have been indentified as resistant and L-80, LM-189-3-1, LM-214, LM-496, LM-671, LM-692, M.J.-2-3 and 189-4-1 as tolerant material. It has been established that there is no correlation between field susceptibility and response of varieties to sap-inoculation, in the glasshouse, under conditions highly favoring disease development. [AS]

*0093 Zote, K.K. ; Dandnaik, B.P. ; Khalikar, P.V. 1983. **Reaction of moong cultivars to Macrophomina blight.** JOURNAL OF MAHARASHTRA AGRICULTURAL UNIVERSITIES, v.8(2):146-147. [En] [En Abst] (REP.MB-2621)

Out of 14 mungbean cultivars tested, none of the cultivars was found to be completely free from the Macrophomina blight. However, 5 cultivars, viz., PIMS-1, 2, 3, 4, and No. 11/395 showed resistance to Macrophomina phaseolina in all the test years. Six cultivars were moderately susceptible, one susceptible, and one highly susceptible to the disease. [AS]

*0094 Jalaluddin, M. 1984. **Field evaluation of mungbean and blackgram germplasm for resistance to Cercospora leaf spot and powdery mildew.** SABRAO JOURNAL, v.16(1):73-76. [En] [En Abst] (A:PS)

A total of 147 mungbean (Vigna radiata (L.) Wilczek) and 39 blackgram (Vigna mungo L.) accessions of local and exotic origin and induced mutants were evaluated for resistance to Cercospora leaf spot (Cercospora cruenta) and powdery mildew (Erysiphe polygoni) under natural epiphytotic conditions during two consecutive rabi (winter) growing seasons of 1977-78 and 1978-79, in Bangladesh. Two mungbean strains, MB 53 from Sri Lanka and SL. No.59 from Bangladesh, were highly resistant to both Cercospora leaf spot and powdery mildew. Blackgram strains B 34 from Sri Lanka and B 20 from Bangladesh were highly resistant to Cercospora leaf spot and powdery mildew, respectively. Several strains of both crops were moderately resistant to both diseases. [AS]

***0095** Gurha, S.N. ; Misra, D.P. 1985. **A note on the field reaction of Cercospora leaf spot in black gram (Vigna mungo).** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.13(3):351-352. [En] (REP.MB-2803)

Of 183 varieties of blackgram tested under natural epiphytotic conditions, 3 were resistant (1815, PLU-2A and 14/8), 6 were moderately resistant (PLU-291, 13/10, PLU-445, PLU-442, PLU-452, and PLU-61) and the rest were susceptible or highly susceptible to Cercospora leaf spot. [THH]

***0096** Das, S.N. ; Routaray, B.N. ; Sahoo, H. 1986. **Reaction of some green gram varieties to root-knot nematode Meloidogyne incognita.** INDIAN PHYTOPATHOLOGY, v.39(1):126-128. [En] (A:PS)

Twenty-four mungbean varieties were tested for resistance to Meloidogyne incognita. The varieties TAD 7, K 851, ML 62, PDM 14 and T 44 were resistant and ML 5, ML 80, TT 8E, ML 3, ML 70, Hyb. 12-4 and TT 9E were moderately resistant. All others were susceptible to highly susceptible. [THH]

- Inheritance of Disease Resistance

***0097** Singh, D. ; Patel, P.N. 1975. **Screening and inheritance of bacterial leaf spot resistance in mung bean.** INDIAN PHYTOPATHOLOGY, v.28:144. [En] (A:PS)

MEETING: Annual Meeting of Indian Phytopathological Society, 27th -- New Delhi, India, Dec 31, 1974

Fifty-nine germplasm lines of mungbean were tested against bacterial leaf spot pathogen Xanthomonas phaseoli in the glasshouse and field. Twenty-six lines proved highly resistant and showed hypersensitive reaction. Except Jalgaon-781 all the cultivated varieties were susceptible. In crosses between the resistant lines P-476, P-646, PLM-501, Jalgaon-781 and the susceptible varieties B-1, T-44, T-2, T-51, Hybrid-45, No.305, Kopergaon and 24-2, all the F1 plants were resistant. Analysis of the F2 and F3 progenies showed that the leaf spot resistance was controlled by a single dominant gene. In contrast, the mungbean yellow mosaic field tolerance in the line 24-2 was recessive and appeared monogenic in screening under natural epiphytotic. The reaction to these diseases, seed color and days to maturity were inherited independently. Using pedigree method, it has been possible to develop lines combining leaf spot resistance, yellow mosaic tolerance, early maturity and other desirable characters. [AS]

***0098** Dahiya, B.S. ; Singh, Kuldip ; Brar, J.S. 1977. **Incorporation of resistance to mungbean yellow mosaic virus in black gram (Vigna mungo L.).** TROPICAL GRAIN LEGUME BULLETIN, no.9:28-32. [En] (A:PS)

This paper investigates the genetics of resistance to mungbean yellow mosaic virus and its incorporation into the high yielding but susceptible cultivars of blackgram. [THH]

*0099 Singh, B.V. ; Ahuja, M.R. 1977. **Phaseolus sublobatus Roxb.: a source of resistance to yellow mosaic virus for cultivated mung.** INDIAN JOURNAL OF GENETICS AND PLANT BREEDING, v.37(1):130-132. [En] (A:PS)

One of the two strains of Phaseolus sublobatus, Pantnagar strain A, showed resistance to yellow mosaic virus. The hybrid materials in mungbean from crosses of Pantnagar strain A and cultivated varieties of mungbean also showed potential for YMV disease resistance. [THH]

*0100 Thakur, R.P. ; Patel, P.N. ; Verma, J.P. 1977. **Genetical relationships between reactions to bacterial leaf spot, yellow mosaic and Cercospora leaf spot diseases in mungbean (Vigna radiata).** EUPHYTICA: NETHERLANDS JOURNAL OF PLANT BREEDING, v.26(3):765-774. [En] [En Abst] (REP.MB-1813)

Studies on the inheritance pattern of bacterial leaf spot (BLS), yellow mosaic (YM) and Cercospora leaf spot (CLS) reactions in crosses of BLS and YM resistant/tolerant but CLS susceptible x CLS resistant but BLS and YM susceptible parents indicated that resistances to BLS and CLS were governed by single dominant genes, whereas YM tolerance was a monogenic recessive character. The studies also indicated that these three genes were inherited independently. The simple inheritance pattern and independent assortment of the genes governing resistance/tolerance to these diseases suggest that the usual breeding methods will be adequate to develop multi-disease resistant mungbean cultivars. [AS]

*0101 Thakur, R.P. ; Patel, P.N. ; Verma, J.P. 1977. **Independent assortment of pigmentation and resistance to Cercospora leaf spot in mungbean.** INDIAN PHYTOPATHOLOGY, v.30(2):264-265. [En] (REF.MB-1912)

Resistance to Cercospora canescens in mungbean lines EC 27087-2 and EC 27261-3 was due to a single dominant gene, which was not linked to a pigmentation gene carried by PS 7, a Cercospora leaf spot susceptible line. [EMS]

*0102 Shukla, G.P. ; Pandya, B.P. ; Singh, D.P. 1978. **Inheritance of resistance to yellow mosaic in mungbean.** INDIAN JOURNAL OF GENETICS AND PLANT BREEDING, v.38(3):357-360. [En] [En Abst] (REP.MB-2184)

The inheritance of resistance to yellow mosaic virus was studied in mungbean [V. radiata (L.) Wilczek]. The parents, 'Tarai Local' (resistant), 'L-80' (moderately resistant), 'L 294-1' and 'LM-214' (tolerant) and 'Jawahar-45' and 'G-65' (susceptible), and their F1's, F2 and F3 generations were inoculated artificially. The resistance was found to be under digenic control and recessive in all the crosses. [AS]

*0103 Sittiyos, P. ; Poehlman, J.M. ; Sehgal, O.P. 1979. **Inheritance of resistance to cucumber mosaic virus infection in mungbean.** CROP SCIENCE, v.19(1):51-53. [En] [En Abst] (REP.MB-2020)

The resistant reaction to cucumber mosaic virus, CMV-M, infection in

mungbean (Vigna radiata (L.) Wilczek) strain PI 271401, in crosses with susceptible strains PI 201868 and PI 368307, was conditioned by a single dominant gene designated Cmm. The Cmm locus was not linked with loci controlling color of seed texture layer or color of seed coat. Seed yields of CMV-M susceptible F2 plants in the field were reduced by more than 50% compared to resistant plants. [AS]

***0104** Lee, Y.B. 1980. **1. Inheritance study on resistance to powdery mildew and sensitivity to photoperiod in mungbean. 2. Inheritance study on resistance to Cercospora leaf spot in mungbean. 3. Inheritance study on number of leaflets in mungbeans.** Shanhua : AVRDC. 38 leaves [En] (AVRDC Production Trainees' Report) (REP.MB-2134)

This study indicated that day length may affect the development of the pathogen and the reaction of the host to the disease. Under long day length conditions, photoperiod sensitivity is controlled by a single dominant gene, and the genetic factors for disease resistance and photoperiod sensitivity are inherited independently. Resistance to Cercospora leaf spot was found to be controlled by a dominant gene in mungbean V 4718. Multifoliate leaves in mungbean V 5926 were governed by a single recessive gene. The genes controlling leaflet number and seed coat color assorted independently into gametes. [AS]

***0105** Singh, D.P. 1980. **Inheritance of resistance to yellow mosaic virus in blackgram (Vigna mungo (L.) Hepper).** THEORETICAL AND APPLIED GENETICS, v.57(5):233-235. [En] [En Abst] (REP.MB-2326)

The inheritance of resistance to mungbean yellow mosaic virus was studied in blackgram (Vigna mungo (L.) Hepper). The highly resistant donors Pant U 84 and UPU 2 and a highly susceptible line UL 2, their F1's, F2's, and backcrosses were grown with spreaders located every 5 to 6 rows. The resistance was found to be digenic and recessive in all the crosses and free from cytoplasmic effect. [AS]

***0106** Thakur, R.P. ; Patel, P.N. ; Verma, J.P. 1980. **Inheritance of resistance to Cercospora leaf spot in mungbean.** INDIAN PHYTOPATHOLOGY, v.33(3):377-379. [En] [En Abst] (A:PS)

Mungbean (Vigna radiata) lines EC-27087-2, EC-27261-3 and ML-1 were identified as sources of resistance to Cercospora leaf spot caused by Cercospora canescens. Resistance to C. canescens was found to be simply inherited and governed by a single dominant gene. [AS]

***0107** Meiners, J.P. 1981. **Genetics of disease resistance in edible legumes.** ANNUAL REVIEW OF PHYTOPATHOLOGY, v.19:189-209. [En] (A:PS)

Information on inheritance of resistance to bacterial leaf spot, Cercospora leaf spot, mungbean yellow mosaic virus, cucumber mosaic virus and powdery mildew in mungbean and blackgram is given. [THH]

*0108 Yadav, H.C. ; Chand, J.N. ; Saharan, G.S. 1981. **Inheritance of resistance in mungbean to bacterial leaf spot.** IN: Lozano, J.C. Fifth international conference on plant pathogenic bacteria; Proceedings of. Cali : CIAT. p.580-583 (SB734.C4)

MEETING: International Conference on Plant Pathogenic Bacteria, 5th -- CIAT, Cali, Colombia, Aug 16-23, 1981

The F1, F2 and F3 progenies of crosses made between resistant and susceptible parents showed that the resistance in Jalgaon-781, ML-8, and ML-10 varieties was governed by a single recessive gene situated on the same locus. [AS]

*0109 Solanki, I.S. ; Waldia, R.S. ; Dahiya, B.S. 1982. **Resistance to mungbean yellow mosaic virus in blackgram.** INDIAN JOURNAL OF GENETICS AND PLANT BREEDING, v.42(2):240-242. [En] [En Abst] (A:PS)

The inheritance of resistance to mungbean yellow mosaic virus (MYMV) in blackgram (Vigna mungo (L.) Hepper), was studied in different generations of two crosses involving resistant (Pant U19 and Pant U26) and susceptible (LU286 and S4) parents. Susceptibility was observed to be dominant over resistance in both the crosses. The resistance was found to be under digenic control and recessive. [AS]

*0110 Leabwon, U. ; Oupadissakoon, S. 1984. **Inheritance of resistance to Cercospora leaf spot in mungbean.** KASETSART JOURNAL (NATURAL SCIENCES), v.18(1):14-19. [Th] [En Abst] (A:PS)

Genetic studies on the resistance to Cercospora leaf spot and some other quantitative traits in 45 F1s deriving from diallel crosses of 10 mungbean varieties indicated that additive gene action was the mode of inheritance for Cercospora leaf spot resistance, 100-seed weight, plant height and number of pods per plant, while the inheritance of days to first flower, days to first ripe pod, days to maturity and yield per plant were governed by dominant gene action. Broad sense and narrow sense heritability of the resistance to Cercospora leaf spot were about 99 and 75%, respectively. Cercospora leaf spot resistance had direct negative effect on yield. Plants, with resistance to Cercospora leaf spot, medium to tall plant height, many pods per plant, and medium seed size should be selected for mungbean breeding programs in Thailand. [AS/SS]

*0111 Dwivedi, S. ; Singh, D.P. 1985. **Inheritance of resistance to yellow mosaic virus in a wide cross of blackgram (Vigna mungo [L.] Hepper).** PLANT BREEDING / ZEITSCHRIFT FUER PFLANZENZUCHTUNG, v.95(3):281-284. [En] [En De Abst] (A:PS)

The inheritance of resistance to mungbean yellow mosaic virus (MYMV) was studied in a wide cross of blackgram [Vigna mungo (L.) Hepper]. The highly susceptible line of wild progenitor (V. mungo var. silvestris, type B) and the highly resistant line of blackgram Pant U 84, their F1, F2 and F3 generations were grown with the virus spreader located after every 5 rows of the test materials. The resistance was found to be digenic and recessive. The gene symbols ymv1 and ymv2 were proposed. [AS]

***0112** Shukla, G.P. ; Pandya, B.P. 1985. **Resistance to yellow mosaic in green gram.** SABRAO JOURNAL, v.17(2):165-171. [En] [En Abst] (A:PS)

The interallelic relationships of resistance/susceptibility genes to yellow mosaic in mungbean were investigated. The parents Tarai Local (resistant-R), L 80 (moderately resistant-MR), L 294-1 and LM 214 (tolerants-T) and Jawahar 45 and G 65 (susceptible-S) were intercrossed and 14 F1 crosses were recovered. The F1 crosses of R x S, MR x S and T x S showed moderately susceptible to susceptible reactions which indicated resistance to be a recessive character. The response from F2 and F3 generations revealed the presence of duplicate recessive genes. F1 reactions of R x MR and R x T were moderately resistant to tolerant suggesting again the higher degree of resistance to be recessive. F2 and F3 reactions indicated the involvement of an inhibitory gene. The F1s of T x T were susceptible and F2 and F3 reactions showed the possibilities for the presence of complementary genes. The genic interactions confirm the genetic constitution of the parents as; Tarai Local, s1s1s2s2ii; L 80 = L 294-1, s1s1S2S2II; LM 214, S1S1s2s2II; Jawahar 45 = G 65, S1S1S2S2ii. Genes S1 and S2 respond for susceptibility and I behaves as an inhibitor. [AS]

***0113** Verma, R.P.S. ; Singh, D.P. 1986. **The allelic relationship of genes giving resistance to mungbean yellow mosaic virus in blackgram.** THEORETICAL AND APPLIED GENETICS, v.72(6):737-738. [En] [En Abst] (REP.MB-2811)

The allelic relationship of resistance genes for mungbean yellow mosaic virus (MYMV) was studied in blackgram (V. mungo (L.) Hepper). The resistant donors to MYMV - 'Pant U84' and 'UPU 2', and their F1, F2 and F3 generations - were inoculated artificially using an insect vector, whitefly (Bemisia tabaci Genn.). The two recessive genes previously reported for resistance were found to be the same in both donors. [AS]

- Breeding for Disease Resistance

***0114** Rajput, M.A. 1974. **Increased variability in the M2 gamma-irradiated mung beans (Phaseolus aureus Roxb.).** RADIATION BOTANY, v.14(2):85-89. [En] (REP.MB-0237)

Seeds of cultivar 6601 were exposed to gamma radiation at doses of 10 to 40 kR and the effects on flowering time, plant height, pods per plant, pod length, grains per pod, 100-grain weight and plant yield were studied. In the M2 generation, positive or negative shifts occurred in the mean values for all the polygenic traits except mean pod length, which remained unchanged. The coefficient of variability increased in all treatments for all the traits. [PBA 45-744]

***0115** Ahuja, M.R. ; Singh, B.V. 1977. **Induced genetic variability in mung bean through interspecific hybridization.** INDIAN JOURNAL OF GENETICS AND PLANT BREEDING, v.37(1):133-136. [En] [En Abst] (A:PS)

Through a systematic program of interspecific hybridization between yellow mosaic virus (YMV) susceptible varieties of Vigna radiata (Hyb.45, T-44 and Pusa Baisakhi) and Phaseolus sublobatus (resistance to YMV), plant materials

have been produced in mungbean which not only showed resistance to YMV but also exhibited enormous genetic variability with respect to yield components and plant type. [AS]

*0116 Shakoor, A. ; Ahsanul-Haq, M. ; Sadiq, M. ; Sarwar, G. 1977. **Induction of resistance to yellow mosaic virus in mungbean through induced mutations.** IN: Induced mutations against plant diseases; Proceedings of. Vienna : International Atomic Energy Agency. p.293-302 (SB123.S96 1977)

MEETING: Symposium on the Use of Induced Mutations for Improving Disease Resistance in Crop Plants -- Vienna, Austria, Jan 31-Feb 4, 1977

Yellow mosaic is a serious disease of mungbean and heavy losses in grain yield may occur, depending on the severity of the disease. Genetic resistance against this disease does not exist in the local or the exotic material so far screened in Pakistan. Eight local cultivars were irradiated with various gamma-ray doses using a 60 Co source. Screening against yellow mosaic disease was done in the M3 generation so as to recover recessive mutations. Of 128 single plant selections made in the M3 generation on the basis of their apparent disease resistance behavior, it was eventually possible to select six mutant lines showing resistance to yellow mosaic. Some of the mutant lines are short in stature compared with the parent. The possible uses of these dwarf resistant lines as commercial varieties and for breeding programs are discussed. [AS]

*0117 Misra, R.C. ; Tripathy, D. ; Sahu, R.C. 1978. **YMV resistant mung bean for summer cultivation.** INDIAN JOURNAL OF GENETICS AND PLANT BREEDING, v.38(1):103-105. [En] [En Abst] (REP.MB-2076)

Two selections of mungbean developed from a cross between 'L. 24-2' and 'Pusa Baisakhi' were found to be free of yellow mosaic virus and high yielding during the summer in the coastal districts of Orissa. [AS]

*0118 Sandhu, T.S. 1978. **Breeding for yellow mosaic virus resistance in mungbean.** IN: The 1st International Mungbean Symposium. Shanhua, Tainan : AVRDC. p.176-179 [En] (SB205.M8I5)

MEETING: International Symposium on Mungbean, 1st -- Los Banos, Philippines, Aug 16-19, 1977

Transmission, host range, and symptoms of mungbean yellow mosaic virus are described. Resistant sources and improved varieties of mungbean resistant to the mosaic disease under Indian conditions are reported. [GF]

*0119 Chandel, K.P.S. ; Joshi, B.S. ; Pant, K.C. 1980. **Breeding mung bean (Vigna radiata Wilczek) for photoinsensitivity, high yield and field resistance to yellow mosaic virus.** TROPICAL GRAIN LEGUME BULLETIN, v.17/18:29-32. [En] (A:PS)

Four selections have been developed which are photoinsensitive and originate from the cross between Pusa Baisakhi, a dwarf early photoinsensitive

cultivar susceptible to yellow mosaic virus (YMV), and Plm 1066, a tall erect photosensitive line with horizontal resistance to YMV. PIMS 1 and PIMS 2 flower after 35-40 days while PIMS 3 and PIMS 4 flower after 40-45 days. PIMS 1 and PIMS 2 are shorter than the other two. All produce many pods per plant and show synchronous maturity, delayed shattering and high tolerance of YMV during the kharif season. In tests at five localities in the spring-summer and kharif seasons, high yields of up to 2,000 kg/ha were obtained. [PBA 52-6148]

***0120** Haq, M.A. 1980. **Use of induced mutations for the induction of resistance against Ascochyta blight in chickpea (Cicer arietinum) and yellow mosaic virus in mungbean (Vigna radiata).** IN: Induced mutations for the improvement of grain legume production; Report of. Vienan : IAEA. p.63-67 (REP.MB-2107)

MEETING: FAO/IAEA Research Coordination Meeting on the Use of Induced Mutations for the Improvement of Grain Legume Production, 1st -- Universiti Kebangsaan, Malaysia, May 28-June 1, 1979

Heavy losses in grain yield may be caused by Ascochyta rabiei in chickpea and yellow mosaic virus in mungbean. Genetic resistance against these diseases is scanty in the germplasm screened so far. Eight local cultivars of mungbean were irradiated with gamma rays. Screening against yellow mosaic virus was done in M3 generation to recover recessive mutations. Out of 128 plant selections made in M3 on the basis of their resistant behavior, six mutant lines were confirmed. The moderately resistant mutant line 3854 has good yield potential. [AS/GF]

***0121** Nagaraj, N.C. ; Muniyappa, V. ; Satyan, B.A. ; Shivashankar, G. 1981. **Resistance to mungbean yellow mosaic virus.** INDIAN JOURNAL OF GENETICS AND PLANT BREEDING, v.41(3):423-435. [En] [En Abst] (A:PS)

Eighteen Phaseolus species were tested artificially for mungbean yellow mosaic. Twelve species showed severe infection, and one had moderate infection. Two showed mild infection and 2 species did not produce any symptoms. Crosses between P. calcaratus and cultivated mungbean varieties Jawahar-45 and PIMS-3 were successful resulting F1 hybrids. [AS]

***0122** Singh, D.P. 1981. **Breeding for resistance to diseases in greengram and blackgram.** THEORETICAL AND APPLIED GENETICS, v.59(1):1-10. [En] [En Abst] (REP.MB-2235)

This review deals with the origin and interrelationship of blackgram and mungbean, as well as symptoms, mode of transmission and host range of important diseases, of the 2 crops, namely: mungbean yellow mosaic virus, leaf crinkle virus, leaf curl virus, mosaic mottle virus, Cercospora leaf spot, powdery mildew, root and stem rots, bacterial leaf spot and halo blight. The screening for resistance, sources of resistance, including interspecific hybridization, and induced mutations, as well as the genetics of resistance are treated along with suggestions for future breeding strategies of these crops. [AS]

***0123** Shaikh, M.A.Q. ; Majid, M.A. ; Ahmed, Z.U. ; Shamsuzzaman, K.M. 1982.

Induced mutations for new plant types and disease resistance in mungbean and blackgram. IN: Induced mutations for improvement of grain legume production II; Proceedings of. Vienna : IAEA. p.7-17 [En] (SB204.R4 1981)

MEETING: Research Co-ordination Meeting on the Use of Induced Mutations for Improvement of Grain Legume Production, 2nd -- Chiang Mai, Thailand, Apr 27-May 1, 1981

Mungbean and blackgram are important grain legumes in Bangladesh, however, the productivity is low. Varietal improvement should be a basic requirement for increasing production. Following treatment of seeds with 60Co gamma rays a number of positive deviants were selected having improved yield factors, including plant types and disease resistance. [AS]

*0124 Singh, D.P. 1982. **Breeding for resistance to mungbean yellow mosaic virus in mungbean and urdbean.** INDIAN JOURNAL OF GENETICS AND PLANT BREEDING, v.42(3):348-355. [En] [En Abst] (A:PS)

Mungbean yellow mosaic virus is one of the most important diseases of mungbean (V. radiata (L.) Wilczek) and blackgram (V. mungo (L.) Hepper). It is transmitted through whitefly, Bemisia tabaci Genn. Resistant lines to virus and vector come from disease prone areas of India. The resistance is recessive and digenic. Screening for resistance can be done in the field by planting spreader rows and/or by mass-screening or individual plant screening techniques. In view of the resistance sources and inheritance of resistance, the breeding methodology involving varietal crosses and interspecific hybridization of mungbean with blackgram and wild progenitor, V. sublobata, have been discussed along with the scope of induced mutations. [AS]

*0125 Gill, K.S. ; Verma, M.M. ; Ohaliwal, H.S. ; Sandhu, T.S. 1983. **Interspecific transfer of resistance to mungbean yellow mosaic virus from Vigna mungo to Vigna radiata.** CURRENT SCIENCE, v.52(1):31-33. [En] (A:PS)

The resistant V. mungo line G 31 was crossed reciprocally with the susceptible V. radiata lines ML 37, ML 30 and ML 34. Subsequent selection resulted in resistant F8 lines which have given higher yields than the best V. radiata lines. [PBA 53-5943]

*0126 Singh, D.P. 1986. **Genetics and breeding for disease resistance in mungbean and urdbean.** IN: Gupta, P.K. ; Bahl, J.R. Genetics and crop improvement. Meerut : Rastogi & Company. p.125-131 [En] [En Abst] (SB123.G8)

MEETING: Symposium on Advances in Genetics and Crop Improvement -- Meerut, India, Dec 1984

The paper describes variation in the cultivated and wild germplasm for resistance to different diseases. The genetics of resistance to mungbean yellow mosaic virus (MYMV) in blackgram (Vigna mungo (L.) Hepper) and mungbean (Vigna radiata (L.) Wilczek) and mosaic mottle virus in blackgram and that to powdery mildew, Cercospora leaf spot (CLS), bacterial leaf spot (BLS) and cucumber mosaic virus in mungbean are discussed. The breeding methods including selection, hybridization and induced mutations are dealt particularly with reference to disease resistance and the strategies for future breeding

programme are suggested. [AS]

- Resistant Varieties

***0127** Chandra, S. ; Sagar, P. ; Singh, B.P. 1974. **We can break the yield barrier in pulses.** INDIAN FARMING, v.24(1):11-13. [En] (REP.MB-0321)

Mungbean varieties, H 70-16, Pusa Baisakhi and Jawahar 45 and blackgram variety T 9 are described, together with cultural practices, mixed cropping with pigeonpea, plant disease control and pest control. [THH]

***0128** Vidhyasekaran, P. ; Arjunan, G. 1976. **Resistance in some urid varieties against powdery mildew.** INDIAN PHYTOPATHOLOGY, v.29(2):212-213. [En] (REP.MB-2088)

Blackgram lines No. 1792 and Warangal, maintained in the Tamil Nadu Agric. Univ., showed resistance to powdery mildews. The two lines were grown in rows of 10' length alternated with the susceptible variety CO 2 to test whether they showed resistance under high disease pressure. The trials were repeated for three seasons in two locations. The test lines along with CO 2 were also grown under greenhouse conditions and inoculated four times with heavy conidial inoculum. No.1792 showed slight incidence of the disease in one season in the field and in the greenhouse. But Warangal was highly resistant to the disease. [THH]

***0129** Singh, K.B. ; Sandhu, T.S. ; Malhotra, R.S. ; Brar, J.S. 1977. **"ML-5" a new moong.** INDIAN FARMING, v.27(5):7-8. [En] (REP.MB-1852)

'ML 5' was developed from the cross 'Mung No. 54' x 'Hyb. 45'. It has erect and compact plant type and profuse pod bearing capacity. It is fairly resistant to yellow mosaic virus under field conditions. It matures in about 90 days and can be successfully grown in rotation with wheat. 'ML 5' outyielded 'Jawahar 45' and 'ML 1'. [THH]

***0130** Krishnaiah, V.V. ; Venkateswarlu, P. ; Prasad, M.M.K.D. ; Rao, Y.H. 1978. **A new strain of black gram (Vigna mungo (L.) Hepper) resistant to powdery mildew (Erysiphe polygoni).** TROPICAL GRAIN LEGUME BULLETIN, no.13/14:28-29. [En] (REP.MB-2148)

During the 1975 rabi (winter) season 51 blackgram F3 families of Netiminumu x Chikkuduminumu were studied for their reaction to powdery mildew in the field and a few families were found to be less susceptible, whereas line 17 was found to be immune. [THH]

***0131** Shah, R.M. ; Chandel, K.P.S. ; Pant, K.C. ; Pathak, A.R. ; Patel, R.S. 1984. **'Sabarmati' a new promising mung variety for Gujarat.** INDIAN FARMING, v.34(9):25,47. [En] (A:PS)

Sabarmati (PIMS 4), a new variety of mungbean is described. It has, among other desirable characters, tolerance to mungbean yellow mosaic virus, resistance to Cercospora leaf spot and Macrophomina phaseoli. Cultural practices for this cultivar are also briefly discussed. [NMC]

***0132** Singh, D.P. ; Sharma, B.L. 1984. **New varieties of mungbean.** INDIAN FARMING, v.33(10):5,31. [En] (A:PS)

Two mungbean varieties, Pant Moong-1 and Pant Moong-2, were developed by Pantnagar University. These varieties are moderately resistant to mungbean yellow mosaic virus and Cercospora leaf spot and have a yield potential of 1200 to 1500 kg/ha. Owing to their short maturity duration (60-75 days), they are suitable as summer crops. [NMC]

***0133** Dahiya, B.S. ; Waldia, R.S. ; Singh, V.P. ; Hooda, J.S. ; Solanki, I.S. 1985. **'UH 80-7' a promising blackgram variety.** INDIAN FARMING, v.35(2):7-8. [En] (A:PS)

A new variety of blackgram UH 80-7, which has evolved at Hissar, is superior to the variety T 9. This variety is resistant to mungbean yellow mosaic virus, leaf crinkle virus and bacterial blight and gives higher yield than T 9 and Pant U-19. [NMC]

VIRAL DISEASES
- General

***0134** Pierce, W.H. 1934. **Viruses of the bean.** PHYTOPATHOLOGY, v.24:87-115. [En] [En Abst] (REP.MB-2391)

This paper reports results of a comparative study of five viruses, viz., common bean mosaic virus, yellow bean mosaic virus, alfalfa mosaic virus, ordinary tobacco mosaic virus and tobacco ring spot virus. Symptom expression, host resistance, properties, transmission and host range are described. Mungbeans could be infected with all viruses, except ordinary tobacco mosaic virus. [THH]

***0135** Williams, F.J. 1968. **Present status of pathological studies in respect of virus diseases with special reference to mung, urd, cowpeas and sterlit mosaic of arhar.** IN: Proceedings [of the] second annual workshop conference on pulse crops. New Delhi : Indian Council of Agricultural Research. 2p. [En] (REP.MB-1419)

MEETING: Annual Workshop Conference on Pulse Crops, 2nd -- New Delhi, India, Apr 1-3, 1968

The symptoms and damage resulting from viral diseases with special reference to mungbean, blackgram, cowpea, chickpea and pigeonpea are presented. A disease rating system is discussed. [THH]

***0136** Williams, F.J. ; Grewal, J.S. ; Amin, K.S. 1968. **Serious and new diseases of pulse crops in India in 1966.** PLANT DISEASE REPORTER, v.52(4):300-304. (REP.MB-0517)

Several diseases caused considerable reduction in yield of pulse crops in India during the 1966 season. Cicer arietinum was severely damaged by the combined effects of wilt and drought in northern India. Sterility mosaic of Cajanus cajan was prevalent in eastern Uttar Pradesh. Yellow mosaic of mungbean caused severe damage to Vigna radiata and V. mungo in Punjab and Uttar Pradesh. Dolichos lablab and D. biflorus in central and southern India were damaged by yellow mosaic diseases. Rust and powdery mildew decreased yield of Pisum sativum in Uttar Pradesh. A new leaf crinkle symptom (probably caused by an unidentified virus), was seen on V. mungo and V. radiata at New Delhi and at Kanpur and Pantnagar in Uttar Pradesh. A new yellow symptom (probably of virus origin), and a new wilt (caused by a fungus), were seen on Cajanus cajan at New Delhi. [AS]

***0137** Chowdhury, S.K. ; Mehra, R.C.S. ; Misra, D.P. 1970. **Natural incidence of yellow chlorosis and distortion mosaic on urid (Phaseolus mungo L.) during 1968-1969 at Pusa, Dholi vis a vis selection of donors.** IN: Proceedings [of the] fourth workshop on pulse crops. New Delhi : Indian Council of Agricultural Research. p.188-191. [En] (REP.MB-1456)

MEETING: Workshop on Pulse Crops, 4th -- Ludhiana, India, Apr 7-10, 1970

All 36 varieties of blackgram were planted in June, July, August and September during 1968 and 1969 to evaluate their performance against the yellow chlorosis and distortion mosaic virus diseases and yield. The maximum incidence of yellow chlorosis and distortion mosaic on the same varieties was in the June-sown crop. There was a decrease of incidence in July, August and September plantings. None of them was free from the diseases. Optimum time of sowing for the best grain yield was not the same for all varieties. [THH]

***0138** Verma, G.S. ; Verma, H.N. ; Srivastava, K.M. 1970. **Further studies on the virus diseases of pulse crops in Lucknow.** IN: Proceedings [of the] fourth workshop of the pulse crops. New Delhi : Indian Council of Agricultural Research. p.171-172. [En] (REP.MB-1454)

MEETING: Workshop on Pulse Crops, 4th -- Ludhiana, India, Apr 7-10, 1970

Seeds of cowpea and mungbean treated with different fungicides were sown in August and September, 1969. A week after sowing, about 10% of plants developed various types of disease symptoms. Cowpea showed three distinct types of viruses and mungbean showed yellow mosaic and phyllody symptoms. [THH]

***0139** Nene, Y.L. 1971. **Viral diseases of urd bean (Phaseolus mungo Roxb.), mung bean (Phaseolus aureus Roxb.) and pigeon pea (Cajanus cajan).** IN: Proceedings [of the] fifth workshop of all India coordinated research project pulses. Hissar : Haryana Agricultural University. p.115-117. [En] (REP.MB-0960)

MEETING: Workshop of All India Coordinated Research Project Pulses, 5th -- Hissar, India, Mar 18-20, 1971

The results of the survey on viral diseases of kharif blackgram, mungbean, and pigeonpea in the state of Uttar Pradesh are presented. Four distinct diseases, viz., yellow mosaic caused by mungbean yellow mosaic virus (MYMV), leaf crinkle caused by blackgram leaf crinkle virus (BLCV), mosaic mottle and leaf curl were observed. It was confirmed that MYMV is transmitted by the vector whitefly (Bemisia tabaci). The viruses of leaf crinkle and mosaic mottle were found mechanically transmissible. Attempts to transmit the leaf curl virus was not successful. [THH]

*0140 Nene, Y.L. 1972. **Diseases of mung and urd beans.** IN: A survey of viral diseases of pulse crops in Uttar Pradesh. p.6-153 [En] (G.B. Pant University of Agriculture and Technology, Research Bull. no.4) (SB608.L4N4)

Four viral diseases of mungbean and blackgram (yellow mosaic, leaf crinkle, mosaic mottle and leaf curl), their symptoms, disease transmission, host range, resistant sources and control means are described. [THH]

*0141 Nene, Y.L. 1973. **Viral diseases of some warm weather pulse crops in India.** PLANT DISEASE REPORTER, v.57(5):463-467. [En] [En Abst] (REP.MB-0728)

Four viral diseases attacking a large number of pulse (grain legume) crops were investigated. Mungbean yellow mosaic virus, transmitted by the whitefly, Bemisia tabaci is the most widespread and causes serious losses. It affects several pulse crops including soybean. Sources of resistance to mungbean yellow mosaic virus have been located in blackgram and soybean, but not in mungbean. An insecticide plus mineral oil spray schedule for the control of whitefly, vector of yellow mosaic, has been worked out. A fungus parasite, Paecilomyces farinosus, of B. tabaci has been discovered. The remaining three viruses, mosaic mottle, leaf crinkle, and leaf curl, are mechanically transmissible. Mosaic mottle is more widespread than leaf crinkle and leaf curl viruses. [AS]

*0142 Varma, J.P. ; Kadian, O.P. ; Singh, J.P. 1973. **Occurrence and incidence of virus diseases of moong and urid in Haryana.** INDIAN PHYTOPATHOLOGY, v.26(3):592-594. [En] (REP.MB-0243)

A survey of the virus diseases affecting mungbean (Vigna radiata Wilczek) and blackgram (V. mungo Hepper) was taken during the summer and autumn of 1971. The seven varieties of V. radiata and six varieties of V. mungo surveyed were found susceptible to both the mosaic and yellow mosaic viruses. There were varietal variations in susceptibility. [GF]

*0143 Narayanasamy, P. ; Jaganathan, T. 1974. **Effects of virus infection on the yield components of black gram.** MADRAS AGRICULTURAL JOURNAL, v.61(8):451-456. [En] [En Abst] (REP.MB-0546)

The study to assess the adverse effects of infection by blackgram mosaic virus [BMV] and blackgram sterility mosaic virus [BSMV] on the yield components of blackgram indicated that both viruses caused significant reduction in height and shoot weight of infected plants. The reduction in height was positively correlated with loss of grain weight. The weight and length of roots of

infected plants were not altered significantly. The number and weight of nodules were considerably reduced due to virus infection. A remarkable reduction in number of pods and weight of grains caused by virus infection was observed. A regression equation to predict the loss in yield based on growth retardation has been formulated. [AS]

***0144** Phatak, H.C. 1974. **Mung bean (Phaseolus aureus) and blackgram (Phaseolus mungo).** IN: Seed-borne plant viruses: identification and diagnosis in seed health testing. Copenhagen : Danish Government Institute of Seed Pathology for Developing Countries. p.46-62 [En] [En De Fr Abst] (REP.MB-1249)
(NOTE: Reprinted from: Seed Sci. & Technol. v.2:3-155, 1974)

Two viruses from mungbean isolated from Iranian samples were examined. One with filamentous, flexuous particles, transmissible by aphids, and serologically related with bean yellow mosaic virus, has been identified as mungbean mosaic virus (MMV). It compares closely with the strain of bean common mosaic virus (BCMV) seed-borne in mungbeans in Iran. Reasons for considering MMV as distinct, and not a strain of BCMV, are elaborated. Another seed-borne virus in mungbean with isometric particles was identified as a strain of cucumber mosaic virus (CMV). The virus isolated from an Indian blackgram sample constitutes new records of a natural host other than broadbean and of seed transmission as such. [AS/THH]

***0145** Shivanathan, P. 1974. **A seed borne virus of Phaseolus aureus (Roxb.).** IN: Symposium on virus diseases of tropical crops; Proceedings of. Tsukuba : Tropical Agricultural Research Center. p.143-150 [En] (Tropical Agricultural Research Series No.10) (REP.MB-1801)

MEETING: Symposium on Virus Diseases of Tropical Crops -- Tsukuba, Japan, Sep 1976

The study indicates that the virus causing mosaic and ringspot symptoms in mungbean has a wide distribution in Sri Lanka and its host range includes the common weed species and many crops. The biological properties of this virus closely resemble those reported strains of tobacco ringspot virus. [THH]

***0146** Singh, J.P. 1974. **Studies on virus disease of mung bean (Phaseolus aureus L. Roxb.) and urd bean (Phaseolus mungo L.).** Hissar : Haryana Agricultural University. 112p. [En] [En Abst] (Thesis - Ph.D. (Plant Pathology)) (SB205.M8S5)

This report characterizes the viruses causing mosaic mottling and leaf crinkle in mungbean and urd bean which occur in India. Several varieties were also evaluated for their susceptibility/resistance, changes occurring in chlorophyl, protein and nucleic acid contents in diseased plants; inhibition of viruses by antiviral chemicals; and effect of insecticides and oils to check field spread of yellow mosaic virus were also studied. [GF]

***0147** Raychaudhuri, S.P. ; Nariani, T.K. 1977. **Mung (Phaseolus aureus) yellow mosaic and Urid (Phaseolus mungo) mosaic virus.** IN: Virus and mycoplasma diseases of plants in India. New Delhi : Oxford & IBH Publishing Co.

p.17-18 [En] (SB736.R3)

Causal viruses, symptoms, disease transmission and host range of mungbean yellow mosaic and blackgram mosaic diseases are described. [THH]

***0148** Raychaudhuri, S.P. ; Dhingra, K.L. ; Verma, J.P. 1977. **Virus diseases of pulse crops in India.** SEEDS AND FARMS, v.4:7-17. [En] (REP.MB-2787)

Virus diseases of mungbean, blackgram, pigeonpea, cowpea, soybean, pea, faba bean, kidney bean, lablab bean, Lima bean and sun hemp were reviewed. [THH

***0149** Benigno, D.R.A. ; Dolores, A.C. 1978. **Virus diseases of mungbean in the Philippines.** IN: The 1st International Mungbean Symposium. Shanhua, Tainan : AVRDC. p.173-175 (SB205.M8I5)

MEETING: International Symposium on Mungbean, 1st -- Los Banos, Philippines, Aug 16-19, 1977

This report contains a listing of the 11 known mungbean diseases occurring in the Philippines, and a description of 4 viral diseases. All 4 virus diseases, yellow mosaic, green mosaic, leaf curl browing and little leaf, can occur in a mungbean plant or in one field at the same time. However, all 4 can also be isolated into pure cultures by using differential hosts. [AS/GF]

***0150** Iwaki, M. ; Auzay, H. 1978. **Virus diseases of mungbean in Indonesia.** IN: The 1st International Mungbean Symposium. Shanhua, Tainan : AVRDC. p.169-172 (SB205.M8I5)

MEETING: International Symposium on Mungbean, 1st -- Los Banos, Philippines, Aug 16-19, 1977

This paper describes the properties of the mungbean yellow mosaic virus (MYMV) and bean yellow mosaic virus (BYMV), their modes of transmission and host ranges. BYMV was shown to have a wide host range in leguminous plants. BYMV is usually not seed-borne, but in this test, the virus BYMV was transmitted through mungbean seed (Siwalik), although the percentage was low (about 1%). Varieties of mungbean resistant to BYMV were not found. [AS/GF]

***0151** Singh, J.P. ; Kadian, O.P. ; Varma, J.P. 1979. **Survey of virus diseases of mung bean and urd bean in Haryana.** HARYANA AGRICULTURAL UNIVERSITY JOURNAL OF RESEARCH, v.9(4):345-347. [En] (REP.MB-2575)

The incidence of yellow mosaic, mosaic and leaf crinkle virus diseases on mungbean and blackgram was tabulated. The intensity of all the diseases on mungbean was higher than blackgram, which could be due to the varieties grown. [THH]

***0152** Singh, J.P. 1980. **Effect of virus diseases on growth components and yield of mung bean (Vigna radiata) and urd bean (Vigna mungo).** INDIAN

PHYTOPATHOLOGY, v.33(3):405-408. [En] [En Abst] (A:PS)

Effect of yellow mosaic virus, mung-urd mosaic virus 1 and 2 and leaf crinkle virus on growth components and yield of some varieties of mungbean and blackgram was studied under natural conditions of infection. Growth components and yield of the plants infected with yellow mosaic virus, mung-urd mosaic virus 1 and mung-urd mosaic virus 2 decreased while leaf crinkle virus occasionally increased growth which was accompanied by drastic decrease in the yield. [AS]

*0153 Singh, J.P. ; Suhag, L.S. 1982. **Pigment, nucleic acid and protein concentration in the virus infected mung bean and urd bean leaves.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.12(1):61-63. [En] (REP.MB-2356)

Leaves of four-week-old mungbean and blackgram were inoculated with yellow mosaic virus, mung-urd mosaic virus 1, mung-urd mosaic virus 2 and leaf crinkle virus. Infected leaves were taken 3 weeks after inoculation to determine the changes in the level of pigments, protein and nucleic acid. Pigment content, DNA and protein concentration remained low in the infected leaves while RNA concentration was significantly increased in the leaves infected with yellow mosaic virus. [THH]

*0154 Boswell, K.F. ; Gibbs, A.J. 1983. **Lists of viruses naturally infecting particular species of legumes (arranged taxonomically).** IN: Viruses of legumes 1983: descriptions and keys from VIDE. Canberra : The Australian National Univ., Research School of Biological Sciences. p.117-118 (REP.MB-2800)

Nine viruses naturally infecting Vigna mungo and V. radiata in Australia are recorded. [THH]

*0155 Bansal, R.D. ; Khatri, H.L. ; Sharma, O.P. ; Singh, I.P. 1984. **Epidemiological studies on viral disease of mung and mash in Punjab.** JOURNAL OF RESEARCH (PUNJAB AGRICULTURAL UNIVERSITY), v.21(1):54-58. [En] [En Abst] (REP.MB-2620)

The prevalence of leaf crinkle and yellow mosaic virus diseases of mungbean and blackgram in different districts of Punjab, were found to be fairly common in nature. Yellow mosaic on mungbean was more prevalent in the districts of Sangrur and Gurdaspur; however, its prevalence was less in the districts of Bhatinda, Ferozepur and Jalandhar. Leaf crinkle was more prevalent on blackgram than in mungbean. One-month-old plants, when infected with leaf crinkle virus, gave the highest percentage of infected seeds. [AS]

*0156 Anonymous [n.d.]. **Studies on the diseases of legume plants: virus diseases of mung bean.** IN: Report of Japan-Indonesia joint food crop research program (Oct 1970-Oct 1975). Tokyo : Japan International Cooperation Agency. p.152-160 (REP.MB-2799)

Occurrence of mungbean mosaic virus (MMV) and bean yellow mosaic virus (BYMV) on mungbean in Indonesia are described. Both MMV and BYMV were

transmitted through seeds. [THH]

- Mungbean Yellow Mosaic Virus

***0157** Nariani, T.K. 1960. **Yellow mosaic of mung (Phaseolus aureus L.).** INDIAN PHYTOPATHOLOGY, v.13:24-29. [En] [En Abst] (REP.MB-0024)

A yellow mosaic disease of mungbean (Vigna radiata) is characterized by the presence of bright yellow patches on the leaves interspersed with green areas. The disease is graft-transmissible but is not transmitted by mechanical means. Whitefly (Bemisia tabaci Gen.) transmitted the disease to V. radiata, V. mungo, V. aconitifolius, Phaseolus acutifolius, P. lathyroides, Glycine max and Dolichos biflorus. [AS/THH]

***0158** Nene, Y.L. ; Naresh, J.S. ; Nair, N.G. 1971. **Additional hosts of mung bean yellow mosaic virus.** INDIAN PHYTOPATHOLOGY, v.24(2):415-417. [En] (REP.MB-0186)

Inoculations using viruliferous Bemisia tabaci established that Brachiaria ramosa, Eclipta alba, Xanthium strumarium and pigeon pea were hosts of mungbean yellow mosaic virus. The epidemiological significance of this finding is discussed. [EMS]

***0159** Ahmad, M. ; Harwood, R.F. 1973. **Studies on a whitefly-transmitted yellow mosaic of urd bean (Phaseolus mungo).** PLANT DISEASE REPORTER, v.57(9):800-802. [En] [En Abst] (REP.MB-1881)

Yellow mosaic (YM) of blackgram (Vigna mungo) has characteristics of a viral disease, but transmission experiments did not preclude a pathogen with similar characteristics. No transmission occurred by mechanical means, or by dodder (Cuscuta), but grafting and whitefly (Bemisia tabaci) from infected mungbean fields yielded symptoms; no transovarian carryover of pathogen by whiteflies was demonstrated. The same pathogen also affects mungbean (V. radiata), moth bean (V. aconitifolius), and soybean (Glycine max). Partial resistance to YM was found in blackgram lines that could be incorporated into susceptible varieties with otherwise desirable characteristics. [AS]

***0160** Nair, N.G. ; Nene, Y.L. 1973. **Studies on the yellow mosaic of urd bean (Phaseolus mungo L.) caused by mung bean yellow mosaic virus. 1. Transmission studies.** INDIAN JOURNAL OF FARM SCIENCE, v.1(1):109-110. [En] (REP.MB-0945)

The mungbean yellow mosaic virus on blackgram was found not to be transmissible by soil, seed, or sap inoculation. The seed transmission trial was also negative for soybean, and the sap inoculation trial for 26 plant species belonging to Leguminosae, Solanaceae, Cucurbitaceae, and Compositae. [EMS]

***0161** Nair, N.G. ; Nene, Y.L. 1973. **Studies on the yellow mosaic of urd bean (Phaseolus mungo L.) caused by mung bean yellow mosaic virus. 2. Virus-vector relationships.** INDIAN JOURNAL OF FARM SCIENCE, v.1(1):62-70. [En] [En Abst] (REP.MB-0946)

Acquisition and inoculation of mungbean yellow mosaic virus (MYMV) by the whitefly (Bemisia tabaci Gen.) took place with a minimum feeding period of 15 minutes each. Pre-acquisition starvation increased the transmission efficiency. MYMV was found to have a definite incubation period of more than three hours in the whitefly. The severity of the disease was the same irrespective of the number of insects used in transmission. The virus was retained by the vector until its death in 10 days. However, the percentage transmission decreased with the increase in the period of retention indicating that MYMV is a typical circulative virus. [AS/THH]

***0162** Nair, N.G. ; Nene, Y.L. ; Naresh, J.S. 1974. **Reaction of certain urd bean varieties to yellow mosaic virus of mung bean.** INDIAN PHYTOPATHOLOGY, v.27:256-257. [En] (REP.MB-0524)

Both necrotic mottle and yellow mottle are host reactions to the same disease, mungbean yellow mosaic virus. The varieties showing necrotic mottle gave higher yield and were less severely affected than those which showed yellow mottle symptoms. It is concluded that necrotic mottle is a type of resistant reaction to MYMV. [EMS]

***0163** Nair, N.G. ; Nene, Y.L. 1974. **Studies on the yellow mosaic of urd bean (Phaseolus mungo L.) caused by mung bean yellow mosaic virus. 3. Factors influencing transmission and symptom expression.** INDIAN JOURNAL OF FARM SCIENCE, v.2:42-47. [En] [En Abst] (REP.MB-0947)

Keeping test seedings 24 hour and 48 hour before and after inoculation with mungbean yellow mosaic virus (MYMV) did not produce any significant difference in the percentage of transmission. Similar was the case with the inoculation at various stages of growth. Moreover, it was found that the cell sap acidity of various blackgram varieties is not involved in their resistance to MYMV. Both the percentage of transmission of MYMV in blackgram as well as the incubation period of the virus in the test seedings were influenced by seasonal variations. During November and December the percentage of transmission was reduced and incubation period was extended compared to months from July through October. [AS]

***0164** Nair, N.G. ; Nene, Y.L. 1974. **Studies on the yellow mosaic of urd bean (Phaseolus mungo L.) caused by mung bean yellow mosaic virus. 4. Nature and extent of losses due to infection at various stages of growth.** INDIAN JOURNAL OF FARM SCIENCE, v.2:48-50. [En] [En Abst] (REP.MB-0948)

Inoculations of blackgram plants at various stages of growth affected the yield considerably. Infection upto an age of three weeks resulted in the complete loss of seed yield. There were no significant differences in the yield between healthy plants and those inoculated at the eighth week or later. The main factor responsible for the reduction in yield was found to be the reduction in the number of pods produced per plant as a result of MYMV infection and not in the number of seeds per pod. It was also observed that the

shrunken seed production was not influenced by viral infection. [AS]

*0165 Rathi, Y.P.S. ; Nene, Y.L. 1974. **Two additional hosts of mung bean yellow mosaic virus.** INDIAN PHYTOPATHOLOGY, v.27(3):429. [En] (REP.MB-0545)

Inoculations using viruliferous whiteflies established that Cosmos bipinnatus and Phaseolus vulgaris cv Manitou were hosts of mungbean yellow mosaic virus. It seems that the host range of MYMV is restricted to Leguminosae, Compositae and Graminae. [EMS]

*0166 Rathi, Y.P.S. ; Nene, Y.L. 1974. **Some aspects of the relationship between mung bean yellow mosaic virus and its vector Bemisia tabaci.** INDIAN PHYTOPATHOLOGY, v.27(4):459-462. [En] (REP.MB-0474)

Mungbean yellow mosaic virus (MYMV) persisted in female and male adults of Bemisia tabaci for a maximum of 10 and 3 days before, respectively, but not throughout the life span of the vector. Female adults remained alive and infective for a longer time as compared to males. The results of the experiment on transovarial transmission were negative. The nymphal stage of B. tabaci can acquire the virus. Adults were able to acquire MYMV from inoculated Mahaillupalam-1 blackgram plants 1 to 3 days before these plants actually showed initial symptoms. MYMV appears to be a circulative type. [AS]

*0167 Suteri, B.D. 1974. **Occurrence of soybean yellow mosaic virus in Uttar Pradesh.** CURRENT SCIENCE, v.43(21):689-690. [En] (REP.MB-2594)

Soybean was infected with yellow mosaic in all soybean-growing areas surveyed in Uttar Pradesh in 1971 and 1972. Virus-infected plants were slightly stunted and produced only a few branches. Leaflets were smaller and narrower and showed bright yellowish patches scattered over the lamina. Pods were fewer, smaller, and contained fewer seeds. The virus could be transmitted only by the whitefly, Bemisia tabaci but not through sap, aphids, or seed. It infects plants of the family Leguminosae only, viz., Glycine max, Vigna mungo, V. radiata, V. sinensis and Phaseolus vulgaris. The virus resembles mungbean yellow mosaic virus in symptomatology, host range and transmissibility. [THH/EMS]

*0168 Venkataraman, S. ; Rao, N.S.S. 1974. **Strain variations of Rhizobium sp. (cowpea group) from root nodules of healthy and yellow mosaic virus (YMV) infected Phaseolus aureus plants.** JOURNAL OF PHYTOPATHOLOGY, v.80(1):29-34. [En] [En De Abst] (REP.MB-0242)

Vigna radiata W. (Baisaki mung) infected by yellow mosaic virus produced mainly small white nodules. Several isolates of nodule bacteria were obtained from infected and healthy plants. Of these, six strains of Rhizobium, two from nodules of healthy plants and four from nodules of infected plants were studied for some cultural biochemical and antigenic properties. The results did not show any critical difference between Rhizobium strains in relation to virus infection of the host. [AS]

***0169** Regupathy, A. ; Rathnasamy, R. ; Venkatnarayanan, D. ; Subramaniam, T.R. 1975. **Physiology of yellow mosaic virus in green gram, Phaseolus aureus Roxb. with reference to its preference by Empoasca kerri Pruthi.** CURRENT SCIENCE, v.44(16):577-578. [En] (REP.MB-0997)

Populations of the non-vector leafhopper, Empoasca kerri, were consistently higher on Vigna radiata plants infected with mungbean yellow mosaic virus than on healthy plants. Though total nitrogen was reduced in diseased plants, different forms of nitrogen were higher. Viral infection also altered amino acid content, both qualitatively and quantitatively. Diseased leaves had a lower sugar, magnesium and potassium content, whereas moisture, phosphorus, and calcium were not affected. [EMS]

***0170** Shankar, K. ; Summanwar, A.S. 1975. **Cytopathological studies of yellow mosaic virus disease of mung.** INDIAN PHYTOPATHOLOGY, v.28:145. [En] (A:PS)

MEETING: Annual Meeting of Indian Phytopathological Society, 27th -- New Delhi, India, Dec 31, 1974

Cytological studies were conducted on yellow mosaic disease in mungbean to detect the presence of the virus in the host and in the vector Bemisia tabaci (whitefly). When the epidermal cells from the diseased and healthy leaves were treated with a fluorescent dye, acridine orange, and examined under fluorescent microscope, the virus appeared as orange red fluorescing inclusions in the cytoplasm of the cells from diseased leaf only. Among the various cytological stains used in light microscopic investigations, Pyronine G-methyl green combination proved superior over other stains for differentiations between the nuclei and virus inclusions. The virus was located in the diseased leaf epidermal cell as red staining masses which were absent in healthy ones. The accumulation of dark orange staining mass was noticed in the first 2-3 abdominal segments of the whiteflies fed on diseased mungbean plants but not in the whiteflies fed on healthy plants. [AS]

***0171** Tripathi, R.K. ; Vohra, K. ; Beniwal, S.P.S. 1975. **Changes in phenoloxidase and peroxidase activities and peroxidase isoenzymes in yellow mosaic virus infected-mung bean (Phaseolus aureus L.).** INDIAN JOURNAL OF EXPERIMENTAL BIOLOGY, v.13(5):513-514. [En] (REP.MB-1591)

Differences in total proteins, polyphenol oxidase and peroxidase between leaves of mungbean cultivar H 45 (susceptible to mungbean yellow mosaic virus) and LM 170 (tolerant) were compared. The diseased leaves of both varieties showed higher activities of polyphenol oxidase and peroxidase. Both starch gel electrophoresis and DEAE-cellulose column chromatography showed that the diseased leaves of LM 170 contained a higher number of protein peaks and isoperoxidases than healthy leaves of the same variety. [AS]

***0172** Rathi, Y.P.S. ; Nene, Y.L. 1976. **Influence of different host combinations on virus-vector relation of mungbean yellow mosaic virus.** PANTNAGAR JOURNAL OF RESEARCH, v.1(2):107-111. [En] [En Abst] (REP.MB-2423)

Influence of different source-test combinations on virus-vector relation of mungbean yellow mosaic virus (MYMV) was studied. The minimum acquisition and

inoculation periods required for whitefly adults (Bemisia tabaci Genn.) to become infective varied from 15 to 60 min and more, and 10 min to 60 min and more, respectively. The minimum incubation period of MYMV in the vector varied from 3 to 8 hr in different source-test host combinations. The hosts that develop yellow mottle reaction ("Mahaillupalam 1" blackgram and "Jalgaon 781" mungbean) were highly susceptible and better sources of MYMV than the hosts that develop necrotic mottle reaction ("UPU 1" blackgram and "T 44" mungbean). The virus was readily transmissible from mungbean to blackgram and vice versa. MYMV was transmissible from soybean to blackgram after a shorter feeding period than from blackgram to soybean. The adults required longer acquisition and inoculation periods to infect "Bragg" soybean and "T 21" pigeonpea than to infect blackgram and mungbean. [AS]

*0173 Sivaprakasam, K. ; Jagadeesan, M. ; Kannapiran, C. ; Pillayarsamy, K. 1976. **Mineral content in the healthy and yellow mosaic infected black gram.** AUARA: ANNAMALAI UNIVERSITY AGRICULTURAL RESEARCH ANNUAL, v.6:171-173. [En] (REP.MB-1901)

Infection with mungbean yellow mosaic virus reduced nitrogen, phosphorus, calcium, and magnesium composition of leaves of blackgram, and increased their potassium composition. [EMS]

*0174 Soria, J.A. 1976. **Epidemiology of mungbean yellow mosaic virus in the Philippines.** College, Laguna : Univ. of the Philippins at Los Banos. x, 71p. [En] [En Abst] (Thesis - Ph.D. (Plant Pathology)) (SB608.M6S6)

The epidemiology of an aphid-borne isometric virus causing a yellow mosaic disease in mungbean (MYMV) was established to be affected by weather conditions. During the wet season, the weather factors that limited MYMV spread were rainfall and wind speed, whereas, during the dry season these were high temperature, high solar radiation, longer photoperiod and wind speed, not higher than 3 mph. While aphid infestations were observed at the onset of flowering, greater aphid population and MYMV infection, however, were more visible during the dry season than the wet season. Aphis craccivora Koch and Myzus persicae Sulz. vectored MYMV but the former, which colonizes on mungbean, was a more efficient vector. However, in both species, MYMV was non-persistent. In addition to it being aphid-borne, MYMV was also readily mechanically transmitted by sap and through the seed by about 4.97 to 98.39%, respectively, from naturally field infected and artificially inoculated plants. The virus had a limited host range, infecting only legumes such as bush sitao (Vigna sesquipedales xv. sinensis), string beans (Vigna sesquipedales), patani (Phaseolus lunatus), Centrosema pubescens and kudzu [Pueraria phaseoloides (Roxb.) Benth]. The local lesion hosts were Vigna sinensis and Datura stramonium. [AS]

*0175 Bhaktavatsalam, G. ; Beniwal, S.P.S. 1977. **Note on auxin content in urdbean (Phaseolus mungo L.) infected mungbean yellow mosaic virus.** PANTNAGAR JOURNAL OF RESEARCH, v.2(2):234-235. [En] (REP.MB-2424)

A decrease in auxin content in mungbean yellow mosaic virus (MYMV) infected leaves was observed and could possibly explain reduction in leaf size and overall stunting of blackgram plants due to MYMV infection. [THH]

*0176 Murugesan, S. ; Chelliah, S. 1977. **Transmission of greengram yellow mosaic virus by the white fly, Bemisia tabaci (Genn.).** MADRAS AGRICULTURAL JOURNAL, v.64(7):437-441. [En] [En Abst] (REP.MB-1857)

Transmission studies revealed that a single viruliferous Bemisia tabaci (Genn.) was able to transmit the virus successfully and maximum percentage of infection was obtained when 10 white flies were used per test plant. Maximum percentage of infection resulted when the vector was given a pre-acquisition starvation of 3 hr. and acquisition feeding period of 24 hr. The incubation period was 8 hr. High percentage of infection resulted when the transmission feeding period of the vector was 24 hr. The virus was retained by the vector for a maximum period of 4 days. There was no transovum transmission and the first instar nymphs of the vector were not capable of acquiring and transmitting the virus. [AS]

*0177 Soria, J.A. ; Solomon, W.S. 1978. **The effect of mungbean yellow mosaic virus on mungbean.** U.S.M. RESEARCH JOURNAL, v.1(1):95-107. [En] [En Abst] (REP.MB-2013)

Mungbean plants inoculated with MYMV at different growth stages by mechanical transmission exhibited marked reduction in height, length of pods, number of pods per plant, number of seeds per pod and bean yield. Flowering and maturity were delayed on plants inoculated with MYMV in the dicotyledonary and first trifoliate leaves. Yield loss was caused primarily by the production of fewer pods and seeds. Most researchers consider that MYMV is only transmitted by whitefly (Bemisia tabaci). [AS/ATT]

*0178 Agrawal, H.S. ; Gupta, N.K. ; Prasad, V.K. ; Vishwakarma, S.L. 1979. **Chemical control of yellow mosaic of moong.** PESTICIDES, v.13(5):44-47. [En] [En Abst] (REP.MB-2890)

Field trials on the chemical control of yellow mosaic of mungbean were conducted in randomized block design at the Regional Experimental Station, Hardoi during zaid and kharif seasons 1976 and 1977. The average disease incidence was higher in the control both during zaid (16.5%) and kharif season (23.2%). DDVP, monocrotophos and phosphamidon resulted in lowering down significantly disease incidence and giving significantly higher yield in all the years except zaid 1976. There was a negative correlation between disease incidence and yield i.e., the lower the incidence, the higher the yield and vice-versa. It is, thus, concluded that effective control of yellow mosaic of mungbean is possible by two sprayings at an interval of a fortnight of DDVP 500 ml or monocrotophos 875 ml or phosphamidon 250 ml/ha. [AS]

*0179 Chenulu, V.V. ; Venkateswarlu, V. ; Rangaraju, R. 1979. **Studies on yellow mosaic disease of mung bean.** INDIAN PHYTOPATHOLOGY, v.32(2):230-235. [En] [En Abst] (A:PS)

Investigations on the relationship of mungbean yellow mosaic virus and its vector Bemisia tabaci showed that primary as well as first trifoliate leaves were suitable for transmission of the virus. The percentage of transmission was influenced by acquisition feeding time, transmission feeding time, number of insects per plant and the resistant or susceptible nature of the test plant. A latent period of 5-6 hours in the whiteflies was found necessary for

transmission. Pre- and post-acquisition fasting did not influence the transmission efficiency of the virus. There was no evidence of transovarial transmission. None of the 13 varieties tested were found resistant to the virus infection although they differed in their degree of tolerance. Three sprays of Anthio at 0.2 per cent, reduced the yellow mosaic incidence significantly. [AS]

***0180** Singh, R.N. 1979. **Natural infection of bean (Phaseolus vulgaris) by mung bean yellow mosaic virus.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.9(1):124-126. [En] (REP.MB-2246)

A yellow mosaic on bean is described and shown to be the same as mungbean yellow mosaic virus. The host range of the disease includes Vigna mungo, V. radiata, V. aconitifolia, Phaseolus acutifolius, P. lathyroides, Glycine max, Dolichos biflorus, and Cajanus cajan. Variety Big bend red was found to be high yielding and resistant to the disease, as well as to bean common mosaic and a virus disease causing a curly top symptom. Germplasm entries Internor, VT 36, Dry Vine and VT 114 Dry Vine were found immune, and entries VT 111 Dry Vine, Idelight Green, P 320-A-L, P 24-A-L, P 498-A-L, P 337-A-L, P 5 I-L, P 426-A-L, P 6-C-L, and VL I-12 were resistant. [EMS]

***0181** Vohra, K. ; Beniwal, S.P.S. 1979. **Effect of mungbean yellow mosaic virus on yield and seed quality of urdbean [Vigna mungo (L.) Hepper].** SEED RESEARCH, v.7(2):168-174. [En] [En Abst] (REP.MB-2639)

Effect of mungbean yellow mosaic virus (MYMV) infection at different stages of plant growth on the yield and seed quality of 'UL 2' blackgram (Vigna mungo) was studied. MYMV significantly decreased the grain yield in infections up to 50 days after planting; insignificant losses in yield were caused by infections at or after 60 days of planting. All the three yield contributing characters, i.e., number of pods per plant, number of seeds per pod and 1000-seed weight, significantly added to the reduction in yield due to MYMV infection. The MYMV infection adversely affected the colour, texture and size of blackgram seeds. Though seed germination was not affected, it was delayed in seeds produced from plants infected at 10 days after planting. Seeds from infected plants contained higher amounts of proteins and amino acids as compared with those from non-infected ones. [AS]

***0182** Beniwal, S.P.S. ; Vohra, K. ; Verma, H.C. 1980. **Effect of mungbean yellow mosaic virus infection at different stages of plant growth on the amino acid composition of urdbean (Vigna mungo L) seeds.** INDIAN JOURNAL OF EXPERIMENTAL BIOLOGY, v.18(3):302-303. [En] [En Abst] (REP.MB-2612)

Amino acid composition of seeds from healthy and mungbean yellow mosaic virus (MYMV)-infected plants was determined. MYMV infection at different stages of plant growth affected the total amino acid content and composition both. Early infections, i.e., 10 and 30 days after planting (DAP) resulted in considerable increase of total amino acids. Seeds from plants infected at 50 DAP showed a considerable decrease in amino acids whereas infection at 70 DAP did not affect the total amino acid content of seeds. In all, 15 amino acids were detected out of which 9 (lysine, histidine, arginine, serine, alanine, valine, leucine, isoleucine, glycine) showed an increase, 4 (aspartic acid, glutamic acid, tyrosine, phenylalanine) showed a decrease whereas 2 (threonine and proline) remained unchanged in seeds from virus infected plants. [AS]

***0183** Chand, P. ; Varma, J.P. 1980. **Some characteristics of mungbean and urdbean varieties resistant and susceptible to yellow mosaic virus.** INDIAN PHYTOPATHOLOGY, v.33(1):48-53. [En] [En Abst] (A:PS)

Some biochemical, morphological and anatomical characteristics of the leaves of some mungbean and blackgram varieties resistant and susceptible to yellow mosaic virus were investigated. Higher levels of phenol and sugar in the leaves did not seem to impart resistance. Total protein content and some free amino acids were perhaps related to resistance/susceptibility although protein pattern as determined by SDS-poly-acrylamide gel electrophoresis was the same. Resistant varieties had significantly more 3-4 septate hooked hairs and thicker cuticles than the susceptible varieties which had fewer straight non-septate leaf hairs and thinner cuticles. [AS]

***0184** Thongmeearkom, P. ; Honda, Y. ; Saito, Y. ; Syamananda, R. 1980. **Nuclear ultrastructural changes and aggregates of viruslike particles in mungbean cells affected by mungbean yellow mosaic disease.** PHYTOPATHOLOGY, v.71(1):41-44. [En] [En Abst] (A:PS)

Yellow mosaic disease of mungbean in Thailand was caused by a whitefly-transmitted agent, presumably a virus. Ultrastructural changes similar to those previously reported for whitefly-transmitted viruses are associated with the disease. The viruslike particles (VLPs) associated with the disease were isometric, about 15-20 nm in diameter, and often formed loose aggregates that sometimes almost filled the total nuclear volume of infected phloem cells. Mungbean infected by whitefly transmission or by grafting had hypertrophied nucleoli, aggregates of VLPs, and fibrillar bodies in the nuclei of phloem cells as early as 2 days before symptom appearance. In vacuoles or lumens of the partially or fully differentiated infected sieve elements, VLPs occasionally formed aggregates having a double cylindrical arrangement of particles. No VLPs were detected in tissues other than the phloem of infected plants or in any tissues of comparable healthy plants. [AS]

***0185** Marimuthu, T. ; Subramanian, C.L. ; Mohan, R. 1981. **Assessment of yield loss due to yellow mosaic infection in mungbean.** PULSE CROPS NEWSLETTER, v.1(1):104. [En] (A:PS)

The number of pods, seeds and seed yield per plant were recorded, for healthy and MYDV infected mungbean plants. The results showed that MYMV caused severe reduction in number of pods, seeds and seed yield per plant. The yield loss ranged between 30 and 70%. [EMS]

***0186** Pearson, M.N. 1981. **A mosaic disease of mung bean in Papua New Guinea.** AUSTRALIAN JOURNAL OF PLANT PHYSIOLOGY, v.10(2):31. [En] (REP.MB-2316)

A mosaic condition of mungbean was observed at Bubia where seed imported from Taiwan was being multiplied for distribution throughout Papua New Guinea. Symptoms included a bright yellow mosaic on young, developing leaves, slight leaf curl and reduction in plant size and pod size. The disease was transmitted to healthy mungbean plants by grafting but not mechanically nor through seed. From the available information the disease appears most similar to the yellow mosaic of mungbean in India. [THH]

*0187 Thongmeearkom, P. ; Kittipakorn, K. ; Surin, P. 1981. **Outbreak of mungbean yellow mosaic disease in Thailand.** THAI JOURNAL OF AGRICULTURAL SCIENCE, v.14(2):201-206. [En] (A:PS)

A heavy outbreak of mungbean yellow mosaic virus on Vigna radiata occurred in 1977 in northern Thailand. The epidemic was favored by unusually dry conditions which allowed a population build-up of the vector, Bemisia tabaci, as well as by an increase in the average cropped to mungbean following the failure of the main corn crop. [EMS]

*0188 Ahmed, S.R. ; Gaur, R.B. 1982. **Chemotherapeutic approach to check yellow mosaic virus of moong (Phaseolus aureus L.).** HINDUSTAN ANTIBIOTICS BULLETIN, v.24(1/2):18-20. [En] [En Abst] (REP.MB-2653)

A combination of aureofungin (0.003%) and phosphamidon (0.25 kg a.i./ha) decreased incidence of mungbean yellow mosaic virus on mungbean and increased yields. [THH]

*0189 Sharma, S.R. ; Varma, A. 1982. **Control of yellow mosaic of mungbean through insecticides and oils.** JOURNAL OF ENTOMOLOGICAL RESEARCH, v.6(2):130-136. [En] [En Abst] (REP.MB-2374)

Efficacy of 5 granular and emulsifiable insecticides, 4 mineral and vegetable oils, and one combination of insecticide and oil was tested to check the spread of mungbean yellow mosaic disease in different cultivars of mungbean under field conditions. The incidence of yellow mosaic was less in summer (April-June) than in the rainy (July-October) season in the cultivars tested. Three cultivars, viz., RS-4, J-45 and T-51 were evaluated during summer, while two more, B-105 and ML-10, were included in a trial in the wet season. Of the various treatments, aldicarb, phorate, disulfoton, and disulfoton + paraffin oil were most effective in checking the spread of yellow mosaic, and consequently increased the yield significantly. Efficacy of various chemicals varied from cultivar to cultivar and season to season. Reduction in seed yield due to infection depended on the time of infection. Maximum reduction in yield, which varied from 69 to 78% depending on cultivar, was recorded when plants were infected up to two weeks after germination. [AS]

*0190 Verma, H.N. ; Kumar, V. 1982. **Prevention of plant virus diseases by Mirabilis jalapa leaf extract.** NEW BOTANIST, v.7:87-91. [En] [En Abst] (REP.MB-2732)

Foliar application or spray of Mirabilis jalapa (L.) leaf extract caused marked suppression of disease symptoms, improved the growth and flowering and considerably reduced the virus multiplication rate in the treated plants of tomato against tomato yellow mottle (TMV-strain) and tomato yellow mosaic viruses, cucumbers against cucumber mosaic and cucumber green mottle viruses, and blackgram against mungbean yellow mosaic virus. The populations of aphids and whiteflies present on treated plants were much lower as compared to control plants. [AS/THH]

*0191 Honda, Y. ; Iwaki, M. ; Saito, Y. ; Thongmeearkom, P. ; Kittisak, K. ;

Deema, N. 1983. **Mechanical transmission, purification, and some properties of white-fly-borne mung bean yellow mosaic virus in Thailand.** PLANT DISEASE, v.67(7):801-804. [En] [En Abst] (A:PS)

The whitefly-borne mungbean yellow mosaic virus (MYMV) in Thailand was transmitted by mechanical inoculation. Among the several buffers used in attempted transmissions, 0.1 M potassium or sodium phosphate, pH 7.8, gave the highest transmission rates. The optimal incubation temperatures for symptom expression ranged from 25 to 30 C in the growth chamber or 30 C in the daytime and 20 C at night in the greenhouse. Host range of MYMV was limited to seven plant species in the family Leguminosae. Determinations of the stability of the virus in plant sap gave the following results: thermal inactivation point of 40-50 C for 10 min, dilution end point of 1.0E-2 to 1.0E-3, and longevity in vitro of 1-2 days at 20 C. Purified virus preparations had an ultraviolet light absorption spectrum typical of that of nucleoprotein with a A260/A280 value of about 1.3-1.4. Purified preparations and leaf-dip samples contained geminate particles of about 18 x 30 nm. Infectivity was associated with the presence of purified virus particles. [AS]

***0192** Singh, R.N. 1983. **Yellow mosaic of Phaseolus atropurpureus caused by mungbean yellow mosaic virus.** LEGUME RESEARCH, v.6(1):52. [En] (A:PS)

Phaseolus atropurpureus, a pasture legume, is reported as a host to mungbean yellow mosaic virus. [THH]

***0193** Ikegami, M. ; Morinaga, T. ; Miura, K. 1984. **Infectivity of virus-specific double-stranded DNA from tissue infected by mung bean yellow mosaic virus.** VIRUS RESEARCH, v.1(6):507-512. [En] [En Abst] (REP.MB-2676)

A double-stranded (ds) DNA which may be a replicative intermediate was isolated from bean (Phaseolus vulgaris L. 'Top Crop') leaves systemically infected with mungbean yellow mosaic virus. The isolation method used phenol/chloroform extraction, hydroxyapatite column chromatography, and rate-zonal centrifugation. The dsDNA was a circular molecule and had sequences complementary to those of viral DNA. These molecules infected bean plants and typical symptoms of downward curling appeared. [AS]

***0194** Ram, R.S. ; Chenulu, V.V. ; Sastry, L.V.S. 1984. **Metabolic changes in black gram infected with mung yellow mosaic virus.** INDIAN PHYTOPATHOLOGY, v.37(1):88-92. [En] [En Abst] (A:PS)

Mungbean yellow mosaic virus (MYMV) infection in blackgram (Vigna mungo) caused significant reduction in the total dry matter content of plants, chlorophylls and carotenoids in the leaf tissues of resistant (S-1) as well as susceptible (Krishna) varieties. Reduction in total chlorophyll was, however, more severe in the susceptible variety. The chlorophyll content decreased progressively with the increase in disease severity and was due to reduced synthetic activity of the chlorophyllase enzyme. [AS]

***0195** Ikegami, M. ; Yazaki, K. ; Honda, Y. ; Iwaki, M. ; Fujii, H. ; Morinaga, T. ; Miura, K. 1985. **Single-stranded DNA in mung bean yellow mosaic**

virus. MICROBIOLOGY AND IMMUNOLOGY, v.29(8):783-789. [En] (REP.MB-2767)

This is the first report on characterization of the mungbean yellow mosaic virus (MYMV) nucleic acid. The nucleic acid isolated from MYMV had an UV spectrum with 260/230 nm and 260/280 nm ratios of about 2.5 and 2.0, respectively, and gave a positive diphenylamine reaction indicating the presence of deoxyribose. A 5-nm shift in wavelength max. and approximately 18% hyperchromicity were observed within 10 min after addition of formaldehyde to purified MYMV DNA, whereas calf thymus DNA, which is double stranded, did not show such a shift. The UV light absorption of MYMV DNA increased over a broad range of temp. from 20 to 70 C, whereas calf thymus DNA showed a sharp transition with a Tm of 77 C. Nucleic acid preparation from MYMV analyzed by polyacrylamide gel electrophoresis in 7 m urea exhibited two bands. MYMV nucleic acid was hydrolyzed by DNase I but not by bovine pancreatic RNase A. When the susceptibility of MYMV nucleic acid to nuclease SI was tested, the rate of digestion of MYMV nucleic acid was comparable to that of heat-denatured calf thymus DNA. The results suggest that the nucleic acid of MYMV is ssDNA. [PLH]

***0196** Honda, Y. ; Iwaki, M. ; Thongmeearkom, P. ; Kiratiya-Angul, K. ; Kiratiya-Angul, S. ; Srithongchai, W. ; Prommin, M. ; Kittipakorn, K. ; Sarindu, N. ; Deema, N. ; Syamananda, R. ; Hibi, T. ; Saito, Y. 1986. **Mungbean yellow mosaic virus isolated from mungbean in Thailand.** TROPICAL AGRICULTURE RESEARCH CENTER, TECHNICAL BULLETIN, no.21:189-202. [En] [En Abst] (A:PS)

The whitefly-borne mungbean yellow mosaic virus (MYMV) in Thailand was transmitted by mechanical inoculation. Among the several buffers used in attempted transmissions, 0.1 M potassium or sodium phosphate, pH 7.8, gave the highest transmission rates. The optimal incubation temperatures for symptom expression ranged from 25 to 30 C in the growth chamber or 30 C in the daytime and 20 C at night in the greenhouse. Host range of MYMV was limited to seven plant species in the family Leguminosae. Determinations of the stability of the virus in plant sap gave the following results: thermal inactivation point of 40-50 C for 10 min, dilution end point of 1.0E-2 - 1.0E-3, and longevity in vitro of 1-2 days at 20 C. Purified virus preparations had an ultraviolet light absorption spectrum typical of that of nucleoprotein with a A260/A280 value of about 1.3-1.4. Purified preparations and leaf-dip samples contained geminate particles about 18 X 30 nm in size. Infectivity was associated with the presence of purified virus particles. In thin sections, the virus particles were isometric, about 15-20 nm in diameter, and they often formed loose aggregates that sometimes almost filled completely the nucleus of infected phloem cells. Mungbean infected by whitefly transmission or by grafting showed hypertrophied nucleoli, aggregates of virus particles, and fibrillar bodies in the nuclei of phloem cells as early as 2 days before symptom appearance. In vacuoles or lumens of the partially or fully differentiated infected sieve elements, virus particles occasionally formed aggregates having a double cylindrical arrangement of particles. No virus particles were detected in tissues other than the phloem of infected plants or in any tissues of comparable healthy plants. [AS]

***0197** Honda, Y. 1986. **[Serological detection of mung bean yellow mosaic virus (MYMV) and bean golden mosaic virus and their taxonomic relationship].** PHYTOPATHOLOGICAL SOCIETY OF JAPAN, ANNALS, v.52(3):553-554. [Ja] (A:PS)
(NOTE: Text in Jap., translated into Eng. by H.G. Su)

MYMV isolated from Thailand and BGMV from Puerto Rico are both geminiviruses with somewhat different host ranges. The antisera against the two viruses absorbed with freeze-dried powder of healthy components and purified through the same method of virus purification from kidney bean leaves, were applied to dot immunobinding assay (DIBA). In case of using dilutions of the antiserum against MYMV at 1:800 and 1:1,600, 0.4, 4 ng of MYMV, and 0.7, 7 ng of BGMV were able to be detected by DIBA. In DIBA, antiserum against MYMV, and antiserum against BGMV reacted with MYMV or BGMV in crude saps of diseased leaves in any combination. The DIBA detected the viruses directly from diseased leaves, but could not differentiate between viruses. One protein with MW 27,500 was isolated from MYMV by SDS-polyacrylamide electrophoresis. Antiserum against MYMV and antiserum against BGMV showed reaction with MYMV or BGMV in immunoblotting assay. It was clarified that MYMV and BGMV had common antigens according to the above-mentioned experimental results. [HGS]

- Leaf Crinkle Virus

***0198** Kolte, S.J. ; Nene, Y.L. 1972. **Studies on symptoms and mode of transmission of the leaf crinkle virus of urd bean (Phaseolus mungo).** INDIAN PHYTOPATHOLOGY, v.25(3):401-404. [En] (REP.MB-0193)

Evidence has been presented to show that the leaf crinkle disease of blackgram is caused by a mechanically transmissible virus which is also seed-borne. The symptoms of the disease, described in this paper in more detail, are characterized by the stunting of plants and crinkling of leaves. Affected plants produce very few pods. The disease, at present, is not widespread. [AS]

***0199** Narayanasamy, P. ; Jaganathan, T. 1973. **Vector transmission of black gram leaf crinkle virus.** MADRAS AGRICULTURAL JOURNAL, v.60(7):651-652. [En] (REP.MB-1309)

Whitefly (Bemisia tabaci) was tested for its ability to transmit the blackgram leaf crinkle virus. The percentage of transmission in different experiments varied from 20 to 60%. The incubation period of the virus in plants ranged from 20 to 23 days. No incubation period of the virus in the vector is necessary. [THH]

***0200** Gupta, V.K. 1974. **Leaf crinkle, a virus disease of Phaseolus mungo L. in Himachal Pradesh.** INDIAN JOURNAL OF EXPERIMENTAL BIOLOGY, v.12(5):477-478. [En] [En Abst] (REP.MB-1568)

Leaf crinkle and phyllody disease of V. mungo (blackgram) can be transmitted by grafting method and through seeds, in addition to sap transmission. The virus infects Phaseolus vulgaris, V. radiata and Nicotiana tabacum. The virus is seed borne. The thermal inactivation point of the virus is between 70 and 75 C, dilution end point between 1.0E-3 and 1.0E-4 and it is infectious at room temperature up to 96 hr. [AS]

*0201 Narayanasamy, P. ; Jaganathan, T. 1974. **Characterisation of blackgram leaf crinkle virus.** MADRAS AGRICULTURAL JOURNAL, v.61(10/12):979-982. [En] [En Abst] (A:PS)

The blackgram leaf crinkle virus (BLCV) lost its activity at dilutions above 1:5000, at temperatures above 60 C and after 48 hours in storage at room temperature. The optimum pH was found to be 7.2. BLCV was antigenic, and capable of reacting specifically with its antiserum. Of the 24 plant species tested cowpea, cluster beans, mungbean, groundnut and redgram were infected by BLCV. [AS]

*0202 Dhingra, K.L. 1975. **Transmission of urid bean leaf crinkle virus by two aphid species.** INDIAN PHYTOPATHOLOGY, v.28:80-82. [En] [En Abst] (A:PS)

Aphis craccivora Koch. and Aphis gossypii Glov. proved to be the vectors of a virus which caused crinkling of the leaves in blackgram (Vigna mungo Hepper). A very short acquisition feeding period of 30 seconds to two minutes preceded by a pre-acquisition fasting was found necessary for the successful transmission of virus. The causal virus has close resemblance in symptomatology to blackgram leaf crinkle virus reported earlier. [AS]

*0203 Kolte, S.J. ; Nene, Y.L. 1975. **Host range and properties of urd bean leaf crinkle virus.** INDIAN PHYTOPATHOLOGY, v.28:430-431. [En] (A:PS)

All 52 plant species belonging to 10 different families were tested for reaction to blackgram leaf crinkle virus. Out of All 52 plant species, only 3 plant species; viz., Vigna radiata, V. aconitifolia, and V. sinesis were susceptible. The virus was found to be inactivated when sap from the infected leaves was subjected to temperature ranging from 60 to 70 C for 10 minutes, or when sap was diluted above 1.0E-4. Infectivity of the sap was retained for 3 days at room temperature, but was lost on the 9th day refrigeration (5 C). This virus is considered to be distinct from those reported so far on blackgram. [THH]

*0204 Narayanasamy, P. ; Jaganathan, T. 1975. **Effect of black gram leaf crinkle virus infection on seed set and distribution of virus in the seeds.** MADRAS AGRICULTURAL JOURNAL, v.62(3):151-154. [En] [En Abst] (A:PS)

Blackgram leaf crinkle virus induced pollen sterility which ranged from 13.64 to 72.09% depending on the variety of blackgram. The significance of pollen sterility as a limiting factor of yield is discussed. The study on distribution of BLCV in the seeds of blackgram revealed that the virus was present in the plumule, radicle and cotyledons of the germinating seed but not in the seed coat. The virus was found at a higher frequency in the plumule. [AS]

*0205 Narayanasamy, P. ; Jaganathan, T. 1975. **Studies on seed transmission of black gram leaf crinkle virus: effect of age of plants at infection.** MADRAS AGRICULTURAL JOURNAL, v.62(5):287-290. [En] [En Abst] (REP.MB-0674)

The experiments with blackgram plants inoculated with blackgram leaf crinkle virus (BLCV) at 5-day intervals from 5 to 50 days of age showed that

the plant susceptibility and the percentage of seed transmission of BLCV were reduced as the age of the plants increased. The higher percentage of infection observed in young infected plants induced a higher rate of seed transmission. The incubation of BLCV in blackgram plants was positively correlated with the age of plants at the time of inoculation, but it showed a negative linear relationship with the percentage of seed transmission of BLCV. The necessity of protecting the plants at early stages of growth to avoid seed transmission of BLCV has been discussed. [AS]

*0206 Narayanasamy, P. ; Jaganathan, T. 1975. **Seed transmission of black gram leaf crinkle virus.** JOURNAL OF PHYTOPATHOLOGY, v.82:107-110. [En] [En De Abst] (REP.MB-0615)

Blackgram plants inoculated with blackgram leaf crinkle virus (BLCV) at 5-day intervals from 5 to 50 days of age showed that plant susceptibility and percentage of seed transmission of the virus were reduced as the age of plants increased. The observed higher percentage of infection in young infected plants induced a higher rate of seed transmission. The incubation period of BLCV in blackgram plants showed positive correlation with the age of plants at the time of inoculation, but it showed a negative linear relationship with the percentage of seed transmission of the virus. The necessity of protecting the plants at early stages of growth to avoid seed transmission of BLCV has been suggested. [AS]

*0207 Sivaprakasam, K. ; Jagadeesan, M. ; Kannapiran, C. ; Pillayarsamy, K. 1976. **Changes in the mineral content of black gram leaves due to leaf crinkle virus.** MADRAS AGRICULTURAL JOURNAL, v.63(2):123-125. [En] (REP.MB-1995)

Leaf crinkle virus infection increased the phosphorus and potassium content in blackgram leaves, but decreased the nitrogen, calcium, and magnesium content. [EMS]

*0208 Beniwal, S.P.S. ; Chaubey, S.N. 1979. **Urdbean leaf crinkle virus: effect on yield contributing factors, total yield and seed characters of urdbean.** SEED RESEARCH, v.7(2):175-181. [En] [En Abst] (REP.MB-2667)

Infection by blackgram leaf crinkle virus (BLCV) significantly and adversely affected number of pods per plant and number of seeds per pod in blackgram cv. Pant U-30 and Pant U-26, whereas 1000-seed weight remained unaffected. The total seed yield was also significantly affected by BLCV infection at different stages of plant growth in both the varieties. Maximum yield reduction of 70.7 and 83.8% was caused by infection occurring at 10 days after planting (DAP) in Pant U-30 and Pant U-26, respectively, which was progressively and significantly reduced with each delay in infection up to 60 DAP, and caused only 18.0 and 13.2% losses in yield in Pant U-30 and Pant U-26, respectively. The BLCV infection resulted in the production of shrivelled and light brown-coloured seed, early infected plants producing maximum percentage of such seeds. The virus caused production of oversize seeds though the average seed size and emergence remained unaffected. [AS]

*0209 Beniwal, S.P.S. ; Kolte, S.J. ; Nene, Y.L. 1979. **Nature and rate of**

spread of urdbean leaf crinkle disease under field conditions. INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.9(2):188-192. [En] [En Hi Abst] (REP.MB-2609)

The nature and rate of spread of blackgram leaf crinkle disease under field conditions was studied. The low percentage (2.75%) of disease incidence provided an evidence for a very low rate of spread of the disease. Most of the disease in the field seems to develop by the seed borne virus though rubbing of diseased with healthy leaves may serve as a source of spread of the disease, particularly in the later part of the season. [AS]

*0210 Kolte, S.J. ; Nene, Y.L. 1979. **Urdbean (Vigna mungo) leaf crinkle virus: noteworthy symptoms on host and influence of growth stages on host susceptibility.** TROPICAL GRAIN LEGUME BULLETIN, v.15:5-8. [En] (REP.MB-2143)

Leaflets of blackgram plants infected with leaf crinkle virus were one and a half times larger than healthy ones. The crinkling induced by the virus became less severe as leaves became older. Infection increased the percentage of sterile pollen from 3.63 to 39.18%, while some buds contained 100% sterile pollen. This resulted in a reduction in pod set and losses in yield of c. 62%. Inoculation at the early stages of growth gave significantly higher plant infection than at later stages. [EMS]

*0211 Beniwal, S.P.S. ; Chaubey, S.N. ; Bharathan, N. 1980. **Presence of urdbean leaf crinkle virus in seeds of mungbean germplasm.** INDIAN PHYTOPATHOLOGY, v.33(2):360-361. [En] (A:PS)

Mungbean seeds of 49 germplasm collectionss were tested for the presence of blackgram leaf crinkle virus by growing-on test. Three out of 49 germplasm collections showed positive seed-borne nature, the rate of its transmission in seed varied from 6 to 15%. Blackgram leaf crinkle virus is a new addition to the list of seed-borne viruses in mungbean. [THH]

*0212 Beniwal, S.P.S. ; Bharathan, N. 1980. **Beetle transmission of urdbean leaf crinkle virus.** INDIAN PHYTOPATHOLOGY, v.33(4):600-601. [En] (A:PS)

Three species of leaf-feeding beetles were tested for their ability to transmit the Pantnagar isolate of blackgram leaf crinkle virus (BLCV). Only one species, namely, Henosepilachna dodecastigma could transmit the virus. The Pantnagar isolate of BLCV could not be transmitted by any of the other insect vector species reported from other Indian states, namely, Aphis craccivora, A. gossypii, Bemisia tabaci, and Circulifer tenellus. [THH]

*0213 Kadian, O.P. 1980. **Studies on leaf crinkle disease of urd bean (Vigna mungo (L.) Hepper)/mung bean (Vigna radiata (L.) Wilczek) and its control.** Hissar : College of Agriculture. 117p., xiv [En] [En Abst] (Thesis - Ph.D. (Plant Pathology)) (SB608.M6K3)

The disease incidence of leaf crinkle virus of mungbean and blackgram was lower in summer than in fall and was higher on blackgram than on mungbean. Among the commonly grown cultivars, mungbean cv. Pusa Baisakhi and blackgram

cv. H-70-3 had the least incidence. The loss in yield ranged from 2.12 to 93.18% in mungbean and 2.82 to 95.17% in blackgram. The symptoms were most conspicuous when the temperature was around 25 to 35 C and the relatve humidity higher than 70% in the morning and 50% in the evening. The virus was readily transmitted through Aphis craccivora and A. gossypii in a non-persistent manner. Seed transmission was aroud 21%. The host range was not restricted to leguminous plants. The virus had a dilution end point between 1.0E-3 and 1.0E-4, thermal inactivation point between 64 and 66 C and longevity in vitro of 3 days at room temperature and 9 days at refrigerator temperature. The virus was purified by chloroform: butanol (1:1) treatment and precipitation with 8% PE$_2$G plus 1.2% NaCl. The virus had spherical particles with an average diameter of about 50 nm and containing 15.24% nucleic acid. This virus has similarities with pea enation mosaic virus. Out of 390 varieties of mungbean and 138 varieties of blackgram screened for resistance, none was found highly resistant, but mungbean varieties L-24-2 and 15227 and blackgram varieties DLU 90 and DLU 487 were resistant. There was an appreciable reduction in seed transmission of the virus when seeds were heat treated. Out of 7 insecticides tested in the field, phosphamidon (0.035% a.i.) was found most effective when sprayed on plants 10 days and 25 days after sowing. The combination of seed heat treatment and 2 foliar sprays of phosphamidon (0.035% a.i.) were found most effective in controlling vectored spread of the disease. [AS/EMS]

***0214** Dhingra, K.L. ; Chenulu, V.V. 1981. **Studies on the transmission of urid leaf crinkle and chickpea leaf reduction viruses by Aphis craccivora Koch.** INDIAN PHYTOPATHOLOGY, v.34(1):38-42. [En] [En Abst] (A:PS)

Myzus persicae (Sulz.) was found to be an additional vector of blackgram leaf crinkle virus (BLCV). The relationship of BLCV and chickpea leaf reduction virus (CpLRV) with A. craccivora was worked out in details. Preacquisition starvation of the vector resulted in appreciable increase in the percentage of transmission of both the viruses. Maximum percentage of transmission was obtained through the optimum combination of 10 aphids per test plant which has been allowed acquisition access for 30 seconds, preceded by preacquisition fasting of 2 hours in the case of CpLRV and 4 hours for BLCV. That these viruses are non persistently borne is further evidenced by the fact that the vector lost infectivity within 10 and 30 minutes in the cases of BLCV and CpLRV, respectively. A 'tapping' aphid inoculation technique was found superior to conventional brush inoculation for virus transmission. [AS]

***0215** Bhaktavatsalam, G. ; Nene, Y.L. ; Beniwal, S.P.S. 1982. **Hyperauxiny in urdbean leaves infected by urdbean leaf crinkle virus.** INDIAN PHYTOPATHOLOGY, v.35(4):683-685. [En] (A:PS)

The increase in IAA content in blackgram leaf crinkle virus infected leaves of blackgram suggests that IAA might be involved in leaf expansion, which is one of the symptoms induced by the disease. [EMS]

***0216** Bhardwaj, S.V. ; Dubey, G.S. ; Sharma, I. 1982. **Effect of benlate on infection and transmission of urdbean (Vigna radiata var. Mungo) leaf crinkle virus.** JOURNAL OF PHYTOPATHOLOGY, v.105(1):87-91. [En] [En De Abst] (A:PS)

Blackgram plants (Vigna mungo Hepper) drenched with benlate solution (1% and higher concentrations) before inoculation with blackgram leaf crinkle virus

by aphids (A. pisum and A. craccivora) and mechanically did not develop disease symptoms. At lower concentrations the degree of transmission was reduced. Post-inoculation drenching of the fungicide was less effective. The aphids failed to acquire the virus from infected plants drenched with benlate solutions of 2% and more. [AS]

*0217 Chowdhury, A.K. ; Nath, P.S. 1982. **Effect of leaf crinkle virus on nodule characteristics of urd bean (Vigna mungo (L) Hepper).** INDIAN JOURNAL OF MICROBIOLOGY, v.22(3):224-225. [En] (REP.MB-2587)

Infection of blackgram plants with leaf crinkle virus substantially reduced the number, size and weight of Rhizobium nodules. [EMS]

*0218 Kadian, O.P. 1982. **Yield loss in mung bean and urd bean due to leaf crinkle disease.** INDIAN PHYTOPATHOLOGY, v.35(4):642-644. [En] [En Abst] (A:PS)

Losses in grain yield due to leaf crinkle disease at Hissar, ranged from 2.12 to 93.98% in mungbean cultivar Varsha and 2.82 to 95.17% in blackgram cultivar T-9. There was a statistically significant decrease in yield in terms of pods per plant, seeds per pod and 1000-grain weight in prebloom infected plants. A direct correlation between the stage of plant growth at which infection occurred and loss in grain yield was observed. The earlier the infection, the greater was the loss, which was mainly attributed to reduction in the number of pods. [AS]

*0219 Beniwal, S.P.S. ; Chaubey, S.N. ; Matheswaran, C. 1983. **Some factors affecting transmission of urdbean leaf crinkle virus through seeds of urdbean (Vigna mungo (L.) Hepper).** SEED RESEARCH, v.11(1):95-99. [En] [En Abst] (REP.MB-2598)

Seed transmission of blackgram leaf crinkle virus (BLCV) ranged from 0 to 15% in different germplasm and varieties of blackgram. Plant age at the time of infection affected seed transmission as higher percentage of transmission occurred in plants infected early than those infected later in the season. Seed transmission of BLCV was not affected by morphological abnormalities in seed, different stages of seed maturation and presence or absence of seed coat. Heat treatment affected BLCV transmission in seed from infected plants as no seed transmission occurred in seed receiving a hot water treatment at 60 C for 10, 20 and 30 min and 70 C for 10 and 20 min and dry heat treatment at 70 C for 10, 20 and 30 min. [AS]

*0220 Beniwal, S.P.S. ; Bharathan, N. ; Chaubey, S.N. 1983. **Two cucurbitous hosts of urdbean leaf crinkle virus.** INDIAN PHYTOPATHOLOGY, v.36(3):577-579. [En] (A:PS)

Sixty plant species belonging to 9 families were tested to find new hosts of blackgram leaf crinkle virus, in addition to mungbean, cowpea and moth bean, which are known hosts. Only cucumber and bottle gourd could be infected. No local lesion host could be found. [EMS]

***0221** Bhaktavatsalam, G. ; Nene, Y.L. ; Beniwal, S.P.S. 1983. **Ultrastructural changes in urdbean leaves infected by urdbean leaf crinkle virus.** INDIAN PHYTOPATHOLOGY, v.36(2):228-232. [En] [En Abst] (A:PS)

Virus-like particles (VLP) appeared to be present in blackgram leaf crinkle virus (BLCV)-infected blackgram leaves in the nucleus, cytoplasm and chloroplasts. Healthy cells were devoid of such particles. The VLP appeared to be spherical with a diameter of 25 to 30 nm. Hypertrophy of infected cells was observed. Some mitochondria were observed to be filiform as compared to normal spherical ones in healthy cells. [AS]

***0222** Bhaktavatsalam, G. ; Nene, Y.L. ; Beniwal, S.P.S. 1983. **Influence of certain physico-chemical factors on the infectivity and stability of urdbean leaf crinkle virus.** INDIAN PHYTOPATHOLOGY, v.36(3):489-493. [En] [En Abst] (A:PS)

Infectivity and longevity of blackgram leaf crinkle virus (BLCV) were affected by a number of physicochemical factors. The infectivity was pH dependent with maximal infectivity at 7.8. Thermal inactivation of BLCV appeared to be highly pH dependent. Calcium tribasic and dibasic phospates and EDTA completely inhibited virus infectivity whereas magnesium silicate had no effect on it. Actinomycin D and cycloheximide decreased infectivity whereas tetracycline hydrochloride did not affect it. Phenol treatment considerably reduced viral infectivity index suggesting that BLCV is not a viroid. BLCV is ether-insensitive and does not possess lipids. Addition of 5% sucrose plus 1% mercaptoethanol to inoculum increased infectivity as well as longevity of BLCV. [AS]

***0223** Chowdhury, A.K. ; Nath, P.S. 1983. **A rapid method of inoculation of urid bean leaf crinkle virus (ULCV) using germinated seed [Abst.].** INDIAN JOURNAL OF EXPERIMENTAL BIOLOGY, v.21(3):58. [En] [En] (REP.MB-2450)

Blackgram leaf crinkle virus was inoculated through germinated seeds by shaking the seeds with a virus preparation for different time intervals. Plants developed from the inoculated seeds showed virus symptoms and the rate of transmission efficiency varied with the exposure of germination and shaking period. [AS]

***0224** Dubey, G.S. ; Sharma, I. ; Prakash, N. 1983. **Some properties of uridbean leaf crinkle virus.** INDIAN PHYTOPATHOLOGY, v.36:762-764. [En] (A:PS)

BLCV was successfully transmitted by Aphis craccivora and Acyrthosiphon pisum. Electron microscopic observations revealed the particles to be isometric with an average diameter of 320 A. The virus did not show any serological relationship with any of 11 viruses of the bromo, poty and como virus groups attacking other legume species. [EMS]

***0225** Kadian, O.P. 1983. **Occurrence and incidence of leaf crinkle disease on urdbean and mungbean in Haryana.** HARYANA AGRICULTURAL UNIVERSITY JOURNAL OF RESEARCH, v.13(1):121-126. (REP.MB-2578)

A survey of different districts of Haryana during the summer and kharif seasons of 1975, 1976 and 1979 revealed that the leaf crinkle disease on blackgram and mungbean was less in summer than in kharif. The disease increased year after year throughout the State. The disease was more in the northern than in the southern region of the State. [AS]

***0226** Kadian, O.P. 1983. **Studies on weed plants as host range of urdbean leaf crinkle virus.** HARYANA AGRICULTURAL UNIVERSITY JOURNAL OF RESEARCH, v.13(4):602-603. [En] (REP.MB-2579)

Of 23 weed species tested, 5 were infected by blackgram leaf crinkle virus. Infection was systemic in Convolvulus arvensis and localized in the four Datura species: D. stramonium, D. metal, D. metaloides, and D. incrimis. It was also observed that disease incidence on blackgram was higher in fields where C. arvensis was prevalent than in fields free from it. [THH]

***0227** Sharma, I. ; Dubey, G.S. 1983. **Histological changes in urdbean flowers due to urdbean leaf crinkle virus infection.** ZEITSCHRIFT FUR PFLANZENKRANKHEITEN UND PFLANZENSCHUTZ, v.90(1):63-67. [En] [En De Abst] (REP.MB-2688)

Blackgram leaf crinkle virus (BLCV) induced a variety of histological changes in the flowers of blackgram plants. The notable changes observed included degeneration of androecium and gynoecium, incomplete development of pollen grains in pollen tetrads, non-formation of ovules and abnormal ovarian cavity. These histopathological abnormalities are corraborated with the pollen sterility and loss in pod setting by BLCV-infected blackgram plants. [AS]

***0228** Beniwal, S.P.S. ; Chaubey, S.N. ; Bharathan, N. 1984. **Detection of urdbean leaf crinkle virus in urdbean seeds.** SEED RESEARCH, v.12(1):101-104. [En] [En Abst] (REP.MB-2641)

Three methods, viz., dry examination, growing-on test and indicator-inoculation test, are described for detection of blackgram leaf crinkle virus in blackgram seeds. The dry examination could serve as a good indicator of the presence of the virus if oversize seeds are present in the seed lot which could be confirmed by growing-on and indicator-inoculation tests described in this paper. [AS]

***0229** Sharma, I. ; Dubey, G.S. 1984. **Control of uridbean leaf crinkle virus through heat treatment, chemotherapy and resistance.** INDIAN PHYTOPATHOLOGY, v.37(1):26-30. [En] [En Abst] (A:PS)

The seed-borne blackgram leaf crinkle virus was completely eliminated by treating blackgram seeds in a waterbath for 30 minutes at 55 C without affecting seed germination. Similarly, pre-inoculation drenching of blackgram plants with 1.0% suspension of Benlate or Bavistin fully checked the disease. Thiouracil, and decoctions of tea and coffee delayed symptom appearance. Plants sprayed with IAA and IBA gave higher percentage of infection. On artificial inoculation, HPU 27, 102, 164 and 315 of blackgram cultivars were found highly

resistant. Mungbean cultivars D-215, HPM-1, R III, Madana-1, MS-8, ML-12, Progeny-5, and T-44 R I were immune and Bhabhar, D-3-9, J-1, K-12, ML-26 R I, S-9, and T-44 R II were highly resistant. [AS/THH]

***0230** Chowdhury, A.K. ; Saha, N.K. 1985. **Inhibition of urd bean leaf crinkle virus by different plant extracts.** INDIAN PHYTOPATHOLOGY, v.38(3):566-568. [En] (A:PS)

The purpose of this study was to screen some of the plant extracts for exploiting their antiviral properties to blackgram leaf crinkle virus. The results showed that all the plant extracts used in the experiment had some influence on the suppression of disease in the case of in vitro mixing. Plant extracts differed in their activity and highest percentage of inhibition (58.13%) with 1 hr incubation period was obtained from zinger extract which in 2 hr incubation was found in turmeric (57.15%). Similarly, lowest inhibition upto 14.29% was found in jute extract at exposure of 1 hr incubation and in 2 hr incubation 16.94% inhibition was obtained in a weed Ipomoea glaberrina. It was observed that increasing incubation periods increased the inhibition percentage. [PLH]

***0231** Bhardwaj, S.V. ; Dubey, G.S. 1986. **Studies on the relationship of urdbean leaf crinkle virus and its vectors, Aphis craccivora and Acyrthosiphon pisum.** JOURNAL OF PHYTOPATHOLOGY, v.115(1):83-88. [De] [En De Abst] (A:PS)

Pre and post-virus-acquisition starvation of Aphis craccivora Koch. and Acyrthosiphon pisum Harris resulted in appreciable increase in percentage of transmission of blackgram leaf crinkle virus. Highest transmission occurred when aphids were starved for 90 min prior to virus-acquisition. A. pisum and A. craccivora on 20 and 80 min of post-acquisition starvation and 10 and 20 min of virus-acquisition inoculated more number of plants. Both the aphids transmitted the virus in probes lasting for one min. However, beyond 5 min of successive transfer on test plants loss in transmissibility was apparent. Viruliferous aphids off the plant retained the virus for a much longer period than on maize plants. The virus appears to be non-persistently borne in the aphids. [AS]

- Bean Common Mosaic Virus

***0232** Nelson, R. 1932. **Investigations in the mosaic disease of bean (Phaseolus vulgaris L).** MICHIGAN AGRICULTURAL EXPERIMENT STATION, TECHNICAL BULLETIN, no.118:1-71. [En] [En Abst] (REP.MB-2432)

This paper gives a description of bean mosaic virus. Mungbean, blackgram and other species of beans in the genus Phaseolus were infected by this virus. [THH]

***0233** Yaraguntaiah, R.C. ; Nariani, T.K. 1963. **Bean mosaic virus in India.** INDIAN JOURNAL OF MICROBIOLOGY, v.3(4):147-150. [En] (REP.MB-2773)

The virus under study resembles the common bean mosaic virus in

symptomatology, physical properties, host range (including Vigna radiata, V. mungo and Glycine max), and transmission through seed and aphids. [THH]

*0234 Kaiser, W.J. ; Mossahebi, G.H. 1974. **Natural infection of mungbean by bean common mosaic virus.** PHYTOPATHOLOGY, v.64:1209-1214. [En] [En Abst] (REP.MB-0494)

A seed-borne, aphid-transmitted virus was found infecting mungbeans (Vigna radiata) in various regions of Iran. The virus produced deformation, puckering, rolling, blistering, and mosaic symptoms on the foliage of virus-infected mungbeans. The pathogen was seed-borne in mungbean (8 to 32%) and common bean (Phaseolus vulgaris) (approx. 7%). The mungbean virus adversely affected growth and yields of mungbean, especially when infection occurred before pod set. Yields from 11 mungbean lines infected from seed were reduced by 31 to 75%. Two mungbean lines were highly resistant to the virus in field trials at Karaj, Iran. The virus was transmitted in a stylet-borne manner by several aphid species, including Aphis craccivora, Acyrthosiphon pisum, and Acyrthosiphon sesbaniae. Electron micrographs of negatively stained leaf-dip preparations showed that infection was associated with flexuous particles approx. 750 nm in length. From host range studies, symptoms, seed and vector transmission, serology, and particle morphology, the mungbean virus was identified as a strain of bean common mosaic virus. [AS]

*0235 Agarwal, V.K. ; Beniwal, S.P.S. ; Verma, H.S. 1976. **Note on transmission of bean common mosaic virus in seeds of greengram (Vigna radiata (L.) Welczek).** PANTNAGAR JOURNAL OF RESEARCH, v.1(1):81-82. [En] [En Abst] (REP.MB-2422)

Bean common mosaic virus was seed-borne in all of the 17 mungbean germplasm entries tested. The rate of seed-transmission varied from 2 to 14%. [THH]

*0236 Agarwal, V.K. ; Nene, Y.L. ; Beniwal, S.P.S. 1976. **Influence of bean common mosaic virus infection on the flower organelles, seed characters and yield of urdbean.** INDIAN PHYTOPATHOLOGY, v.29:444-446. [En] (A:PS)

Blackgram plants systemically infected with bean common mosaic virus (BCMV) either had their entire inflorescences transformed into leaf-like structures or had greatly reduced numbers of flowers. BCMV infection did not affect pollen viability, seed color, and seed viability. It did, however, greatly reduce the number of pods per plant and grain yield. [EMS]

*0237 Agarwal, V.K. ; Nene, Y.L. ; Beniwal, S.P.S. 1977. **Detection of bean common mosaic virus in urdbean (Phaseolus mungo) seeds.** SEED SCIENCE AND TECHNOLOGY, v.5(3):619-625. [En] [En Fr De Abst] (REP.MB-1731)

Bean common mosaic virus was successfully detected in blackgram seeds by indicator-inoculation, growing-on and microprecipitin tests. Any one of these tests, depending upon facilities available, can be used to detect the virus in blackgram seeds. [AS]

***0238** Godse, D.B. ; More, B.B. ; Patil, P.L. 1977. **Effect of common bean mosaic virus-infection on nodulation of mung (Phaseolus aureus Roxb).** JOURNAL OF MAHARASHTRA AGRICULTURAL UNIVERSITIES, v.1:310-311. [En] [En Abst] (REP.MB-2447)

Infection by bean common mosaic virus reduced nodulation in mungbean. The dry weight of nodules in infected plants was reduced significantly, while reduction in number of nodules per plant was not significant. [THH]

***0239** Singh, R.N. 1977. **Natural infection of mung bean by bean common mosaic virus in India.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.6:94-95. [En] [En Abst] (REP.MB-2416)

The symptoms produced on blackgram cultivar UPU-2, sap, seed and aphid transmission, host range and physical properties in vitro showed that the virus causing mosaic mottle in mungbean is similar to the blackgram isolate of bean common mosaic virus. [THH]

***0240** Singh, R.N. ; Nene, Y.L. 1977. **Factors affecting symptom expression and incubation period of bean common mosaic virus in urd bean.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.7:111-114. [En] [En Hi Abst] (REP.MB-2417)

Symptom expression and incubation period of bean common mosaic virus in blackgram (Vigna mungo) is affected by the stage of the test plant, inoculum potential, salt concentration and pH of the buffer used for extraction of infective sap and temperature during and after inoculation of the plants. Optimum conditions favoring fullest expression of the symptoms and shorter incubation period are inoculation of the test plants at the third trifoliate stage with standard inoculum of 1.0E-2 dilution extracted in potassium phosphate buffer of 7.6 pH and 0.2 molarity. Placing the inoculated plants at 22 to 26 C results in earlier and severe symptom appearance. [AS]

***0241** Agarwal, V.K. ; Nene, Y.L. ; Beniwal, S.P.S. ; Verma, H.S. 1979. **Transmission of bean common mosaic virus through urdbean (Phaseolus mungo) seeds.** SEED SCIENCE AND TECHNOLOGY, v.7(1):103-108. [En] [En Fr De Abst] (REP.MB-2136)

The bean common mosaic virus (BCMV) was present in seeds of all the 25 germplasm and varieties of blackgram studied, though seed transmission ranged from 2% to 10%. Plants which expressed mosaic mottle symptoms from five to 30 days after sowing showed 17.3% seed transmission, whereas those expressing the symptoms from 30 to 40 and from 40 to 50 days after sowing showed 12.1% and 5.1%, respectively. Small seeds showed a slightly higher percentage transmission than shrivelled and bold ones. The virus was not inactivated during any stage of seed development. Neither dry heat nor hot water treatment had any effect on the survival of BCMV within the seeds while they remained viable. [AS]

***0242** Singh, Rajendra ; Chowdhury, J.R. 1983. **Influence of the infection by common bean mosaic virus on nodulation and nitrogen fixation by mung bean (Vigna radiata (L.) Wilczek).** RIVISTA DI AGRICOLTURA SUBTROPICALE E TROPICALE,

v.77(2):249-257. [En] [En It Abst] (REP.MB-2551)

The influence of common bean mosaic virus infection on nodulation and nitrogen fixation by mungbean [Vigna radiata (L.) Wilczek] was studied. The virus infection delayed the nodule formation on secondary roots. The virus infection decreased the nodule number, nodule size, nodule fresh weight but increased the percent dry matter. The values of aforesaid parameters were more in soil grown plants than in sand grown. The virus infection enhanced the contents of total nitrogen, nitrate nitrogen, nitrite nitrogen, protein, but decreased the ammoniacal nitrogen, carbohydrate fractions, organic carbon, C:N ratio, leghaemoglobin, bacterial population in nodule and media. [AS]

*0243 Singh, Rajendra ; Srivastava, R.S. 1983. **Effect of nitrogen nutrition and Rhizobium on multiplication and symptom expression of common bean mosaic virus in mung bean.** ZEITSCHRIFT FUR PFLANZENKRANKHEITEN UND PFLANZENSCHUTZ, v.90(2):207-212. [En] [En De Abst] (REP.MB-2689)

The effects of different levels of nitrogen (0, 56, 112, 168, 224, 448, 672 and 784 mg/l) nutrition and Rhizobium on multiplication and symptom expression of common bean mosaic virus (CBMV) in mungbean cv. Pusa Baisakhi were studied. The virus activity was higher in Rhizobium-untreated than in Rhizobium-treated plants. The increase in the virus activity was associated with an increasing supply of nitrogen (from 0 to 784 mg/l). In Rhizobium-treated and Rhizobium-untreated plants, the most severe virus symptoms were observed at 168 and 224 mg/l of nitrogen supply, respectively. The nitrogen level (784 mg/l) which produced the maximum virus activity did not increase the symptom severity in the host plants. Symptoms appeared earlier in Rhizobium-untreated than in Rhizobium-treated plants. [AS]

*0244 Srivastava, R.S. ; Singh, Rajendra 1984. **Effect of nitrogen nutrition and Rhizobium on the uptake of macro nutrients by common bean mosaic virus infected mung bean [Vigna radiata (L.) Wilczek].** RIVISTA DI AGRICOLTURA SUBTROPICALE E TROPICALE, v.78(3/4):713-721. [En] [En It Abst] (REP.MB-2729)

Virus infection increased the uptake of nitrogen and phosphorus, but decreased those of potassium, calcium, magnesium and sulphur. In Rhizobium treated diseased (RD) plants the uptake of nitrogen and phosphorus was lower than in the Rhizobium untreated (D) ones. However, the uptake of potassium, calcium, magnesium and sulphur was higher in Rhizobium treated plants than those of Rhizobium untreated ones. The uptake of nitrogen by healthy (H and RH) as well as diseased (D and RD) plants of both the groups increased with increasing nitrogen levels from 0 up to 784 ppm of nitrogen. The uptake of phosphorous by diseased plants increased with increasing nitrogen levels from 0 up to 784 ppm but by healthy plants (H and RH) from 0 up to 224 ppm of nitrogen. The uptake of potassium by Rhizobium treated and Rhizobium untreated plants increased from 0 up to 56 ppm of nitrogen but declined thereafter, while the uptake of calcium, magnesium and sulphur increased from 0 up to 168 ppm in Rhizobium treated and from 0 up to 224 ppm in Rhizobium untreated plants. [AS]

*0245 Chowdhury, J.R. ; Srivastava, R.S. ; Singh, Rajendra 1985. **Effect of common bean mosaic virus and Rhizobium on the amino acid contents in mung bean (Vigna radiata (L.) Wilczek).** RIVISTA DI AGRICOLTURA SUBTROPICALE E TROPICALE, v.79(3):411-424. [En] [En It Abst] (REP.MB-2831)

The synthesis of virus protein by the host tissues almost certainly induce small and transitory changes in their free amino acids pool (Selman, 1941). These changes result from the alteration in host metabolism or the multiplication of virus itself (Ford and Tu, 1969). However, most of the earlier work on the metabolism of virosed legumes has been mostly inferred as due to virus infection and little emphasis has been given to physiological alterations produced due to interaction of Rhizobium and virus. Therefore, in the present investigation, it was aimed to study the influence of common bean mosaic virus (CBMV) and Rhizobium on the free amino acid contents of mungbean cv. 'Pusa Baisakhi'. [AS]

***0246** Tsuchizaki, T. ; Iwaki, M. ; Thongmeearkom, P. ; Sarindu, N. ; Deema, N. 1986. **Bean common mosaic virus isolated from mungbean (Vigna radiata) in Thailand.** TROPICAL AGRICULTURE RESEARCH CENTER, TECHNICAL BULLETIN, no.21:184-188. [En] [En Abst] (A:PS)

A seed-borne, aphid-transmitted virus was found infecting mungbean (Vigna radiata) in various regions of Thailand. The pathogen was seed-borne in mungbean and bean (Phaseolus vulgaris). The plants showing systemic symptoms by mechanical inoculation of the virus were limited to the Leguminosae. Infectivity of crude sap of leaves was lost by heating at 50-60 C for 10 minutes, by diluting to 1.0E-3 - 1.0E-4, and by aging at room temperature for 4-8 days. The virus consisted of flexuous filaments about 750 nm in length and was transmitted by aphids in a non-persistent manner. In double-diffusion tests in agar gel plates containing 0.5% lithium 3,5-diiodosalicylate, the virus reacted strongly with antisera to bean common mosaic virus (BCMV) isolated from bean, blackeye cowpea mosaic virus, and azuki bean mosaic virus. Based on host range studies, symptoms, seed and vector transmission, serology, and particle morphology, the virus was identified as a strain of BCMV. [AS]

- Mosaic Virus

***0247** Shahare, K.C. ; Raychaudhuri, S.P. 1963. **Mosaic disease of urid (Phaseolus mungo L.).** INDIAN PHYTOPATHOLOGY, v.16:316-318. [En] (REP.MB-1020)

A serious disease of blackgram was observed at the Indian Agricultural Research Institute, New Delhi. The disease is characterized by a mosaic pattern of broad patches of light and dark green areas and blistering of the leaf blade, and induces growth retardation of the affected plants and shedding of most of their flowers. The virus resembles the bean common mosaic virus in physical properties and host range. [THH]

***0248** Gorbunova, N.I. ; Shevtsova, L.B. ; Gumarova, K.F. ; Frantskevich, I.A. 1969. **The preparation of specific serum to mosaic virus of cowpea and mung bean.** SEL'SKOKHOZYAISTVENNAYA BIOLOGIYA, v.4(1):96-97. [Ru] [En Abst] (REP.MB-0498)

The non-specificity of antivirus sera obtained as a result of the immunization of animals with unpurified infectious juice can be overcome by the

sedimentation of normal antibodies with the help of extractions from acetone powders of corresponding healthy plants. [AS]

*0249 Srivastava, K.M. ; Verma, G.S. ; Verma, H.N. 1969. **A mosaic disease of black gram (Phaseolus mungo).** SCIENCE AND CULTURE, v.35(9):475-476. (REP.MB-1063)

Blackgram grown near Lucknow, India, showed mosaic mottling symptoms associated with reduction in plant size and narrowing of leaves. The disease could be transmitted mechanically from one host to another, and transmitted only to a few members of Leguminosae, including mungbean. The yield was greatly reduced. [THH]

*0250 Verma, G.S. ; Verma, H.N. ; Srivastava, K.M. 1969. **Studies on the virus diseases of pulse crops in Lucknow and its suburbs.** IN: Proceedings [of the] third annual workshop conference on pulse crops. New Delhi : Indian Council of Agricultural Research. p.117-123. [En] (REP.MB-1167)

MEETING: Annual Workshop Conference on Pulse Crops, 3rd -- New Delhi, India, Feb 3-5, 1969

Symptoms of mosaic disease on blackgram (Vigna mungo) and cowpea (V. sinensis) are described. [THH]

*0251 Oblisami, G. ; Deiveekasundaram, M. ; Balaraman, K. ; Purushothaman, D. ; Rangaswami, G. 1973. **Correlation between the presence of sugars and amino acids in the leaf exudates and the quantities of microorganisms present in the phyllosphere of healthy and mosaic affected greengram.** MADRAS AGRICULTURAL JOURNAL, v.60(7):481-483. [En] [En Abst] (REP.MB-0789)

The phyllosphere microflora of mosaic diseased mungbean revealed that fungi and actinomycetes were more on the healthy leaves while bacteria and Azotobacter were more predominant on the infected leaves. The washings of the infected leaves contained more quantities of amino acids and reducing sugars as compared to the healthy leaves. The possible correlation between the leaf exudation patterns of infected plants as a result of altered physiology of the plant, and the quantity and quality of phyllosphere microflora is indicated. [AS]

*0252 Ramakrishnan, G. ; Ranganathan, K. ; Murugesan, S. ; Damodaran, A.P.S. ; Janaki, I.P. ; Ayyavoo, R. 1973. **Studies on mosaic disease of blackgram (Phaseolus mungo L.).** MADRAS AGRICULTURAL JOURNAL, v.60(7):469-471. [En] [En Abst] (REP.MB-0316)

Mosaic disease of blackgram was observed in different places of Tamil Nadu. Five isolates from different locations were studied. All the isolates were found to be sap transmissible. In addition the Isolates Bg 1 and Bg 5 were transmitted by the aphid vector Myzus persicae while the isolate Bg 4 was transmitted by Aphis craccivora. The Isolates Bg 2 and Bg 4 had similar physical properties but different host ranges. Isolates Bg 5 and Bg 7 were similar in their physical properties but not in host range transmissibility.

[AS]

*0253 Ramakrishnan, G. ; Kandaswamy, T.K. ; Damodaran, A.P.S. ; Ayyavoo, R. 1973. **Studies on new mosaic viruses occurring on Phaseolus aureus Roxb.** MADRAS AGRICULTURAL JOURNAL, v.60(7):465-468. [En] [En Abst] (REP.MB-0318)

Four isolates causing mosaic mottling in mungbean are described. They were transmissible by sap and also by the aphid vectors Aphis gossypii, A. craccivora and Myzus persicae. Of the four isolates studied, GGM 2 and GGM 3 had similar host ranges and physical properties and infected Vigna radiata and V. mungo systemically while they produced necrotic lesions on Phaseolus vulgaris and Cyamopsis tetragonaloba. The GGM 1 isolate caused systemic infection on Pisum sativum, Medicago sativa and Physalis floridana while GGM 4 infected V. mungo and Solanum nigrum. The isolates were not serologically related to tobacco mosaic virus, cowpea mosaic virus, soybean mosaic virus or potato virus, but all were serologically related. Hence, the virus reported here is tentatively considered as new and is designated as mungbean mosaic virus. [AS]

*0254 Singh, Rajendra ; Mall, T.P. 1974. **Physiology of Phaseolus mungo L. affected by urd mosaic virus. 1. Effect on chlorophyll content, catalase and peroxidase activity.** PORTUGALIAE ACTA BIOLOGICA (SERIES A), v.13:63-71. [En] [En Abst] (REP.MB-2396)

In leaves of ten cultivars of blackgram (Vigna mungo) viz. T-9, T-27, T-65, T-77, Mash 1-1, Mash-48, L 41-43, Co.1, No.55 and Khargoan, the blackgram mosaic virus caused a decrease in chlorophyll content, catalase activity and increase in peroxidase activity in comparison with their healthy counterparts. Chlorophyll content and peroxidase activity increased with the age of the plant but catalase decreased. Different cultivars varied in their response to infection. [AS]

*0255 Singh, J.P. ; Varma, J.P. 1977. **Mosaic disease of mung and urd bean in Haryana.** NATIONAL ACADEMY OF SCIENCES, INDIA, PROCEEDINGS (SECTION B: BIOLOGICAL SCIENCE), v.47(1):33-40. [En] [En Abst] (REP.MB-2373)

Various types of mosaic symptoms on mungbean (Vigna radiata) and blackgram (V. mungo) were caused by two different viruses tentatively designated as mung/urd mosaic virus 1 (MUMV 1) and mung/urd mosaic virus 2 (MUMV 2) in Haryana. Symptoms produced by these two viruses on several other leguminous plants were different. Vigna catjang and Dolicos lablab were the distinct local lesion hosts of MUMV 1 and MUMV 2, respectively. The maximum number of local lesions were produced by MUMV 1 on primary leaves of V. catjang at the time of initiation of first trifoliate leaf and not later. Both viruses were easily sap and seed transmitted but differed in host range, host reactions, physical properties and were serologically unrelated. MUMV 1 was found more related to bean common mosaic virus and MUMV 2 to cowpea mosaic virus than other leguminous viruses infecting mungbean and blackgram. [AS/THH]

*0256 Singh, Rajendra ; Singh, Raj Bahadur 1977. **Studies on mosaic diseases of mung bean.** REVISTA DI BIOLOGIA, v.70(3/4):349-361. [En] [En Abst]

(REP.MB-2797)

Mungbean mild mosaic (MBMM) and mungbean severe mosaic (MBSM) viruses were found to be commonly occurring on mungbean crop grown at Gorakhpur, India. Cross-protection tests revealed that the two viruses were not related. Both of them have their host range limited to Leguminosae. However, MBSM produced local lesions on C. amaranticolor Coste & Reyn. MBMM and MBSM were inactivated after 10 min at 65 to 70 C and 55 to 60 C, respectively. The dilution end point of MBMM was 1:10,000 to 1:100,000 and MBSM was 1:300 to 1:400. MBMM remained active 15 days (18 to 25 C) and MBSM, only for 8 h at 22 C in vitro. MBMM and MBSM remained active in mungbean cv. Pusa Baisakhi leaves, desiccated over calcium chloride, for 182 days (15 to 31 C) and 6 days (15 to 20 C), respectively. MBMM was not transmitted by any of the aphids tested (Aphis craccivora Koch., A. gossypii Glov., A. nerri Boyer, Lapophis pseudobrassicae Davis., Myzus persicae Sulz., Rhopalosiphum maidis Fitch.) but MBSM was transmitted by A. craccivora in stylet-borne (non-persistent) manner. Both the viruses were not seed borne but readily transmitted by sap inoculation. Both were detected from all parts of infected mungbean cv. Pusa Baisakhi plants except the embryo and mature seed parts. Although all parts of infected plants contained the viruses, the leaf was a richer source than other plant parts. Higher concentration of viruses was associated with severe symptoms; moderate and mild symptoms showed lower concentration. Nine cultivars of mungbean were tested for susceptibility and reaction against both viruses but none of the cultivars were resistant to infection. [AS]

*0257 Singh, Rajendra ; Singh, Raj Bahadur 1978. **Changes in enzymatic activity of mung bean leaves due to mung bean severe mosaic virus infection.** LEGUME RESEARCH, v.2(1):53-55. [En] (A:PS)

Peroxidase and catalase activities of mungbean leaves infected by mungbean severe mosaic virus is tabulated. [THH]

*0258 Singh, Rajendra ; Singh, Raghuraj 1978. **Studies on a virus causing mosaic disease of urd bean.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.8(2):185-187. [En] [En Hi Abst] (REP.MB-2895)

A sap transmissible mosaic virus disease of blackgram (Vigna mungo) is reported. Its host-range was restricted to Leguminosae. Its thermal inactivation point was between 95 and 100 C, the dilution end point 1.0E-6 to 1.0E-7 and longevity in vitro 35-36 days (at 5-7 C). The virus remained active in blackgram cv. T-9 desiccated leaves for more than 950 days (room temp. 12-40 C). The virus was transmitted by sap but not by seed and some aphids. The blackgram mosaic virus appears to be different from the major legume viruses so far reported. [AS]

*0259 Singh, Rajendra ; Singh, Raj Bahadur 1983. **Changes in chemical composition of mung bean fruits due to mung bean severe mosaic virus infection.** INDIAN PHYTOPATHOLOGY, v.36(1):129-131. [En] (A:PS)

Total sugars, reducing sugars, non-reducing sugars, total nitrogen, protein, nitrate nitrogen, total free amino acids and inorganic phosphorus were higher in mungbean fruits harvested from mungbean mosaic virus-infected plants than in those from healthy plants. Starch, ammoniacal nitrogen, organic

phosphorus and total phosphorus showed the reverse trend. [THH]

***0260** Singh, A.K. ; Srivastava, S.K. 1985. **Effect of urd bean mosaic virus infection on the yield and chemical composition of urd bean fruits.** INDIAN PHYTOPATHOLOGY, v.38(1):85-89. [En] [En Abst] (A:PS)

Blackgram mosaic virus infection was found to reduce the number of pods/plant, and seeds/pod in blackgram (Vigna mungo) cv. Type-9. The seed weight was also adversely affected. The percent yield loss was higher in early inoculated plants in comparison to mid- and late-inoculated ones. Virus infection increased the nitrogenous fractions except ammoniacal nitrogen (total nitrate, nitrite nitrogen, total free amino acids and protein) in comparison to healthy ones. Carbohydrate fractions (total reducing sugar, non-reducing sugars and starch) were decreased in virus-infected fruit parts. All the phosphorus fractions were also reduced in diseased fruit parts. [AS]

- Mottle Virus and Mosaic Mottle Virus

***0261** Singh, R.N. ; Nene, Y.L. 1977. **Diagnostic symptoms of mosaic mottle disease of urd bean (Phaseolus mungo L.).** SEEDS AND FARMS, v.3:23-25. [En] [En Abst] (REP.MB-2418)

The mosaic mottle disease of blackgram (Vigna mungo) is characterized by conspicuous reduction in the size followed by a typical mosaic mottle of trifoliates, partial or complete modification of the infloresences into vegetative structures and stunting and bushy appearance of infected plants. While typical mosaic mottle symptoms on the leaves are more pronounced in the glasshouse (20 to 26 [plus or minus] 2 C), the stunting and bushy appearance of the plants is more so in the field. Characteristic symptoms on the primary leaves and on first and second trifoliates have been described, in the case of plants originating from infected seeds, which would be helpful in screening the seed lots by growing on test against infection with bean common mosaic virus. [AS]

***0262** Sun, M. ; Lai, P.L. ; Yan, L.P. 1977. **Mungbean mottle virus, a new pathogen of mungbean [Abst.].** AMERICAN PHYTOPATHOLOGICAL SOCIETY, PROCEEDINGS, v.4:91-92. [En] (REP.MB-2368)

MEETING: Annual Meeting of the American Phytopathological Society, 69th -- USA, 1977

Mungbean plants, Vigna radiata, with symptoms and deformed leaves were observed in fields in Taiwan. The incidence of diseased plants was high (70 - 80%) in spring plantings but low (1 - 5%) in fall plantings. Flexous rod-shaped particles and pinwheel inclusions were found in sap and in thin sections, respectively, from diseased plants. A virus purified by chloroformbutanol clarification, polyethylene glycol precipitation and density gradient centrifugation had 13 x 750 nm particles that were infectious (by mechanical inoculation) in Vigna radiata, Chenopodium amaranticolor, C. quinoa, Phaseolus vulgaris, P. acutifolius, V. sinensis cv. Susquipedalis and Nicotiana glutinosa. Vigna radiata, V. sinensis cv. Susquipedalis and Chenopodium spp.

were identified as natural hosts. In microprecipitin and agar gel diffusion tests, the virus failed to react with antisera of bean common mosaic, bean yellow mosaic, soybean mosaic, potato virus Y, peanut mottle, henbane mosaic, and tobacco etch viruses. This causal virus, apparently in the potato virus Y group, is a newly-characterized pathogen of mungbean and is named mungbean mottle virus. [AS]

*0263 Singh, R.N. ; Nene, Y.L. 1978. **Further studies on the mosaic mottle disease of urd bean.** INDIAN PHYTOPATHOLOGY, v.31(2):159-162. (REP.MB-2175)

A viral disease with systemic mottle symptoms in blackgram (Vigna mungo) is widely prevalent in north India. The in vitro properties of the virus in extract are: thermal inactivation, infection after heating for 10 minutes at 55 C but not at 60 C; dilution end point, infection at 5 x 1.0E-3 but not at 1.0E-4; longevity in vitro at 24 C, infection at 36 hours but not at 48 hours. The host range is restricted to a few legumes. It is transmitted by Aphis craccivora and A. gossypii and is serologically related to common bean mosaic virus. [AS]

*0264 Talens, L.T. 1978. **Mungbean viruses in the Philippines. 1. Identity of a virus causing mottle in mungbean.** PHILIPPINE PHYTOPATHOLOGY, v.14(1&2):58-62. [En] (REP.MB-2079)

A virus inducing a mottle reaction and stunted growth in field-grown mungbean [Vigna radiata (L.) Wilczek] was isolated and identified. Based on thermal stability, serological property, and morphological features, the mungbean virus isolate was found to possess physical and antigenic properties similar to blackgram mottle virus (BgMV). The virus was stable at high temperature (10 min duration at 90-95 C) and occurred in high concentration (infectivity retained at 1.0E-6 dilution) in infected mungbean tissues harvested 10-14 days after mechanical inoculation. The virus reacted strongly in an Ouchterlony double immunodiffusion test with reference BgMV antiserum. Isometric particles which measured 28-30 nm in diameter were seen in electron microscopic examinations of partially purified preparations stained with 2% neutral phosphotungstate. This study describes the first report on the occurrence of mungbean mottle virus in the Philippines with antigenic properties similar to blackgram mottle virus. [AS]

*0265 Talens, L.T. ; Dolores, A.C. 1978. **Mungbean viruses in the Philippines. 2. Host range, symptomatology and effect of mungbean mottle virus on growth of mungbean, Vigna radiata (L.) Wilczek.** PHILIPPINE JOURNAL OF CROP SCIENCE, v.3(4):242-246. [En] [En Abst] (REP.MB-2085)

A virus previously named mungbean mottle virus (MMV) was shown to incite veinal chlorotic reaction in inoculated primary leaves of mungbean. This was accompanied by the appearance of random chlorotic areas in the emerging trifoliate leaves. The chlorotic reaction originated from the veins, spread outwards to the interveinal areas, and gave the foliage a mottled appearance. The chlorotic reaction intensified as viral infection progressed. This is apparently the first detailed description of the virus in the Philippines. Blackgram and soybean proved susceptible to systemic invasion by the mottle virus. Local lesions were produced on Chenopodium amaranticolor, C. quinoa, Cyamopsis tetragonoloba, Macroptilium lathyroides, and Phaseolus vulgaris cv.

The Prince. Only Chenopodium quinoa developed systemic chlorotic spots due to virus infection. The severity of host reaction to MMV infection appeared to be related to the age at which mungbean became infected. Seven-day old mungbean seedlings were severely stunted and did not produce seeds. Plants which had been infected 14 days after seeding were not as seriously affected but growth remained substantially less than uninfected mungbean plants. This information is of some value in screening germplasm materials for sources of resistance to mungbean mottle virus. [AS]

***0266** Scott, H.A. ; Phatak, H.C. 1979. **Properties of blackgram mottle virus.** PHYTOPATHOLOGY, v.69(4):346-348. [En] [En Abst] (REP.MB-2141)

Blackgram mottle virus was purified from infected black valentine bean plants by a chloroform-butanol procedure. Purified preparations contained polyhedral particles 28 nm in diameter and exhibited a single immunoelectrophoretic component that migrated toward the anode at pH 8.8. Analytical ultracentrifugation showed a single component with a sedimentation coefficient of 122S and a density of 1.364 gm/cm3. Polyacrylamide gel electrophoresis demonstrated one nucleic acid component and one coat protein subunit with estimated molecular weights of 1.4x1.0E6 and 38,200 daltons, respectively. Phenol-extracted nucleic acid was infectious on pinto bean and sensitive to ribonuclease and had a nucleotide ratio of G = 24.9%; A = 25.9%; C = 25.3%; U= 24.0%. Blackgram mottle virus was transmitted by the bean leaf beetle, Cerotoma trifurcata, and the Mexican bean beetle, Epilachna varivestis. Reciprocal serologic tests failed to show relationships between blackgram mottle virus and members of other beetle-transmitted legume virus groups. [AS]

***0267** Talens, L.T. 1979. **Evidence that blackgram mottle and mungbean mottle viruses are distinct but serologically indistinguishable viruses [Abst.].** PHILIPPINE PHYTOPATHOLOGY, v.15:89. [En] (A:PS)

MEETING: Annual Meeting of the Philippine Phytopathological Society, 16th -- Manila, Philippines, May 2-5, 1979

Comparative studies on the host range, symptomatology, and serology of blackgram mottle virus (BGMV) and mungbean mottle virus (MMV) suggest that the two viruses are serologically indistinguishable, but biologically distinct. They only differed in symptoms induced on the indicator plants Chenopodium amaranticolor and C. quinoa. [EMS]

***0268** Scott, H.A. ; Hoy, .W. 1981. **Blackgram mottle virus.** DESCRIPTIONS OF PLANT VIRUSES, Set.15(..o.237). [En] (A:PS)

Geographical distribution, host range, symptomatology, and other information on blackgram mottle virus are described. [EMS]

***0269** Honda, Y. ; Iwaki, M. ; Thongmeearkom, P. ; Deema, N. ; Srithongchai, W. 1982. **Blackgram mottle virus occurring on mungbean and soybean in Thailand.** JARQ: JAPAN AGRICULTURAL RESEARCH QUARTERLY, v.16(1):72-77. [En] [En Abst] (A:PS)

Blackgram mottle virus (BLMV) isolated from naturally infected mungbean, blackgram, and soybean plants in Thailand infected plants in the families Aizoaceae, Amaranthaceae, Chenopodiaceae, Leguminosae, Pedaliaceae and Solanaceae. The virus was transmitted by beetles (Monolepta signata) and by mechanical inoculations in the laboratory. The virus in plant sap has a dilution end point between 1.0E-9 and 1.0E-10, a thermal inactivation point between 85 and 90 C for 10 min. and a longevity in vitro of 6-9 weeks at 20 C. Purified virus preparations had an ultraviolet light absorption spectrum typical of nucleoprotein components with an A260/A280 value of about 1.55. Purified virus preparations contained isometric particles with a diameter of about 28 nm. BLMV isolated from mungbean and soybean in Thailand was serologically identical with the BLMV previously reported from India (double-diffusion test), but did not react with antisera against some other beetle-transmitted viruses. [AS/EMS]

- Cucumber Mosaic Virus

***0270** Provvidenti, R. 1976. **Reaction of Phaseolus and Macroptilium species to a strain of cucumber mosaic virus.** PLANT DISEASE REPORTER, v.60(4):289-293. [En] [En Abst] (REP.MB-0676)

A strain of cucumber mosaic virus (CMV-B) incited unusually prominent foliar blistering, chlorosis, green vein-banding and deformation resembling 2,4-D injury in naturally and experimentally infected plants of Phaseolus vulgaris 'Lake Shasta'. Ninety additional domestic cultivars and 105 plant introductions of the same species reacted with a mild to moderate mottle and/or green vein-banding. All CMV-B infected plants eventually recovered from symptoms and recrudescence was rare. CMV-B also infected systemically accessions of P. aborigenus, P. aconitifolius, Vigna angularis, P. bracteatus, V. umbellata, P. caracalla, P. coccineus, P. dumosus, P. erythroloma, P. lunatus, P. panduratus, P. phyllanthus, P. pilosus, P. polystachios, V. radiata, Macroptilium atropurpureum, and M. lathyroides. Resistance occurred in accessions of P. acutifolius var. latifolius, P. adenanthus, P. anisotrichus, P. polyanthus, and P. trilobatus. CMV-B was efficiently transmitted from bean to bean by the green peach aphid (Myzus persicae) and carried in 0.3% of the seeds of the bean cultivar Pioneer. Although of common occurrence in the bean crops in New York State, CMV-B is rarely noticed because of the mildness and transient nature of the symptoms in many of the leading commercial cultivars, and the prevalence of other viruses, particularly bean yellow mosaic virus. [AS]

***0271** Purivirojkul, W. ; Poehlman, J.M. 1977. **Injury in mungbean from natural infection with cucumber mosaic virus.** CROP SCIENCE, v.17(4):654-656. [En] [En Abst] (REP.MB-1758)

Five mungbean (Vigna radiata (L.) Wilczek) strains susceptible to cucumber mosaic virus (CMV) and one resistant strain were grown with three treatments: unprotected control; systemic insecticide; and screen cages to exclude insects. Virus was spread by natural agents. The susceptible strains were damaged severely in the control and systemic insecticide plots but were free of virus symptoms when grown in the screen cages. The resistant strain was free of virus symptoms in all plots. Absence of virus symptoms in susceptible strains in the cages indicated that the virus was spread by an insect vector. A systemic insecticide to control the vector provided slight protection to mungbeans from

the virus. In the unprotected plots, the mungbean strain with greatest virus injury had only 16% of the height, 9% of the branch length, 9% of the leaf size, and 5% of the dry weight index of the resistant strain. In the cages the same susceptible strain had 91% of the height, 106% of the branch length, 65% of the leaf size, and 114% of the dry weight index of the resistant check. [AS]

*0272 Iwaki, M. 1978. **Seed transmission of a cucumber mosaic virus in mungbean (Vigna radiata).** PHYTOPATHOLOGICAL SOCIETY OF JAPAN, ANNALS, v.44(3):337-339. [En] (REP.MB-1958)

The paper describes a mosaic virus disease observed on some introduced mungbean cultivars. The particle morphology, symptomatology on various test species, transmissibility by aphids and seeds, and serology suggest the virus is a strain of cucumber mosaic virus. Since many mungbean cultivars are not invaded systemically by this virus, seed transmission should not occur, and, therefore, the virus should not seriously affect mungbean production in the area. [EMS]

*0273 Purivirojkul, W. ; Sittiyos, P. ; Hsu, C.H. ; Poehlman, J.M. ; Sehgal, O.P. 1978. **Natural infection of mungbean (Vigna radiata) with cucumber mosaic virus.** PLANT DISEASE REPORTER, v.62(6):530-534. [En] [En Abst] (REP.MB-1921)

Cucumber mosaic virus caused serious damage to mungbean (Vigna radiata) plants grown at the University of Missouri, Agronomy Research Center at Columbia during the past several years. The affected plants showed pronounced mosaic, leaf deformities, stunting and, occasionally, flower abortion and pod distortion. The causal virus was transmitted readily with sap inoculation and was seed-borne in mungbeans (0.61%). It was acquired and transmitted by the cowpea aphid (Aphis craccivora) during brief probes. Identity of the causal virus was confirmed with host range, electron microscopy, and serology. [AS]

- Others

*0274 Hartley, C. ; Haasis, F.W. 1929. **Brooming disease of black locust (Robinia pseudacacia).** PHYTOPATHOLOGY, v.19:162-166. [En] (REP.MB-2392)

This paper deals with a witches' broom disease of black locust (Robinia pseudoacacia). Similar witches' broom diseases have been reported on Vigna mungo and other crops in Java. [THH]

*0275 Dale, W.T. 1943. **Preliminary studies of the plant viruses in Trinidad.** TROPICAL AGRICULTURE, v.20(12):228-235. [En] (REP.MB-2805)

The paper deals with plant viruses encountered in Trinidad: cowpea mosaic virus, common bean mosaic virus, tobacco mosaic virus, and other suspected viruses. Vigna radiata and V. mungo were easily infected by cowpea mosaic virus, whereas inoculation with common bean mosaic virus failed to cause infection. [EMS]

*0276 Capoor, S.P. ; Varma, P.M. 1948. **Yellow mosaic of Phaseolus lunatus L.** CURRENT SCIENCE, v.17:152-153. [En] (REP.MB-2399)

A new virus mosaic disease was reported on Phaseolus lunatus. The virus is only transmissible through grafting or the whitefly Bemisia tabaci. Its host range is restricted to a few leguminous species, including mungbean. [EMS]

*0277 Dale, W.T. 1949. **Observations on a virus disease of cowpea in Trinidad.** ANNALS OF APPLIED BIOLOGY, v.36(3):327-333. [En] [En Abst] (REP.MB-2388)

A mosaic of cowpea and asparagus-bean (Vigna unguiculata) is common in Trinidad. The same virus sometimes attacks Cajanus indicus, Crotalaria juncea, Glycine max, Vigna mungo and V. radiata, usually when growing near to infected cowpeas. Desmodium frutescens, Psophocarpus tetragonolobus, Sesbania speciosa, Vigna vexillata, Phaseolus trinervius and varieties of P. lunatus are also susceptible to systemic infection. Most of the above give local lesions, which are the only symptoms produced on Canavalia ensiformis and Dolichos lablab. No infections were obtained on Phaseolus vulgaris, or on any plant outside the Leguminosae. The virus is seed-borne in asparagus-bean, but apparently not in tested cowpea varieties. The leaf beetle Ceratomia ruficornis is a vector, and is probably largely responsible for spread in the field; Aphis medicaginis seems unable to transmit the disease. The thermal inactivation point of the virus is 66 C., its dilution endpoint 1:100,000 and longevity in vitro over 20 days. [AS]

*0278 Raychaudhuri, S.P. ; Pathanian, P.S. 1950. **A mosaic disease of Crotalaria mucronata Desv. (C. striata D.C.).** CURRENT SCIENCE, v.19:213. [En] (REP.MB-2461)

A mosaic disease of Crotalaria mucronata is described. The virus is readily transmitted by sap-inoculation to C. juncea, Vigna sinensis, Vigna mungo and Vigna radiata. The symptoms appear 7-12 days after inoculation. [THH]

*0279 Fry, P.R. 1959. **A clover mosaic virus in New Zealand pastures.** NEW ZEALAND JOURNAL OF AGRICULTURAL RESEARCH, v.2:971-981. [En] [En Abst] (REP.MB-2380)

Clover mosaic virus is widespread in New Zealand infecting over 50% of plants in many pastures more than four years old. The virus has been found occurring naturally on white, red, subterranean, and strawberry clovers, broad bean, and sweet pea. It has been transferred experimentally to pea, bean, blue lupin, mungbean, and cowpea but not to Lotus uliginosus, lucerne, cucumber, spinach, tobacco, or Nicotiana glutinosa. The virus is readily transmitted experimentally by mechanical inoculation. Natural transmission occurs in the field in the absence of mechanical damage, suggesting the presence of an insect vector but the species involved has not yet been determined. Seed transmission did not occur. From host range, symptoms, and physical properties (thermal inactivation 60 - 62 C, tolerance to dilution 1.0E-6 but not 1.0E-7), the virus appears to be closely related to pea-wilt virus of Johnson (1942). No immunity has been found in 194 white clover mother plants. An antiserum has been prepared by injection of purified virus into a rabbit. The specific serological precipitate is the flocculent or H type suggesting the virus has a rod shaped

particle. In the glasshouse, infection with the virus caused a reduction in leaf yield of 24% in white, 55% in red, and 36% in subterranean clovers. [AS]

*0280 Shanta, P. ; Menon, K.P.V. 1961. **Studies on some properties of the coconut wilt virus.** INDIAN COCONUT JOURNAL, v.15(1):36-46. [En] [En Abst] (REP.MB-2398)

Some physical properties and the mode of transmission of coconut wilt virus (CWV), the virus associated with the root (wilt) disease of coconut has been studied using cowpea as an indicator plant. The virus is sap transmissible and its insect vector on coconut is Stephanitis typicus Dist. It is also soil-borne, the clay and silt fractions collected from the base of diseased trees being infective. It has a fairly wide host range when mechanically transmitted and occurs naturally in the roots of a number of weeds. The virus induces 'vein clearing' symptoms on blackgram. [AS]

*0281 Van Velsen, R.J. 1962. **Cowpea mosaic, a virus disease of Vigna sinensis in New Guinea.** PAPUA NEW GUINEA AGRICULTURAL JOURNAL, v.14(4):153-161. [En] (REP.MB-2743)

The paper describes a mosaic virus disease of cowpea. Vigna mungo and V. radiata were found susceptible to the virus. Similarities of the present virus with previously reported mosaic viruses of cowpea are discussed. [EMS]

*0282 Teakle, D.S. ; Gold, A.H. 1963. **Further studies of Olpidium as a vector of tobacco necrosis virus.** VIROLOGY, v.19:310-315. [En] [En Abst] (REP.MB-0563)

Mungbean (Vigna radiata) seedlings were used to test tobacco necrosis virus (TNV) infectivity of zoospore suspensions. When a zoospore suspension of Olpidium brassicae (Wor.) Dang. and TNV was added to seedling roots of mungbean and the seedlings were placed in a moist chamber 30 minutes, infection of the roots by Olpidium and by TNV resulted. When the seedlings were placed in running tap water, TNV infection was increased. [THH]

*0283 Kassanis, B. ; MacFarlane, I. 1964. **Transmission of tobacco necrosis virus by zoospores of Olpidium brassicae.** JOURNAL OF GENERAL MICROBIOLOGY, v.36:79-93. [En] [En Abst] (REP.MB-2394)

Strain D of tobacco necrosis virus (TNV) was transmitted by zoospores of 3 different isolates of Olpidium brassicae to roots of mungbean and lettuce. Exposure of roots to virus + zoospore mixture for 1 min. sufficed to infect them with virus. Roots, exposed to zoospores for 10 min., then washed, were more readily infected by TNV when virus was introduced during the first hour or two after zoospore attachment to the root cells than later; there was some transmission even when virus was withheld till 4 hr after washing. Immersing roots, inoculated with fungus and virus, in hot water (60 C) killed the fungus but not the virus, and varying the interval between inoculation and heating showed that virus became established after 2-3 hr. Virus transmission was prevented by adding concentrated homologous antiserum to zoospores, or very dilute antiserum to virus before mixing with zoospores. The extent to which

transmission was prevented by antiserum to other strains of TNV depended on the degree of their serological relationship to strain D. The present evidence does not support the suggestion that TNV is carried inside the fungus. [AS/THH]

*0284 Bustrillos, A.D. 1965. **Purification, serology and electron microscopy of pea enation mosaic virus.** DISSERTATION ABSTRACTS, v.25(11):6145-6146. [En] [En Abst] (REP.MB-2472)

The paper describes pea enation mosaic virus. Mungbean was found to be a new host of the virus. [THH]

*0285 Majorana, G. 1966. **Phaseolus aureus Roxb., new local lesion host for two citrus viruses.** ANNALS OF THE FACULTY OF AGRICULTURE, UNIVERSITY OF BARI, v.20:483-492. [It] [En It Abst] (REP.MB-0454)

Vigna radiata Wilczek proved satisfactory as local lesion host for infectious variegation and crinkly leaf viruses. The inoculated primary leaves dusted with celite 535 developed dark brown, roundish local lesions within 3-4 days after inoculation. This new host plant can be used for the quantitative assay of infectivity of crude sap and partially purified preparations of both viruses. [AS]

*0286 Liu, H.Y. ; Holmes, F.O. ; Reichmann, M.E. 1969. **Satellite tobacco necrosis virus from mung bean.** PHYTOPATHOLOGY, v.59:833-836. [En] (REP.MB-0050)

Satellite tobacco necrosis virus was grown in mungbean (Vigna radiata) seedlings under controlled growth room conditions. The virus yields were determined from Schlieren diagrams of the analytical ultracentrifuge obtained from bean extracts under standard conditions. The optimum conditions for high virus yield and a suitable isolation and purification procedure are described. This procedure is particularly suited for large scale virus preparations. It eliminates tedious inoculations, and allows for better control of growth conditions than can be achieved in the greenhouse. The yields are approximately 25 mg of purified virus per 550 g of frozen mungbean tissue. [AS]

*0287 Ramakrishnan, G. ; Rangaraju, R. ; Thangamani, G. ; Damodaran, A.P.S. ; Kandaswamy, T.K. 1969. **Studies on a new mosaic disease of Phaseolus aureus L.** MADRAS AGRICULTURAL JOURNAL, v.56(5):378-380. [En] (REP.MB-1213)

A mosaic disease of mungbean was found to be transmitted easily by sap but not by aphids and infects a restricted range of hosts. This disease varied in its symptoms from all viruses so far reported to infect mungbean. The virus was tentatively identified as a strain of tobacco mosaic virus. [EMS]

*0288 McCarthy, D. ; Jarvis, B.C. ; Thomas, B.J. 1970. **Changes in ribosomes extracted from mung beans infected with a strain of tobacco mosaic virus.** JOURNAL OF GENERAL VIROLOGY, v.9(1):9-17. [En] [En Abst] (REP.MB-0298)

Virus infection causes an increase in the quantity of ribosomes extracted from the hypocotyls of mungbeans. Though this increase is not confined to a particular size of ribosome, presumptive virus messenger RNA is associated predominantly with polyribosomes composed of nine or more monoribosomes. [AS]

***0289** McCarthy, D. ; Lander, D.E. ; Hawkes, S.P. ; Ketteridge, S.W. 1972. **Effects of cycloheximide and chloramphenicol on the multiplication of tobacco necrosis virus.** JOURNAL OF GENERAL VIROLOGY, v.17(1):91-97. [En] [En Abst] (REP.MB-2395)

Infectivity studies have shown that the multiplication of tobacco necrosis virus can be inhibited by cycloheximide but not by chloramphenicol, and that it is likely that cycloheximide inhibits the synthesis of at least two proteins necessary for multiplication. [AS]

***0290** Singh, Rajendra ; Mall, T.P. 1973. **Changes in agronomic characteristics and content of mung bean (Phaseolus aureus Roxb.) infected with arhar mosaic virus.** ACTA AGRONOMICA, v.23(1/2):51-55. [En] [En Abst] (REP.MB-1652)

Changes in agronomic characteristics and protein contents of mungbean (Vigna radiata Wilczek) cv. Sheela as influenced by arhar mosaic isolates (ASM and AMM) infection was studied. Isolate ASM caused more reduction in growth and yield in comparison to the AMM isolate. Infected plant samples have lower dry weight but higher moisture contents in comparison to their healthy counterparts. The protein content was higher in healthy mungbean than virus isolate-infected mungbean. The protein content was the highest in seeds, followed by leaves, stems and roots. Virus infection reduced the protein percentage in seeds, leaves and stems but was the same in healthy and AMM isolate-infected mungbean roots. [AS]

***0291** Ghanekar, A.M. ; Beniwal, S.P.S. 1975. **Cowpea, a local lesion host for mungbean leaf curl virus.** INDIAN PHYTOPATHOLOGY, v.28(4):527-528. [En] (REP.MB-1404)

Cowpea (Vigna sinensis) C-20 was found to be a local lesion host for mungbean leaf curl virus. Two types of spots, i.e., chlorotic and necrotic, developed as a result of viral infection. [EMS]

***0292** Govier, D.A. 1975. **Complementation between middle and bottom components of broad bean stain virus and Echtes Ackerbohnenmosaik-Virus.** JOURNAL OF GENERAL VIROLOGY, v.28:373-379. [En] [En Abst] (REP.MB-0878)

Jack bean (Canavalia ensiformis) and French bean (Phaseolus vulgaris) cv. The Prince were useful diagnostic hosts for broad bean stain virus (BBSV) and Echtes Ackerbohnenmosaik-Virus (EAMV). Bottom and middle component of each virus complemented one another to give greatly increased infectivity but there was no complementation between components from the different viruses. Bottom and middle components of each virus were indistinguishable serologically. Both BBSV and EAMV can infect mungbean. [AS/THH]

*0293 Kaiser, W.J. ; Mossahebi, G.H. 1975. **Studies with cowpea aphid-borne mosaic virus and its effect on cowpea in Iran.** FAO PLANT PROTECTION BULLETIN, v.23(2):33-39. [En] (REP.MB-0919)

The result of investigation on cowpea aphid-borne mosaic virus, an important virus of cowpea in Iran, is reported. The virus has a wide host range including mungbean cultivar Oklahoma 12. [THH]

*0294 Singh, Rajendra ; Singh, Raghuraj 1975. **Studies on a mosaic disease of urd bean (Phaseolus mungo L.).** PHYTOPATHOLOGIA MEDITERRANEA, v.14:55-59. [En] [En Fr It Abst] (REP.MB-2769)

Three strains of southern bean mosaic virus were isolated from field-grown blackgram (Vigna mungo). The host-range of southern bean mosaic virus isolates (SBMV1, SBMV2 and SBMV3) was almost similar with slight differences. These isolates infected only some members of the family Leguminosae. The dilution end point ranged from 1.0E-3 to 1.0E-4; thermal inactivation point from 70 to 80 C; longevity in vitro from 65 to 72 days (at 5 to 7 C). Isolates also remained infective in the leaves of blackgram cv. T-9 desiccated over calcium chloride for a period of 426-634 days at room temperature (12 to 40 C). These isolates were readily transmitted by sap but not by seed and aphids. The virus was recovered from various parts (leaf, petiole, stem, sepal, petal, pollen, carpel, root and root-nodules) of infected blackgram cv. T-9. Various cultivars of Cajanus cajan (L.) Millsp (7); Vigna radiata Wilczek (7), V. mungo (11) and V. sinensis (Torner) Savi. (8) were tested for susceptibility and reaction to virus isolates. [AS/THH]

*0295 Atheya, S.C. 1977. **A mosaic disease of urd from Kanpur, India.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.7:99-100. [En] (REP.MB-2430)

A mosaic disease of blackgram is described. The virus resembles cowpea mosaic in host range, physical properties and insect transmission. This is the first report of natural occurrence of an aphid-transmitted virus of the cowpea mosaic group on blackgram from India. [THH]

*0296 Garg, I.D. ; Mandalhar, C.L. 1977. **Physiology of Phaseolus mungo leaves infected with bean yellow mosaic virus.** INDIAN PHYTOPATHOLOGY, v.30(1):123-125. [En] (REP.MB-1904)

Blackgram plants infected with bean yellow mosaic virus had an increased respiration rate over healthy plants and higher polyphenol oxidase and ascorbic acid oxidase activities, but a lower rate of net photosynthesis and reduced chlorophyll and starch contents. Sugar content was higher at the time of symptom appearance, but decreased afterward. [EMS]

*0297 Roechan, M. ; Iwaki, M. ; Nasir, S. ; Tantera, D.M. 1978. **Virus diseases of legume plants in Indonesia. part 3. Bean yellow mosaic virus.** CONTRIBUTIONS CRIA, no.45:1-12. [En] [En In Abst] (REP.MB-2749)

A virus was isolated from soybean plants showing mosaic symptom collected at Muneng, East Java in 1973. The virus was identified as bean yellow mosaic

virus by the host range, symptoms, transmissibility by aphids, stability in crude juice, morphology, inclusions and serological relationship. The virus was transmitted easily by juice inoculation and also by aphids, but not through seed of soybean and mungbean. Eighteen plant species of 5 families out of 34 plant species of 11 families were infected by juice inoculation. The virus withstood heating at 55 C for 10 min but not 60 C, dilution of 1.0E-3 but not of 1.0E-4, ageing of 7 days but not 14 days at room temperature (22-30 C). The virus particles were elongated flexuous rods, 760 nm in length. Inclusions induced by infection of the virus were similar to those produced by bean yellow mosaic virus group. The virus showed positive reaction to antiserum against bean yellow mosaic virus. [AS]

***0298** Benigno, D.R.A. 1979. **An aphid-borne virus isolated from blackgram in the Philippines.** PHILIPPINE AGRICULTURIST, v.62(4):328-332. [En] [En Abst] (A:PS)

A flexuous rod virus, similar in properties to the bean common mosaic virus, was isolated from blackgram (Vigna mungo). The virus was mechanically transmitted by 3 species of aphids (Aphis craccivora Koch., A. gossypii Glover and Rhopalosiphum maidis Fitch). Tests on the stability of the virus in crude extract revealed that its thermal inactivation point was between 60 and 70 C, the dilution end point between 1.0E-3 and 1.0E-4, and its longevity in vitro was 3 days. It systemically infected blackgram, mungbean, and cowpea while Chenopodium amaranticolor and C. quinoa reacted by chlorotic local lesions, often followed by systemic vein yellowing. No infections were observed in Datura stramonium, Gomphrena globosa, Nicotiana glutinosa, N. rustica, N. tabacum, Vicia faba 'Xanthi' and Zinnia elegans. [AS]

***0299** Farrag, S.H. ; Kandaswamy, T.K. 1979. **Soybean and greengram as local lesion assay hosts for sugarcane mosaic virus.** CURRENT SCIENCE, v.48(19):865. [En] (REP.MB-2186)

Soybean and mungbean were found to be local lesion hosts for sugarcane mosaic virus. The local lesions could be seen on the second trifoliate leaves within two days after inoculation in mungbean and five days in soybeans. The lesions in mungbean were irregular and purple, while in soybean they were well-defined and necrotic. [EMS]

***0300** Kaiser, W.J. 1979. **Natural infection of cowpea and mung bean by alfalfa mosaic virus in Iran.** PLANT DISEASE REPORTER, v.63(5):414-418. [En] [En Abst] (REP.MB-2086)

Field plantings of cowpea (Vigna unguiculata) and mungbean (Vigna radiata) in Iran were naturally infected by alfalfa mosaic virus (AMV) during 1966-1971. Cowpea and mungbean plants typically were stunted and their foliage exhibited yellow mosaic (calico) symptoms, as did the pods of some infected cowpea accessions. The incidence of AMV in cowpea and mungbean plantings was usually less than 10%. Inoculation of cowpea in the field with AMV strains from cowpea or alfalfa at the full bloom and prebloom stages reduced seed yields about 15% and 50%, respectively. No mortality of infected plants was observed in these studies. The virus was transmitted by the pea aphid (Acyrthosiphon pisum) in a stylet-borne (noncirculative) manner from AMV-infected alfalfa and cowpea to healthy cowpea. Seeds harvested from naturally or artificially infected cowpeas

apparently did not transmit the virus. Identification of AMV strains isolated from naturally infected food and forage legumes was based on symptomatology, host range, host reactions, serology and vector transmission mode. [AS]

*0301 Lazar, E. ; Walter, E. ; Stussi-Garaud, C. ; Hirth, L. 1979. **RNA-dependent RNA polymerases from healthy and tobacco necrosis virus-infected Phaseolus aureus: assay of localization in fractions of cellular homogenates.** VIROLOGY, v.96(2):553-563. [En] [En Abst] (REP.MB-2154)

"Sedimenting" and "soluble" RNA-dependent RNA polymerases were detected, in healthy and tobacco necrosis virus (TNV)-infected cotyledons of Vigna radiata, in the 30,000 g pellet and the 100,000 g supernatant, respectively. The activity recovered in the 30,000 g pellet is commonly assumed to be a "membrane-bound" enzyme. Attempts to localize the "bound" RNA-dependent RNA polymerases of both healthy and infected cotyledons on a defined membrane fraction were made after linear sucrose gradient centrifugation of the 1000 g supernatants containing the membranes. Each membrane fraction was localized in the gradient by assaying for characteristic enzymes known to be associated with it. RNA-dependent RNA polymerase activities of the 1000 g supernatants from both healthy and TNV-infected extracts migrated in the gradient to a position of 22-24% sucrose. This fraction of the gradient contained an activity sedimenting at 100,000 g together with nucleoproteic structures and also a soluble activity. The soluble RNA-dependent RNA polymerases contained in the 100,000 g supernatant migrated to the same depth in the gradient. These activities are not associated with any of the types of membranes characterized and thus the problem of the existence of an actual "bound" RNA-dependent RNA polymerase must be reconsidered. [AS]

*0302 Singh, A.K. ; Singh, Raj Bahadur 1980. **Alterations in protein yield and protein qualtiy in urd bean infected by southern bean mosaic virus.** ANNALES DE PHYTOPATHOLOGIE, v.12(2):131-138. [En] [En Abst] (REP.MB-2247)

The effect of southern bean mosaic virus (SBMV) on urd bean (Vigna mungo (L.) Hepper) was studied. Virus infection increased the total N, protein N, ash value in leaf and leaf protein concentrates (LPC). Extractability of LPC, p. 100 extractability of total N and protein N were higher and dry matter was lower in diseased leaf than healthy one. Virus infection also increased the fiber, lipid and phosphorus but decreased the total soluble sugars, starch and calorific value in diseased samples. Free amino acids were also found higher in diseased samples but enzymatic hydrolysis (in vitro digestibility) was lowered in the infected plants. [AS/THH]

*0303 Singh, B.R. ; Singh, Raj Bahadur ; Singh, H.C. ; Gangulee, R. 1980. **Observation on a virus disease of coffee senna.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.9(1):101. [En] (REP.MB-2608)

This note describes a virus disease of Cassia occidentalis. The virus caused mosaic symptoms on Vigna mungo and V. sinensis. A comparison of host range, physical properties and mode of transmission suggests that the present virus differs from all the viruses previously reported on Cassia occidentalis. [THH]

*0304 Rajagopalan, K. ; Rao, M.A. ; Seshadri, B.T. ; Krishna, B.A. 1981. **Studies on seed transmission of Dolichos enation mosaic virus in certain legumes.** MADRAS AGRICULTURAL JOURNAL, v.68(2):129-130. [En] (A:PS)

Dolichos enation mosaic virus (DEMV), a virulent leguminous strain of TMV, was found to be not seed-transmitted in Dolichos lablab, Vigna radiata, V. mungo, V. sinensis and Glycine max. [EMS]

*0305 Tripathi, R.K.R. ; Tripathi, G. 1983. **Assay of NR activity in Vigna radiata infected by broad bean mosaic virus (BBMV).** LEGUME RESEARCH, v.6(1):43-44. [En] (A:PS)

Nitrate reductase activity was higher in mungbean plants infected with broadbean mosaic virus than in healthy plants. The increase in NR activity occurred in leaves, roots, and stems. [EMS]

*0306 Rao, M.A. ; Rajagopalan, K. 1984. **More phenomenon of abnormal elongation of inflorescence in green gram (Phaseolus aureus Roxb.) varieties infected by Dolichos enation mosaic virus.** CURRENT SCIENCE, v.53(10):546-547. [En] (REP.MB-2570)

This note describes the effect of Dolichos enation mosaic virus infection on flowering and inflorescence characters of mungbeans. All infected plants of the 16 different varieties of mungbean recorded an increase of 9.4-65.6% in the length of the main inflorescence axis, 3.1-121.1% increase in the length of the first branch of the inflorescence and 107.7-350.6% increase in the number of glands on the branch of the inflorescence as compared to the healthy plants. Flowering was delayed by 4-10 days in the infected plants. [THH]

*0307 Rao, K.A.R. ; Gopalan, K.R. 1985. **Varietal reaction and symptom expression in black gram and green gram to inoculation with Dolichos enation mosaic virus in summer and winter.** JOURNAL OF RESEARCH APAU, v.8(1):111-113. [En] (A:PS)

This paper describes symptoms induced by Dolichos enation mosaic virus, a virulent leguminous strain, on varieties of mungbean and blackgram. Symptoms included mosaic puckering, crinkling, mottling, laminar reduction, chlorosis, vein clearing, leaf malformation, and plant stunting. No enations were produced, unlike on other leguminous species. [EMS]

*0308 Rao, K.A.R. ; Gopalan, K.R. 1985. **Effect of Dolichos enation mosaic virus infection on nodulation in different varieties of black gram and green gram.** JOURNAL OF RESEARCH APAU, v.8(1):23-27. [En] [En Abst] (A:PS)

Nodule number, fresh and dry weights of nodules were appreciably reduced in all the nine varieties of blackgram and eleven of the sixteen varieties of mungbean infected by Dolichos enation mosaic virus (DEMV). The nodules from the infected plants of blackgram and mungbean varieties studied, not only showed the presence of the virus but also recorded an increase in the nitrogen content as compared to the healthy. [AS]

*0309 Provvidenti, R. 1986. **Seed transmission of blackeye cowpea mosaic virus in Vigna mungo.** PLANT DISEASE, v.70(10):981. [En] [En Abst] (A:PS)

During greenhouse evaluations of leguminous species for disease resistance, viral symptoms were noted on seedlings of an accession of blackgram (Vigna mungo (L.) Hepper). Seeds of PI 222823 were collected at Bukan, Western Azerbaijan (Iran) in 1954 and erroneously listed as mungbean (V. radiata (L.) Wilczek). The original collection was sent to the USDA Northeast Regional Plant Introduction Station, Geneva, NY, from which we obtained a sample years later. Symptoms consisted of a diffuse green mottle, foliar cupping along the main vein, and plant stunting. The causal agent was identified as blackeye cowpea mosaic virus (BlCMV) by electron microscopy, serology, host range, and absence of infection in the cowpea line TVU 2480, which possesses a specific gene for resistance to BlCMV. In the original seed lot, the rate of virus transmission was 14%. However, a higher proportion of BlCMV-infected plants was detected in progenies of individual plants, ranging from 20 to 48%. Before planting, seed lots had been kept in storage for 3 yr. In BlCMV-infected seed, the virus was recovered from embryos but not from testae. This is believed to be the first report of seed transmission of BlCMV in V. mungo. [AS]

*0310 Mink, G.I. 1987. **First report of cowpea mild mottle virus on bean and mung bean in Tanzania [Abst.].** PLANT DISEASE, v.71(6):5571. [En Abst] (A:PS)

Using indirect enzyme-linked immunosorbent assay and an antiserum, cowpea mild mottle virus (CMMV), a carlavirus, was detected in leaf tissue from three bean (Phaseolus vulgaris L.) and two mungbean (Vigna radiata) plants collected on the Sokoine University research farm located near Morogoro, Tanzania. Typical carlavirus particles with modal lengths of 600-650 nm were observed in leaf-dip preparations from infected bean and mungbean tissues. Mild but distinct veinclearing and mottle were observed on both infected mungbean plants. No symptom attributable to CMMV was found on the three infected bean plants. CMMV was not detected in over 100 bean leaf samples tested from private farms and research stations in other areas of Tanzania and Kenya. Occurrence of CMMV only in and near plots of imported germplasm suggested that the virus was introduced into the area through infected mungbean seed lots from India and subsequently spread to a few nearby bean plants. No residual mungbean seed was available. [AS/THH]

MYCOPLASMA-LIKE DISEASES

*0311 Singh, D. 1954. **Phyllody in mung (Phaseolus aureus L.).** SCIENCE AND CULTURE, v.20(4):194. [En] (REP.MB-1374)

The mycoplasma-like disease was first noted in a summer crop of mungbean in 1952, and again noted in kharif season of 1952 and 1953. The plants are characterized by the transformation of the flower parts into leaf-like structures. [THH]

*0312 Iwaki, M. ; Roechan, M. ; Saleh, N. ; Sugiura, M. ; Hibino, H. 1978. **Identity of Mycoplasma-like agents of legume witches' brooms in Indonesia.** CONTRIBUTIONS CRIA, no.41:1-11. [En] [En Abst] (REP.MB-2754)

Peanut and soybean witches' brooms were transmitted to peanut, soybean, mungbean, cowpea and Crotalaria juncea by Orosius argentatus. These plants showed typical witches' broom symptoms. Mycoplasma-like organisms occurred in the phloem tissue of peanut, soybean and C. juncea plants showing witches' broom symptoms. These results suggest that the mycoplasma-like agents which cause witches' broom on legume plants are identical. Transmission mode of peanut witches' broom by the insect was examined. The insects were efficient after acquisition access of 1 day and transmitted the disease in one hour inoculation feeding. Incubation period of the pathogen in insects was 20-26 days and the insects retained the pathogen until dead. Percentage of active transmitter was 80-90%. [AS]

*0313 Benigno, D.R.A. 1979. **Occurrence of a witches' broom disease of mungbean in the Philippines.** PHILIPPINE PHYTOPATHOLOGY, v.15(1):86. [En] (A:PS)

A witches' broom disease of mungbean is reported from the Philippines. Infected plants are recognized by their stunted and bushy appearance. Leaves are diminutive in size, cupped or twisted, and tend to cluster together close to the stem. [THH]

*0314 Kiratiya-Angul, S. ; Semboku, T. ; Deema, N. 1984. **Phyllody disease of some legumes in Thailand. 1. Mycoplasma-like organisms associated with phyllody of peanut, soybean, mungbean and winged bean.** JARQ: JAPAN AGRICULTURAL RESEARCH QUARTERLY, v.17(4):302-303. [En] (A:PS)

This research note deals with the electron microscopic observations of lesions of the phyllody diseased tissues of peanut, soybean, mungbean and winged bean, and describes the mycoplasma organisms detected in the tissue. [THH]

BACTERIAL DISEASES
- General

*0315 Patel, P.N. ; Jindal, J.K. 1972. **Bacterial leaf spot and halo blight diseases of mung bean (Phaseolus aureus) and other legumes in India.** INDIAN PHYTOPATHOLOGY, v.25(4):517-525. [En] (REP.MB-0182)

Two bacterial diseases of mungbean named as bacterial leaf spot and halo blight are described for the first time and the pathogens identified as new strains of Xanthomonas phaseoli and Pseudomonas phaseolicola, respectively. The bacterial leaf spot was observed at eight locations in India during 1969 and was found spreading through seeds. The characteristic symptom of the disease was the brown, dry raised spots on leaf and stem. On leaf the spots first appeared superficially as eruptions and gradually invaded the tissue through the leaf thickness. In artificial inoculations the pathogen also infected Phaseolus vulgaris, P. lunatus, P. bracteatus, Dolichos lablab and Lens esculentum but the reaction was not as severe as on mungbean. The mungbean variety Jalgaon-781 was highly resistant. The halo blight produced water-soaked spots surrounded by characteristic chlorotic halo and other symptoms like in bean halo blight disease. The organism produced water-soaking in P. bracteatus,

P. atropurpureus, D. lablab, D. biflorus and Ficus religiosa. All the 24 mungbean varieties tested were susceptible. [AS]

*0316 Jindal, J.K. ; Patel, P.N. 1980. **Variability in xanthomonads of grain legumes. 1. Pathogenic behaviour and taxonomy.** JOURNAL OF PHYTOPATHOLOGY, v.99:332-356. [En] [En De Abst] (A:PS)

Comparative host-range of ten xanthomonads isolated from nine pulse crops [including mungbean and blackgram] was studied using five inoculation methods. Type of reaction and the presence or absence of bacterial ooze in the infected tissues were noted to indicate compatibility or noncompatibility. Degrees of compatibility (susceptibility) could be noted on the basis of intensity of bacterial ooze and severity in the symptoms. The results revealed that some of these pathogens were cross-infective, and had overlapping host-range but all were more aggressive on their natural host. These findings suggest close evolutionary relationship among the pulse xanthomonads and form a distinct group among the legume xanthomonads. Compatibility of pulse xanthomonads to bean is considered a good criterion for taxonomic revision at subspecies level. It is proposed that X. phaseoli var. fuscans and X. phaseoli from Dolichos lablab be considered as strains of X. phaseoli, and X. cyamopsidis, X. phaseoli var. sojense, X. vignicola, X. phaseoli from V. radiata (Syn. P. aureus), V. mungo and V. aconitifolia be given a status of forma specialis in X. phaseoli. X. phaseoli isolates from V. mungo and V. radiata, which do not cross infect, were highly virulent on P. sublobatus. This suggests that evolution in these xanthomonads towards the specialized pathogenic forms occurred simultaneously with the evolution of their hosts. Similarly, among the pulse xanthomonads only the ones from V. mungo, V. radiata and V. unguiculata (Syn. V. sinensis) produced susceptible reaction on attached V. unguiculata pods, suggesting close evolutionary relationships among these hosts and these pathogens, and give indirect support to the recent transfer of P. aureus and P. mungo to the genus Vigna. [AS]

*0317 Jindal, J.K. ; Patel, P.N. ; Khan, A.M. 1981. **Variability in xanthomonads of grain legumes. 2. Pathogenic variability in Xanthomonas phaseoli mungbean strain, X. vignicola and X. phaseoli var. sojense.** JOURNAL OF PHYTOPATHOLOGY, v.100(1):1-9. [En] [En De Abst] (A:PS)

Pathogenic variability in three pulse xanthomonads has been investigated. Out of the 45 mungbean genotypes tested using rub-inoculation method, 32 reacted as resistant, 6 as susceptible and the remaining 7, viz., P-23, P-28, P-125, P-161, P-10875, PLM-95 and PLM-141 showed differential reactions to the 11 isolates of the leaf spot pathogen (X. phaseoli mungbean strain). On the basis of these studies six distinct races were identified. Cowpea blight pathogen (X. vignicola) showed differences in virulence and attackability (Pathogenic races) when 12 resistant and 23 susceptible cowpea genotypes were inoculated with 11 isolates using stem-stab method. Of the resistant lines, nine reacted as resistant to all the isolates and three, P-370, P-1325 and P-1418 differentiated these isolates into five races. On susceptible varieties isolate XC-3 proved to be the most virulent, whereas XC-9 was least virulent. Soybean pustule organism (X. phaseoli var. sojense) showed no pathogenic variability when 15 resistant and 5 susceptible genotypes were spray-inoculated with eight isolates. [AS]

***0318** Jindal, J.K. ; Patel, P.N. 1981. **Variability in xanthomonads of grain legumes. 3. Variation in sensitivity to bacteriophages.** JOURNAL OF PHYTOPATHOLOGY, v.100(2):97-110. [En] [En De Abst] (A:PS)

When 51 bacteriophages (established using xanthomonads as the host bacterium) were tested against 117 bacterial cultures representing Xanthomonas (101), Pseudomonas (12), Erwinia (2), Bacillus (1) and Rhizobium (1), all were found specific to the genus Xanthomonas and none was species specific. Further, none attacked all the nomen species tested. An individual phage strain obtained by employing a particular isolate of a bacterial species not only reacted with other bacterial species, but also failed to react with all the isolates of the same species. No definite trend, either in phage sensitivity in the bacterial isolates or attackability of the phages, was observed, that can be used for the identification of the nomen species of Xanthomonas of pulses or other crops. Colony variants of different pulse pathogens behaved similarly to the phages isolated from their natural hosts, but similarly or differently to phages from other pulse crops, leguminous and non-leguminous hosts. White mutants of mungbean, cowpea and castor xanthomonads behaved like their yellow forms to the phages isolated from their natural hosts, but could be distinguished from their parent yellow strains by some phage isolates from other hosts. P. azadirachtae and P. mangiferaeindicae were lysed by 11 and 16 Xanthomonas phages, respectively, but eight other true Pseudomonas cultures were not attacked by any of the 51 Xanthomonas phages. [AS]

- Bacterial Leaf Spots

***0319** Rangaswami, G. ; Gowda, S.S. 1963. **On some bacterial diseases of ornamentals and vegetables in Madras State.** INDIAN PHYTOPATHOLOGY, v.16(1):74-85. [En] [En Abst] (REP.MB-0993)

Six bacterial diseases of common ornamental plants and seven of vegetables in Madras State were studied in detail. Of these six are identified as caused by new species of bacteria, viz., Xanthomonas cosmosicola sp. nov., on Cosmos sylphureus Cav., X. tagetis sp. nov., on Tagetes erecta L., X. balsamicorum sp. nov., on Impatiens balsamina L., Pseudomonas hibiscicola, sp. nov., on Hibiscus rosa-sinensis L., Ps. cyamopsicola sp. nov., Cyamopsis psoralioides DC and Ps. madrasensis sp. nov., on Amaranthus viridis L. The other seven are identified as Ps. syringae van Hall on Chrysanthemum indicum L., X. nigromaculans (Takimoto) Dowson Zinnia elegans L., Ps. tomato Okabe on Lycopersicon esculentum Mill., and Capsicum annuum L., X. vignicola Burk. on Vigna catjang Walp. and X. phaseoli (E.F. Sm.) Dowson on Vigna mungo and Dolichos lablab L. Of these records on Chrysanthemum indicum, Zinnia elegans and Lycopersicon esculentum are new for India, on Vigna mungo and Capsicum annuum new for the hosts, and on Dolichos lablab and Vigna catjang new for Madras State. [AS]

***0320** Patel, P.N. ; Jindal, J.K. 1970. **Bacterial diseases in seed legumes in 1968 and 1969.** IN: Proceedings [of] fourth workshop on pulse crops. Ludhiana : Punjab Agricultural University. p.177-187 [En] [En Abst] (REP.MB-1480)

MEETING: Workshop on Pulse Crops, 4th -- Ludhiana, India, Apr 7-10, 1970

Surveys were made in 1968 and 1969 at 11 locations in nine different states

where research work on improvement of seed legumes was in progress. The nine diseases encountered were cowpea blight (Xanthomonas vignicola), mungbean leaf spots (Xanthomonas sp. and Pseudomonas sp.), blackgram leaf spot and stem canker soybean pustule (X. phaseoli var. sojense), arhar leaf spot and stem canker (X. cajani), moth blight (Xanthomonas sp.), Fuscus blight of French bean (X. phaseoli var. fuscans) and Dolichos leaf spot (X. phaseoli). Of these, mungbean leaf spot due to Pseudomonas sp. and moth blight are new records from anywhere on these crops in nature, whereas the occurrence of Fuscus blight in French bean is the first for India. The diseases were widespread in the germplasm collections and improved varieties in the coordinated trials at most of the locations. Evidences from field observations suggested that the pathogens involved were transmitted through seeds and by way of infected seeds they were disseminated from one research institution to the other and to farmers' fields. Several germplasm lines and varieties exhibited high degree of resistance under natural epiphytotic. A distribution map prepared from the previous reports and our surveys of these diseases in India are presented. [AS]

*0321 Patel, P.N. ; Jindal, J.K. ; Singh, D. 1972. **Studies on resistance in crops to bacterial diseases in India. 4. Resistance in mung bean (Phaseolus aureus) to Xanthomonas phaseoli.** INDIAN PHYTOPATHOLOGY, v.25(4):526-529. [En] [En Abst] (REP.MB-0183)

Of the 2160 germplasm lines of mungbean (Vigna radiata) tested for resistance against the bacterial leaf spot pathogen, Xanthomonas phaseoli, 29 proved to be highly resistant and 5 to be tolerant in more than one test. In some resistant lines the young leaves on seedlings exhibited strong hypersensitive reaction but at seed maturity stage old leaves showed few spots. [AS]

*0322 Sood, A.K. ; Thind, B.S. ; Singh, N. 1976. **Occurrence and control of bacterial leaf spot of mung (Phaseolus aureus Roxb.) in the Punjab State.** JOURNAL OF RESEARCH (PUNJAB AGRICULTURAL UNIVERSITY), v.13(2):182-185. [En] [En Abst] (REP.MB-2421)

Studies on Xanthomonas phaseoli mung strain, the causal organism of bacterial leaf spot of mungbean (Vigna radiata Wilczek), revealed that the bacterium is seed-borne. Seed treatment with different chemicals was found to reduce the seedling infection, although a marked reduction in germination was observed in some cases. Captan (0.3%) and bleaching powder (0.025%) were found to be the most effective seed-treating agents. In field experiments laid out at Ludhiana and Gurdaspur, three protective sprays each of streptocycline (100 ppm), zineb (0.3%) and benomyl (0.2%) were found to be effective in controlling the secondary infection of the bacterium. [AS]

*0323 Sood, A.K. ; Thind, B.S. ; Singh, N. 1976. **In vitro, evaluation of some antibiotics and fungicides against Xanthomonas phaseoli causal agent of leaf spot of mung.** HINDUSTAN ANTIBIOTICS BULLETIN, v.18(3/4):119-120. [En] (REP.MB-2440)

The mungbean bacterial leaf spot Xanthomonas phaseoli was inhibited in vitro by streptocycline, agrimycin 100, streptomycin, and a combination of streptocyline and copper sulphate. Zineb, mancozeb, Bavistin, copper oxychloride, and benomyl did not inhibit the bacterium by the paper disc

method, but did show inhibitory action by the turbidimetric method. [EMS]

*0324 Shekhawat, G.S. ; Patel, P.N. 1977. **Seed transmission and spread of bacterial blight of cowpea and leaf spot of green gram in summer and monsoon seasons.** PLANT DISEASE REPORTER, v.61(5):390-392. [En] [En Abst] (REP.MB-1542)

Seed transmission and secondary spread of cowpea (Vigna unguiculata ssp. unguiculata) blight and mungbean (Vigna radiata var. radiata) leaf spot caused by Xanthomonas vignicola and X. phaseoli, respectively, were studied during the summer and monsoon seasons in Rajasthan and Delhi in India. During the summer with mean relative humidity (RH) 20-80% and temperature 25-34 C, the incidence of cowpea blight reached 62% from an initial inoculum load of 1% infested seed, but the incidence of mungbean leaf spot was only 0, 3, and 32% from 1, 10, and 100% initial seed infestation. Both diseases became severe during monsoon (mean RH 50-95% and temperature 24-32 C). Stem infection was rare in mungbean leaf spot. The seed transmission of cowpea blight caused seedling mortality or bushy and stunted plants as a result of severe stem cankers; secondary spread, however, caused leaf blight only. [AS]

*0325 Singh, D. ; Patel, P.N. 1977. **Studies on resistance in crops to bacterial diseases in India. 8. Investigations on inheritance of reactions to bacterial leaf spot and yellow mosaic diseases and linkage, if any, with other characters in mungbean.** INDIAN PHYTOPATHOLOGY, v.30(2):202-206. [En] [En Abst] (REP.MB-1915)

The resistance to bacterial leaf spot pathogen Xanthomonas phaseoli mungbean strain, in mungbean (Vigna radiata (L.) Wilczek) lines P 476, P 646, PLM 501 and Jalgaon 781 was found to be controlled by a single dominant gene whereas yellow mosaic tolerance in variety 24-2 was governed by a single recessive gene. The genes controlling disease reactions, seed color, and maturity were independently inherited and freely combined. [AS]

*0326 Thakur, R.P. ; Patel, P.N. ; Verma, J.P. 1977. **Studies on resistance in crops to bacterial diseases in India. 11. Genetic make-up of mungbean differentials of the races of bacterial leaf spot pathogen, Xanthomonas phaseoli.** INDIAN PHYTOPATHOLOGY, v.30(2):217-221. [En] [En Abst] (REP.MB-1914)

Existence of distinct pathogenic races in the bacterial leaf spot pathogen, X. phaseoli, in mungbean (Vigna radiata) was confirmed. To study the genetic make-up of the four mungbean differential lines P-23, P-10875, PLM-95 and IC-11303-3 a diallele set of crosses was made and the F1, F2 and backcross progenies were inoculated with six races of the pathogen. The results indicate that (1) resistance in a differential to a race is governed by a single gene; (2) the gene governing resistance in a differential is dominant to its recessive allele governing susceptibility in another differential; (3) that a gene or allele governing resistance or susceptibility in the differentials to different races do not overlap. [AS]

*0327 Kore, S.S. ; Shirshikar, S.P. 1978. **Investigations on bacterial leaf**

spot disease of urd bean (Phaseolus mungo). INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.10(2):142-145. [En] [En Hi Abst] (REP.MB-2671)

Incidence of bacterial leaf spot disease of blackgram (Vigna mungo) was found during 1976 at Central Farm, Parbhani. The pathogen could infect Phaseolus vulgaris, Dolichos biflorus, Phaseolus lunatus, Dolichos lablab and Lens esculentus and could infect its host up to the age of 65 days only. Variety Krishna proved to be highly resistant and varieties H-70-3 and U-S-131 were resistant. [AS]

*0328 Thakur, R.P. ; Kumar, S. ; Patel, P.N. ; Verma, J.P. 1978. **Studies on virulence of biochemical mutants of Xanthomonas phaseoli mungbean strain.** INDIAN PHYTOPATHOLOGY, v.31(1):52-56. [En] [En Abst] (REP.MB-2077)

Biochemical mutants of Xanthomonas phaseoli mungbean strain (XMB), the incitant of bacterial leaf spot of mungbean, were isolated by nalidixic acid (Nal) selection method and their virulence tested. Seven auxotrophs : one arabinose nonutilizing mutant (XMB Nalr Ara-), two adenine mutants (XMB Nalr Ade-) and four proline mutants (XMB Nalr Pro-) singly and in various combinations with auxotrophs or wild type strain (XMB Nal8) and five prototrophs (XMB Nalr) were inoculated on trifoliate leaves of a mungbean cv. S-8 following infiltration rub or spray inoculation. Virulence was measured in terms of incubation period, water soaked lesions, number and nature of leaf spots produced by the strains. Each mutant either alone or as mixture was either less virulent or avirulent as compared to the wild type stain. Virulence of the mutants was explained on the basis of nutritional factor(s). [AS]

*0329 Kore, S.S. ; Khandale, D.Y. 1979. **A bacterial leaf spot disease of bean (Dolichos lablab) in Parbhani, Maharashtra.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.9(2):220-224. [En] (REP.MB-2280)

In a survey, bacterial leaf spot disease of bean (Dolichos lablab) caused by Xanthomonas phaseoli was observed to the extent of 10-15%. The pathogen could develop disease on its host up to the age of 60 days only and intensity of disease was more in younger plants. In an artificial inoculation test the pathogen could infect Vigna sinensis, V. radiata, Phaseolus vulgaris, Dolichos biflorus, and P. lunatus but not Glycine max. The fungicide agallol and an antibiotic, agrimycin, had maximum inhibitory effect on the growth of the bacterium in vitro. [AS]

*0330 Behniwal, M.S. ; Parashar, R.D. 1981. **Evaluation of antibiotics and fungicides for the control of bacterial leaf spot of mung.** v.11(1):36-39. [En] [En Abst] (REP.MB-2273)

Among antibiotics and fungicides tested in vitro for inhibition of Xanthomonas phaseoli mungbean strain, only Chloramphenicol out of 8 antibiotics and vitavax out of 12 fungicides showed maximum inhibition. The results in vivo were unlike that in vitro. [AS]

*0331 Rani, N. ; Parashar, R.D. 1981. **Studies on nitrogen metabolism in moong as affected by bacterial leaf spot.** HARYANA AGRICULTURAL UNIVERSITY

JOURNAL OF RESEARCH, v.11(3):375-378. [En] [En Abst] (REP.MB-2576)

Nitrogen and free amino acids of the healthy and diseased leaves of three varieties of mungbean were analysed. Nitrogen content of the healthy leaves of susceptible variety Jawahar 45 was higher than moderately resistant ML 8, and resistant Jalgaon 781 varieties. Thirteen free amino acids were detected in Jawahar 45, 11 in ML 8 and only 8 in Jalgaon 781. Total nitrogen and free amino acids decreased with disease development in Jawahar 45 and ML 8, whereas no symptoms of disease appeared in Jalgaon 781. [AS]

***0332** Gurha, S.N. ; Misra, D.P. 1982. **Donors for resistance in blackgram (Vigna mungo (L.) Hepper) against Xanthomonas phaseoli (Smith) Dowson.** MADRAS AGRICULTURAL JOURNAL, v.69(2):139-140. [En] (A:PS)

One hundred ninety-six cultivars of blackgram were evaluated for resistance to bacterial spot (Xanthomonas phaseoli). Six cultivars viz., 13/10, 13/1, 1369/4, 12/2, PLU 443 and Krishna were found resistant. [EMS]

***0333** Saini, L.C. ; Parashar, R.D. 1982. **Suitability of stable bleaching powder and other chemical formulations for the control of bacterial leaf spot of greengram.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.52(5):330-334. [En] [En Abst] (A:PS)

The efficacy of stable bleaching powder (SBP), antibiotics and fungitoxicants was evaluated in vitro and in vivo for the control of bacterial leaf spot of mungbean [Vigna radiata (Linn.) Wilczek] caused by Xanthomonas phaseoli (Smith) Dowson. SBP [illegible] and 1,000 ppm gave 100% colony inhibition, followed by SBP 250 ppm, agal[illegible], SBP 100 and 150 ppm, and emisan-6. With turbidimetric method SBP 100 and 150 ppm, streptocycline and agrimycin-100 inhibited the bacterial growth fully. Soil drenching with SBP gave better seed germination than all the chemicals except agallol-3 seed treatment, and increased the yield. Emisan-6, SBP 1,000 ppm spray and seed treatment + spray gave best disease control. SEP 1,000 and 500 ppm seed treatment + spray and SBP 1,000 ppm spray gave the highest yield. [AS]

- Bacterial Blights and Halo Blights

***0334** Patel, P.N. ; Walker, J.C. 1964. **Reactions of Phaseolus spp. to two races of Pseudomonas phaseolicola and a brown-spot organism [Abst.].** PHYTOPATHOLOGY, v.54:903. [En] (REP.MB-0073)

MEETING: Annual Meeting of the American Phytopathological Society — Lafayette, IN, USA, Aug 23-26, 1964

Vigna radiata was resistant to races 1 and 2 of Pseudomonas phaseolicola, whereas V. mungo was susceptible. Both were susceptible to a recently isolated bacterial brown-spot organism. [EMS]

***0335** Patel, P.N. ; Walker, J.C. 1965. **Resistance in Phaseolus to halo**

blight. PHYTOPATHOLOGY, v.55:889-894. [En] [En Abst] (REP.MB-0512)

Isolates of Pseudomonas phaseolicola from the USA and foreign countries were separated into race 1 and race 2, on the basis of their pathogenicity on Red Mexican UI-3 bean (Phaseolus vulgaris). Of 19 pathogenic isolates from foreign countries, 18 belonged to race 1. Some of the dry bean varieties of Great Northern, Pinto, Red Mexican, and Red Kidney types were resistant to race 1 but all were susceptible to race 2. Most snap bean varieties grown in the USA were susceptible, except certain Blue Lake lines which showed some tolerance to both races. About 14% of the 1,520 PI lines of Phaseolus vulgaris tested gave uniform hypersensitive reactions to race 1. None of these lines showed this type of reaction to race 2; however, PI 150414, from El Salvador, contained some plants with a high degree of tolerance. Vigna radiata, V. aconitifolius, V. mungo, V. umbellata, and a line of V. angularis were resistant (hypersensitive) to both races, whereas Vigna radiata, Phaseolus lathyroides, P. coccineus, P. lunatus, P. polyanthus, P. bracteatus, P. acutifolius, and P. polystachyus were susceptible to both races. [AS]

*0336 Schmitthenner, A.F. ; Hoitink, H.A.J. ; Kroetz, M.E. 1971. **Halo blight limits Ohio production of mung beans.** OHIO REPORT, v.56(4):58-60. [En] (REP.MB-0029)

Halo blight (Pseudomonas phaseolicola) is the most serious disease of mungbean in Ohio. It causes yield losses of 50% or more. The only means of control so far is by use of disease-free seed from greenhouse-grown plants. A breeding program for developing resistant cultivars is envisaged. One apparently resistant accession has been found and attempts are being made to identify others. [EMS]

*0337 Schmitthenner, A.F. ; Hoitink, H.A.J. ; Kroetz, M.E. 1971. **Halo blight of mung bean incited by a new strain of Pseudomonas phaseolicola [Abst.].** PHYTOPATHOLOGY, v.61:909. [En] (REP.MB-1014)

MEETING: Annual Meeting of the American Phytopathological Society, 63rd -- Philadelphia, PA, USA, Aug 15-19, 1971

Introduction of mungbean (Vigna radiata) has not been successful in Ohio because of severe losses from halo blight. The pathogen isolated was similar to both Pseudomonas phaseolicola and P. glycinea in cultural characteristics. Mungbean isolates caused water-soaking on mungbean, red kidney bean, Fordhook 242 Lima bean, and Acme soybean, but not on other soybeans used to differentiate P. glycinea races. None of six P. phaseolicola isolates or six P. glycinea races caused water-soaking on mungbean. Since only the mungbean isolates are virulent to mungbean, it is proposed that they be named the mungbean strain of P. phaseolicola. The pathogen was introduced on seed. In experimental plots at 11 locations in Ohio initial infection occurred in plots of Berken, Jumbo, and Oriental cultivars from seed produced in Oklahoma. Plots from Brazil, Peru, or Thailand seed or plots from greenhouse-produced Berken seed had no initial infection. Halo blight eventually developed in most cultivars at all locations. However, at four locations, plots from greenhouse Berken seed isolated from a source of primary inoculum remained free of halo blight. At these four locations, Berken with halo blight (Oklahoma seed) yielded ca. 60% less than healthy Berken (greenhouse seed). [AS]

***0338** Mukoo, H. 1975. **The diseases of adzuki beans and mungbeans.** IN: Kawada, H. Encyclopedia of pests and diseases of crops. Tokyo : Yokendo. p.270-275 [Ja] (REP.MB-0505)

The pathogen, symptoms and control of mungbean bacterial blight are described. [THH]

***0339** Marimuthu, T. ; Kandaswamy, T.K. 1980. **Permeability alterations in moderately resistant and susceptible variety of green gram infected by Xanthomonas phaseoli.** CURRENT SCIENCE, v.49(17):667-668. [En] (A:PS)

The moderately resistant, susceptible and highly susceptible varieties of mungbean, CO 2, CO 3 and CO 1, were inoculated with Xanthomonas phaseoli. Leaf samples were collected at 0, 12 h, 1, 3, 5 and 10 days after inoculation to determine amino acids and sugars. The results showed that pathogenic inoculation increase the permeability of the cell membrane and caused leakage of ions, amino acids and sugars. The highly susceptible CO 1 showed more leakage of ions, amino acids and sugars than CO 3 and CO 2. [THH]

***0340** Marimuthu, T. ; Kandaswamy, T.K. 1980. **Bacterial leaf blight of greengram (Vigna radiata var. aureus) caused by Xanthomonas phaseoli and reaction of certain varieties to the disease.** MADRAS AGRICULTURAL JOURNAL, v.67(6):413. [En] (A:PS)

A Xanthomonas phaseoli isolate was found to induce symptoms on mungbean leaves not reported previously. Out of 25 lines tested cv. CO 2 was found to be moderately resistant to the pathogen followed by K 851, PLS 292, PLS 278 and PLS 266. [THH]

***0341** Marimuthu, T. ; Kandaswamy, T.K. 1981. **Role of soluble sugars in the resistance or susceptibility of greengram varieties to bacterial leaf blight caused by Xanthomonas phaseoli.** CURRENT SCIENCE, v.50(14):643-645. [En] (A:PS)

Three mungbean varieties differing in their resistance to bacterial blight (Xanthomonas phaseoli) were compared for their sugar content. The moderately resistant variety (cv. CO 2) contained the least amount of total soluble sugars, glucose and fructose. Inoculation with the bacterium was followed by a decrease in total sugars and glucose in all 3 varieties, but the decrease was strikingly more pronounced in the moderately resistant variety. [THH]

***0342** Marimuthu, T. ; Kandaswamy, T.K. 1981. **Toxin production in vitro by Xanthomonas phaseoli (E. F. Smith) Dowson, the incitant of bacterial leaf blight of Vigna radiata var aureus (Roxb).** MADRAS AGRICULTURAL JOURNAL, v.68(2):121-123. [En] (A:PS)

The production of toxins by Xanthomonas phaseoli, the incitant of bacterial leaf blight of mungbean in culture and in the host tissue were given. [THH]

*0343 Gaur, R.B. ; Ahmed, S.R. 1983. **Studies on the chemical control of bacterial blight of moong incited by Xanthomonas phaseoli (Smith) Dowsen.** PESTICIDES, v.17(2):22-23. [En] [En Abst] (REP.MB-2352)

A field trial was conducted for 3 consecutive years to evaluate various chemicals for the control of bacterial blight of mungbean. Xanthomonas phaseoli on mungbean was effectively controlled by 3 sprays of Agrimycin 100 (0.025%) + Bavistin (0.1%) and Plantomycin (0.025%) + Bavistin (0.1%). [AS]

*0344 Marimuthu, T. 1983. **Effect of sulphur containing amino acids on growth, toxin production of Xanthomonas campestris pv. phaseoli and leaf blight development in greengram.** INDIAN PHYTOPATHOLOGY, v.36(1):47-51. [En] [En Abst] (A:PS)

Cysteine, a sulphur containing amino acid inhibited the growth and toxin production of Xanthomonas campestris pv. phaseoli. Mungbean cultivar CO 2 moderately resistant to leaf blight contained larger quantities of cysteine than the susceptible CO 1 and CO 3. Exogenous application of cysteine at 0.05% on susceptible varieties gave protection against disease development. [AS]

*0345 Matimuthu, T. ; Kandaswamy, T.K. 1983. **Changes in the amino nitrogen and amino acids in the mung lines moderately resistant and susceptible to bacterial leaf blight organism.** INDIAN PHYTOPATHOLOGY, v.36(2):345-348. [En] (A:PS)

Three mungbean cultivars differing in their degree of resistance to bacterial leaf blight (Xanthomonas campestris pv. vignaeradiatae) were compared for their nitrogen content. The moderately resistant cultivar was richer in aromatic and sulphur-containing amino acids than the susceptible ones. [EMS]

FUNGAL DISEASES
- General

*0346 Sprague, R. 1935. **Ascochyta boltshauseri on beans in Oregon.** PHYTOPATHOLOGY, v.25:416-420. [En] [En Abst] (REP.MB-2405)

Vigna radiata was slightly susceptible to Mycosphaerella pinodes, Ascochyta pisi and Ascochyta pinodella isolated from pea, and could also be infected by Ascochyta boltshavseri isolated from beans. [THH]

*0347 Chona, B.L. ; Munjal, R.L. 1956. **Notes on miscellaneous Indian fungi - 3.** INDIAN PHYTOPATHOLOGY, v.9(1):53-66. [En] (REP.MB-2431)

This note describes new species of Mycosphaerella observed on the leaves, stem and pods of Vigna radiata. This species is designated as Mycosphaerella phaseoli and appears to represent the ascigerous stage of Cercospora kikuchii. [THH]

*0348 Nattrass, R.M. 1961. **Host lists of Kenya fungi and bacteria.** MYCOLOGICAL PAPERS, no.81:1-46. [En] [En Abst] (A:PS)

In this report, Elsinoe phaseoli, Ascochyta phaseolorum, and Erysiphe polygoni are listed as pathogens on mungbeans in Kenya. [THH]

*0349 Grewal, J.S. 1967. **Fungal diseases of pulse crop in India.** IN: Proceedings [of the] first annual workshop conference on pulse crops. New Delhi : Indian Council of Agricultural Research. 9 leaves (REP.MB-1713)

MEETING: Annual Workshop Conference on Pulse Crops, 1st -- New Delhi, India, Feb, 1967

The paper gives a brief description of fungal diseases of pulse crops in India, including Cercospora leaf spots, anthracnose (Colletotrichum lindemuthianum), powdery mildew (Erysiphe polygoni), rust (Uromyces appendiculatus), dry root rot (Macrophomina phaseoli), and Ascochyta blight (Ascochyta phaseolorum) of mungbean and blackgram. [EMS]

*0350 Mohanty, N.N. ; Rao, V.B. 1968. **Fungal diseases of pulses.** IN: Proceedings [of the] second annual workshop conference on pulse crops. New Delhi : Indian Council of Agricultural Research. 6p. [En] (REP.MB-1421)

MEETING: Annual Workshop Conference on Pulse Crops, 2nd -- New Delhi, India, Apr 1-3, 1968

The paper gives a brief description of Cercospora leaf spots (Cercospora canescens and C. kikuchii), powdery mildew (Erysiphe polygoni), and stem and root rots (Macrophomina phaseoli), on mungbean and blackgram. [THH]

*0351 Williams, F.J. 1969. **Report on the coordinated fungicidal trial (1968).** IN: Proceedings [of the] third annual workshop conference on pulse crops. New Delhi : Indian Council of Agricultural Research. p.127-128. (REP.MB-1158)

MEETING: Annual Workshop Conference on Pulse Crops, 3rd -- New Delhi, India, Apr 1-3, 1969

Fungicidal trials with mungbean, blackgram, and cowpea, including seed treatment, protective spraying and soil treatment at different locations are discussed. [THH]

*0352 Khare, M.N. ; Sharma, H.C. ; Chand, J.N. ; Kumar, S.M. 1970. **Efficacy of fungicides in the control of diseases of pulses - mung, urid and cowpea.** IN: Proceedings [of the] fourth workshop on pulse crops. New Delhi : Indian Council of Agricultural Research. p.173-175. (REP.MB-1455)

MEETING: Workshop on Pulse Crops, 4th -- Ludhiana, India, Apr 7-10, 1970

An experiment was conducted to see the efficacy of different fungicides in controlling the diseases of mungbean, blackgram and cowpea at various stages of

plant growth. Maximum emergence of mungbean and cowpea seedlings was obtained from seeds treated with captan. Captan was the most effective fungicide in protecting mungbean against foliar diseases, whereas PCNB was the most effective for blackgram. [THH]

***0353** Khare, M.N. ; Jain, N.K. ; Sharma, H.C. 1970. **Variation among Rhizoctonia bataticola isolates from urid bean plant parts and soil [Abst.].** PHYTOPATHOLOGY, v.60:1298. [En] (REP.MB-0579)

MEETING: Annual Meeting of the American Phytopathological Society -- Hot Springs, AR, USA, Oct 4-8, 1970

Rhizoctonia bataticola was found associated with root, stem, pod, and seeds of blackgram (Vigna mungo). Six isolates from various plant parts and soil exhibited differences in virulence. The soil isolate proved most pathogenic, followed by the pod and root isolates. In vitro morphological studies at pH 6.5 and 25 C revealed differences in growth patterns and sclerotia size. When grown on differential media (potato-dextrose agar without or with extracts from soil, seed, root, stem, leaf tissue, and oatmeal agar), all six isolates differed from each other in their growth patterns and rate of growth. The soil isolate had the least amount of growth in almost all media, and the pod isolate, the most. The leaf isolate developed the largest sclerotia (96 x 86 u) and the soil isolate the smallest (79 x 63 u) after 72 hr. The isolates varied in their growth rates at different temperature and pH levels. The best pH for growth of all isolates was 5.5. The variation among the isolates may be due to various biochemical processes in the plant parts. [AS]

***0354** Jhooty, J.S. ; Singh, Harjit 1972. **Stability of benomyl in plants.** PHYTOCHEMISTRY, v.11(7):2207-2208. [En] [En Abst] (REP.MB-0362)

Unchanged benomyl and its breakdown product have been found in seedlings of mungbean (Vigna radiata) treated with benomyl. [AS]

***0355** Jhooty, J.S. ; Bains, S.S. 1976. **Modification of the toxicity of benomyl by seed exudates of mung.** INDIAN JOURNAL OF MICROBIOLOGY, v.16:73-75. [En] [En Abst] (REP.MB-2458)

Exudates from 10 g seeds of mungbean (Vigna radiata) collected at 27-28 C and concentrated at 40-42 C were studied for their effect on the toxicity of benomyl. Chlamydospores of Fusarium solani f. phaseoli were used for toximetric studies. Exudates greatly reduced the toxicity of benomyl. Exudates were analysed chromatographically for amino acids and sugars. Fifteen amino acids and three sugars were identified. The amino acids added to benomyl gave three types of reactions. Seven amino acids. i.e. alanine, arginine, gamma-amino butyric acid, glutamic acid, glycine, isoleucine and tyrosine decreased the toxicity of benomyl, leucine and lysine increased the toxicity of benomyl whereas the rest (except cystine) did not affect it. Glucose and sucrose increased the toxicity of benomyl. [AS]

***0356** Shukla, D.N. ; Bhargava, S.N. 1976. **Some pathogenic fungi from pulses and oil seed crops.** NATIONAL ACADEMY OF SCIENCES, INDIA, PROCEEDINGS (SECTION

B: BIOLOGICAL SCIENCE), v.46(B):531-532. [En] (REP.MB-2439)

Seed samples of various pulses and oil crops were examined for contamination with pathogenic fungi. Macrophomina phaseolina, Fusarium solani, and Curvularia lunata were found in mungbean seeds. The first two fungi were also found in blackgram seeds, together with Fusarium oxysporum. [EMS]

*0357 Verma, K. ; Sareen, V.K. ; Singh, Rattan 1976. **The effect of aflatoxin on allantoinase activity of germinating seeds.** JOURNAL OF RESEARCH (PUNJAB AGRICULTURAL UNIVERSITY), v.13(1):99-104. [En] [En Abst] (REP.MB-2420)

Aflatoxins, extracted from Aspergillus flavus Link ex Fries grown on rice, have been found to reduce the percentage germination and the allantoinase (allantoin amidohydrolase, E. C. 3.5.2.5) activity of germinating groundnut (Arachis hypogaea Linn.), mungbean (Vigna radiata Wilczek) and blackgram (V. mungo Hepper) seeds. The inhibition in the case of mungbeans and blackgram increases with the period of germination. The extracted aflatoxins have been found to inhibit the allantoinase activity by acting as mixed inhibitors. [AS]

*0358 Ilag, L.L. 1978. **Fungal diseases of mungbean in the Philippines.** IN: The 1st International Mungbean Symposium. Shanhua, Tainan : AVRDC. p.154-156 [En] (SB205.M8I5)

MEETING: International Symposium on Mungbean, 1st -- Los Banos, Philippines, Aug 16-19, 1977

Anthracnose, Cercospora leaf spots, pod rot, powdery mildew, root and stem rots and rust of mungbean encountered in the Philippines are described. [THH]

*0359 Quebral, F.C. 1978. **Powdery mildew and Cercospora leaf spot of mungbean in the Philippines.** IN: The 1st international mungbean symposium. Shanhua : AVRDC. p.147-148 [En] (SB205.M8I5)

MEETING: International Symposium on Mungbean, 1st -- Los Banos, Philippines, Aug 16-19, 1977

The most serious diseases of mungbean in the Philippines are powdery mildew and Cercospora leaf spot. Powdery mildew is prevalent during the dry season. The disease can reduce yield by as much as 21% when all the leaves are covered with mildew colonies at flowering time. Field experiments showed that powdery mildew can be effectively controlled by timely spraying of benomyl at the rate of 30 g/100 liter at least twice during the growing season at 10-14 days intervals. When mixed into the soil at 0.07 g/400 micro l of rooting medium, benomyl can provided complete protection against powdery mildew for 70 days. Several mungbean lines with good resistance were identified. Cercospora leaf spot is serious during the wet season planting and can reduce yield by 23% when 75% of the foliage is killed. The disease can be effectively controlled by spraying with benomyl twice at 10-day intervals at the rate of 30 g/100 liters of water. A variety, CES ID-21 (Pag-asa) is highly resistant to powdery mildew and moderately resistant to Cercospora leaf spot. [THH]

*0360 Thind, B.S. ; Kumar, I. 1980. **Chemical control of bacterial and Cercospora leaf spots and leaf reddening of mungbean.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.10(2):78-79. [En] (REP.MB-2302)

Five chemicals were tried for 3 years to develop a common spraying schedule for the control of Cercospora leaf spot (Cercospora canescens), bacterial leaf spot (Xanthomonas phaseoli) and leaf reddening of mungbean. Bavistin was highly effective for the control of all three leaf diseases. It completely controlled Cercospora leaf spot and leaf reddening. However, for the control of bacterial leaf spot, blitox and streptocyline also showed very promising results. [THH]

*0361 Samiappan, R. ; Vidhyasekaran, P. 1981. **Differences between Macrophomina phaseolina isolates causing root rot and leaf blight of uridbean.** INDIAN PHYTOPATHOLOGY, v.34(4):407-409. [En] [En Abst] (A:PS)

Differences between two Macrophomina phaseolina isolates, one causing root rot and another leaf blight in blackgram (Vigna mungo (L.) Hepper) were studied. The root rot isolate grew more profusely in blackgram hypocotyl extract medium while the leaf blight isolate preferred the host leaf extract medium. Both the isolates produced various pectolytic and cellulolytic enzymes both in vitro and in vivo. Glucose increased polygalacturonate trans eliminase production by the root rot isolate and decreased the enzyme production by the leaf blight isolate. [AS]

*0362 Sivaprakasam, K. ; Marimuthu, T. 1981. **Efficacy of different rates and number of sprays with Carbendazim in controlling Cercospora leaf spot and powdery mildew of mungbean.** PULSE CROPS NEWSLETTER, v.1(3):56-57. [En] (A:PS)

To determine the minimal fungicide concentration and spraying frequency for effective control of Cercospora leaf spot and powdery mildew of mungbean with Carbendazim, the fungicide was sprayed either once or twice in concentrations ranging from 12.5 to 250 g a.i./ha. One spray with 125 and 62.5 g a.i./ha or two sprays with 62.5, 50 and 25 g a.i./ha resulted in the highest yields. Two sprays at still higher doses gave significantly lower yields than the lower doses. [EMS]

*0363 Zote, K.K. ; Dandnaik, B.P. ; Jature, S.D. 1981. **Chemical control of foliar diseases on mungbean (Vigna radiata).** PULSE CROPS NEWSLETTER, v.1(2):68. [En] (A:PS)

Six fungicides, viz., Bavistin, Calixin, Karathane, Morocide, Dithane M-45 and Sulfex, sprayed repeatedly at 10 days interval, were evaluated for control of powdery mildew (Erysiphe polygoni) and leaf blight (Macrophomina phaseoli) of mungbean. All fungicides were significantly superior to the check in controlling the diseases. Maximum disease control as well as grain yield were recorded with Bavitin. [EMS]

*0364 Roy, A.N. ; Sharma, R.B. 1982. **Effect of Phaseolus mungo L. seed-coat-leachate on fungal growth.** PHYTOPATHOLOGIA MEDITERRANEA, v.21(1):31. [En] (REP.MB-2685)

Results of in vitro studies indicate that the seed coat of Vigna mungo possesses certain antifungal substances which reduce the growth of seed surface fungi (Aspergillus niveus, Cladosporium herbarum, Rhizoctonia solani), but stimulates internally borne fungi (Aspergillus flavus, A. terreus). [THH]

***0365** O'Neill, M.J. ; Adesanya, S.A. ; Roberts, M.F. 1983. **Antifungal phytoalexins in Phaseolus aureus Roxb.** ZEITSCHRIFT FUER NATURFORSCHUNG (TEIL C: BIOCHEMIE, BIOPHYSIK, BIOLOGIE, VIROLOGIE), v.38(9-10):693-697. [En] [En Abst] (REP.MB-2375)

Eight phytoalexins have been isolated from Vigna radiata (mungbean) seedlings after treatment with aqueous CuCl2. These compounds include three isoflavones: genistein, 2'-hydroxygenistein and a compound tentatively identified as 2,3-dehydrokievitone, four isoflavones: dalbergioidin, kievitone, cyclokievitone and 5-deoxykievitone, and the pterocarpan phaseollidin. The antifungal activities against Cladosporium cucumerinum were determined. [AS]

***0366** Deng, T.C. 1984. **[The major diseases of mungbean and their control].** PESTICIDE WORLD, v.12:47-49. [Ch] (A:PS)

More than 26 diseases of mungbean have been reported. Powdery mildew and Cercospora leaf spot are the most important diseases of mungbean in Taiwan. The symptomology, epidemiology varietal resistance and control measures are discussed. [TCW]

***0367** Arora, Y.K. ; Bajaj, K.L. 1985. **Peroxidase and polyphenol oxidase associated with induced resistance of mung bean to Rhizoctonia solani Kuhn.** PHYTOPATHOLOGISCHE ZEITSCHRIFT, v.114(4):325-331. [En] [En De Abst] (A:PS)

Peroxidase and polyphenol oxidase activities and peroxidase isozyme patterns were determined at different stages of hypocotyls of mungbean infected with Rhizoctonia solani. The effect of ethephon (2-chloroethyl phosphonic acid) has been studied. Peroxidase activity increased at 24 h after inoculation as compared with controls followed by a decline later. It increased at 120 h. Polyphenol oxidase activities increased after inoculation. Ethephon treatment increased the resistance to Rhizoctonia solani and enhanced peroxidase and polyphenol oxidase activities. Peroxidase isozyme pattern was found to change as a result of inoculation and ethephon treatment. The results indicated that ethephon-induced resistance was related to peroxidase and polyphenol oxidase activities. [AS]

- Leaf Spots

***0368** Welles, C.G. 1924. **Studies on a leaf spot of Phaseolus aureus new to the Philippine islands.** PHYTOPATHOLOGY, v.14:351-358. [En] [En Abst] (REP.MB-0581)

A leaf spot of Vigna radiata has appeared in the plantings at the College

of Agriculture, Los Banos, the Philippines. The disease apppears to be caused by Cercospora cruenta Sacc., which is responsible for leaf spot diseases of various species of beans in the United States, India, Ceylon, and China. The disease is very serious and inhibits pod development due to defoliation or partial destruction of the photosynthetic area of leaves. About 100% of the leaves and 75% of the older pods are attacked. Stems are less frequently parasitized. Inoculation experiments with pure cultures of Cercospora lussoniensis on Vigna radiata produced symptoms slightly different from those caused by Cercospora cruenta. Conidiophores and conidia were of approximately the same length and appeared very similar. A close relationship between these two species of Cercospora is suggested. While it is believed that Bordeaux mixture will successfully control the disease, it is not recommended because of the cost involved. Resistant varieties and a change in cultural practice are suggested as possible means of combatting the disease. [AS]

***0369** Solheim, W.G. ; Stevens, F.L. 1931. **Cercospora studies 2. Some tropical Cercosporae.** MYCOLOGIA, v.23:365-405. [En] [En Abst] (REP.MB-2404)

This paper describes various Cercospora species, including C. cruenta on leaves, stems and pods of Phaseolus spp. and Vigna mungo. [THH]

***0370** Latham, D.H. 1934. **Life history of a Cercospora leaf spot fungus of cowpea.** MYCOLOGIA, v.26:516-527. [En] [En Abst] (REP.MB-2390)

This report deals with a fungus, here designated by the new combination Mycosphaerella cruenta, that causes a leaf and stem spot disease of cowpeas. Lesions on the leaves are usually irregular and reddish brown. Those on the stems have not been observed to bear conidia. The fungus has three spore forms in its life cycle. Two of these are herein described for the first time. This disease has previously been attributed to the conidial stage, Cercospora cruenta Sacc., but evidence of the genetic connection between this conidial stage and its newly found spermogonial and perithecial stages is given. The pathogen has been isolated in pure culture from conidia and from ascospores, both of which gave rise to typical Cercospora conidia. The pathogenicity of this fungus has been established by inoculation experiments with conidia and with ascospores. Mungbean is among the hosts of Cercospora cruenta. [AS/THH]

***0371** Preston, D.A. ; Ray, W.W. 1943. **Yeast spot of soybeans and mungbeans caused by Nematospora coryli Peglion in Oklahoma.** PLANT DISEASE REPORTER, v.27:601-602. [En] [En Abst] (REP.MB-2469)

This note describes a yeast-like fungus, Nematospora coryli, which causes a disease of soybean seeds and also attacks mungbean. [EMS]

***0372** Ahmed, Q.A. 1949. **Varietal resistance and susceptibility of Phaseolus radiatus towards Cercospora.** SCIENCE AND CULTURE, v.14(10):436. [En] (REP.MB-0038)

A severe leaf spot disease, probably due to Cercospora cruenta, was observed in the Dacca University Botanical Garden on three mungbean varieties viz., Hali-mung, Krishna-mung, and Sona-mung. Sona-mung was much more resistant

than the two other varieties. It has fewer stomata per leaf area in it and a smaller stomatal pore size, which might account partly for its higher resistance. [EMS]

*0373 Patel, M.K. ; Kulkarni, Y.S. ; Dhande, G.W. 1949. **A new Synchytrium on Phaseolus mungo.** CURRENT SCIENCE, v.18:171. [En] (REP.MB-1220)

A severe leaf spot disease on blackgram is described. The causal agent, a fungus of the genus Synchytrium, had not been reported previously on this host and was named by the authors S. phaseoli. [EMS]

*0374 Gupta, S.C. ; Sinha, S. 1951. **Further additions to the Synchytria of India.** INDIAN PHYTOPATHOLOGY, v.4:7-10. [En] [En Abst] (REP.MB-2425)

Synchytria collected in the district of Agra, India, during the years 1948, 1949, and 1950 have yielded five new species on seven hosts, including Synchytrium phaseoli-radiati on Vigna radiata and Vigna mungo. [THH]

*0375 Payak, M.M. 1951. **A Synchytrium disease of urid beans.** CURRENT SCIENCE, v.20(4):103. [En] (REP.MB-1217)

A severe foliar disease of blackgram caused by an undescribed species of Synchytrium is recorded. [THH]

*0376 Pavgi, M.S. ; Thirumalachar, M.J. 1953. **Angular black spot disease of mung beans.** NATURE, v.172:314-315. [En] (REP.MB-0982)

A severe leaf spot disease of mungbean, which could be easily mistaken for Cercospora cruenta, was shown to be due to Protomycopsis patellii. This fungus is the same as Synchytrium phaseoli, previously reported on mungbean. [EMS]

*0377 Munjal, R.L. 1960. **A commonly occurring leaf spot disease caused by Myrothecium roridum Tode ex Fr.** INDIAN PHYTOPATHOLOGY, v.13:150-155. [En] (REP.MB-2583)

This paper reports results of investigations on Myrothecium roridum, a fungus leaf spot disease that affects a wide array of agricultural crops including mungbean. [EMS]

*0378 Prasad, N. ; Agarwal, J.P. ; Agnihotri, J.P. 1962. **The genus Protomycopsis in India.** INDIAN PHYTOPATHOLOGY, v.15:24-27. [En] [En Abst] (REP.MB-2427)

Protomycopsis on two new hosts Vigna sinensis and Sesbania aegyptiaca is reported. On the basis of the detailed studies in the symptomatology and morphological characters the species of Protomycopsis have mainly been divided into P. phaseoli and P. ajmeriensis. P. phaseoli caused severe angular leaf

spot diseases on Vigna mungo, V. radiata and V. sinensis. [AS]

*0379 Golato, C. 1967. **Cercosporiosi del fagiolo in Somalia. = A Cercospora disease of Phaseolus mungo in Somalia.** RIVISTA DI AGRICOLTURA SUBTROPICALE E TROPICALE, v.61(4/6):159-162. [It] (REP.MB-0501)

Symptoms and morphological characters of Cercospora columnaris (Isariopsis griseola) are described. [EMS]

*0380 Haware, M.P. ; Pavgi, M.S. 1969. **Evaluation of some fungicides and antibiotics for the control of angular black spot of legumes.** HINDUSTAN ANTIBIOTICS BULLETIN, v.12(1):17-21. [En] [En Abst] (REP.MB-1530)

Several commercial fungicides and antibiotics were tested in the laboratory to devitalize the resting chlamydospores of Protomycopsis patelii Pavgi and Thirum, incitant of angular black spot of blackgram and mungbean and Protomycopsis thirumalacharii Pavgi, incitant of purple leaf spot of Sesbania grandiflora Pers. All the copper compounds and dithiocarbamic acid derivatives brought about lysis of the vesicles of germinating chlamydospores at 0.2% con. Mercuric chloride was effective even at the 0.1% level. Bordeaux mixture (1%) permitted chlamydospore germination but lysis occurred in the extruded vesicles. Ziram, brassicol and ceresan were not effective even at the 0.4% con. Aureofungin inhibited the spore germination at 120 ug/ml and griseofulvin at 400 ug/ml. Possibilities are indicated of their use in eradicating and/or minimizing the inoculum potential within the host tissue during the crop season, and later in the debris going into the soil. [AS]

*0381 Haware, M.P. ; Pavgi, M.S. 1969. **Field trials with some fungicides and antibiotic aureofungin in control of angular black spot of black gram and green gram.** HINDUSTAN ANTIBIOTICS BULLETIN, v.12(1):22-25. [En] [En Abst] (REP.MB-1529)

Four proprietary fungicides, viz., Blitox 50, Dithane Z-78, Dithane M-45, Hexathane and an antibiotic--Aureofungin were tested under field conditions to control angular black spot of blackgram (Vigna mungo) and mungbean (V. radiata) caused by Protomycopsis patelii Pavgi and Thirum. Blitox 50 was most effective at a lower dosage. Other fungicides and Aureofungin showed promise for better results with a higher dosage. [AS]

*0382 Kumar, S.M. ; Khare, M.N. ; Shrivastava, S.K. 1969. **Macrophomina leaf spot of urid (Phaseolus mungo L.) 1. Some observations on disease resistance.** MYSORE JOURNAL OF AGRICULTURAL SCIENCES, v.3(4):472-474. [En] (REP.MB-1075)

A peculiar type of leaf spot was observed on blackgram and mungbean. The fungus was identified as Macrophomina phaseoli. Screening of 21 varieties of blackgram revealed two resistant varieties, viz., BR-68 and T-29. [THH]

*0383 Gupta, B.M. 1970. **New disease on mung bean from Udaipur, Rajasthan, India.** PLANT DISEASE REPORTER, v.54(6):453. [En] (REP.MB-0028)

A leaf spot of mungbean caused by Alternaria alternata (=A. tenuis), was found in September 1969 at the Udaipur, Rajasthan, India. Eighty percent of the plants were infected. It was estimated that 45% of the leaf area showed brown lesions. This appears to be a new record for this leaf spot on mungbean. [THH]

***0384** Quebral, F.C. ; Cagampang, I.C. 1970. **Influence of Cercospora leaf spot control on yield of mungbean.** AGRICULTURE AT LOS BANOS, v.10(4):4,7,12. (REP.MB-1270)

Mungbean yield was reduced due to Cercospora leaf spot by 23% when 75% of the foliage was killed. Timely spraying of Benlate can delay the rate of development and spread of Cercospora leaf spot and thus prevent yield losses. [THH]

***0385** Haware, M.P. ; Pavgi, M.S. 1971. **Perpetuation of Protomycopsis species causing purple leaf spot of legumes in India.** PHYTOPATHOLOGICAL SOCIETY OF JAPAN, ANNALS, v.37:242-248. [En] [En Abst] (REP.MB-2451)

Protomycopsis patelii Pavgi and Thirumalachar causing angular black spot of Vigna mungo and V. radiata, and Protomycopsis thirumalacharii Pavgi causing purple leaf spot of Sesbania grandiflora Pers. are perpetuated from one season to another through desiccated but viable, heat-resistant chlamydospores in the host residue and those developed in vitro in the soil. The heat-resistant mycelium is later consumed in forming the resting chlamydospores in the soil, thus adding another dimension to the initial soil-borne inoculum potential of the disease. [AS]

***0386** Mishra, R.P. ; Khare, M.N. ; Chand, J.N. 1971. **Sclerotium leaf spot of urid (Phaseolus mungo).** INDIAN PHYTOPATHOLOGY, v.24(3):609-611. [En] (REP.MB-0159)

A leaf spot disease of blackgram was shown to be due to Sclerotium rolfsii. Four cultivars out of 21 tested were resistant to the disease. [EMS]

***0387** Anahosur, K.H. ; Fazalnoor, K. ; Narayanasamy, B.C. 1972. **A new leaf spot disease of Salvia leucantha Cav. from India.** SYDOWIA: ANNALES MYCOLOGICI, v.25:143-146. [En] (REP.MB-2764)

Corynespora cassiicola was isolated from diseased plants of Salvia leucantha Cav. Its pathogenicity was confirmed on Vigna radiata, V. sinensis and Glycine max. [THH]

***0388** Haware, M.P. ; Pavgi, M.S. 1972. **Physiology of chlamydospore germination in Protomycopsis species.** FRIESIA, v.10(1-2):43-51. [En] [En Abst] (REP.MB-2441)

Physiology of chlamydospore germination in Protomycopsis patelii Pavgi and Thirumalachar, the incitant of angular black spot of Vigna mungo and V.

radiata, and Protomycopsis thirumalacharii Pavgi, the incitant of purple leaf spot of Sesbania grandiflora Pers. (Papilionaceae) was studied in relation to environment. Various acids, alkalies and potassium permanganate (1% soln. in dist. water) and fertilizers induced and hastened the chlamydospore germination in both species. External nutrition and light were not essential factors; they favored 25-30 C temperature of incubation and a wide range of pH 3-7 for their germination. [AS]

*0389 Haware, M.P. 1972. **A note on angular black spot of Phaseolus mungo and P. radiatus.** JNKVV RESEARCH JOURNAL, v.6(1):55-56. [En] (REP.MB-1685)

The paper describes the symptoms of angular black spot (Protomycopsis phaseoli) on mungbean and blackgram. [EMS]

*0390 Rath, G.C. ; Grewal, J.S. 1973. **A note on Cercospora leaf spot of Phaseolus aureus.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.3:204-207. [En] (REP.MB-2672)

The age of mungbean leaves contributed to the severity of the disease incited by Cercospora canescens. Sporulation of the fungus on infected mungbean leaves was enhanced by darkness and was restricted to a range of relative humidity of 90-100% with optimum at 96%. The optimal temperature for sporulation was 27 C. Out of 648 mungbean accessions which were screened for the disease, 292 were resistant and 47 moderately resistant. Twenty-two promising accessions combined food agronomic traits and Cercospora resistance. [EMS]

*0391 Gupta, V.K. ; Saharan, G.S. 1974. **Epidemiological observations on leaf spot (Cercospora sp.) of black gram.** INDIAN PHYTOPATHOLOGY, v.27(4):606-608. [En] (REP.MB-0870)

Cercospora leaf spot (Cercospora sp.) is a very serious disease of blackgram in Himachal Pradesh. It is especially severe on blackgram plants sown earlier and when the rainfall is widely spread during the growing season. [THH]

*0392 Kannaiyan, S. ; Venkatarao, A. ; Thangamani, G. 1974. **Control of Cercospora leaf spot of greengram.** LABDEV JOURNAL OF SCIENCE AND TECHNOLOGY, PART B: LIFE SCIENCE, v.12-B(4):150-151. [En] (REP.MB-2433)

Benomyl was very effective in controlling Cercospora leaf spot (Cercospora cruenta) of mungbean and also reduced leaf shedding. EL 273, Hinosan, Dithane M-45 and Kocide also significantly reduced leaf spotting but not leaf shedding. All fungicide treatments increased yield. [EMS]

*0393 Reddy, G.S. ; Gupta, B.M. 1974. **Epidemiological studies of leaf spot of mung bean (Phaseolus aureus Roxb) caused by Alternaria alternata (Fr.) Keissl.** LABDEV JOURNAL OF SCIENCE AND TECHNOLOGY, PART B: LIFE SCIENCE, v.12-B(3):117-118. [En] (REP.MB-2434)

The effect of four sowing dates on the incidence of Alternaria leaf spot on 14 varieties of mungbeans was investigated. [THH]

*0394 Mew, I.C. ; Wang, T.C. ; Mew, T.W. 1975. **Inoculum production and evaluation of mungbean varieties for resistance to Cercospora canescens [Abst.].** IN: Proceedings of the American Phytopathological Society, vol.1. St. Paul, MN : The American Phytopathological Society. p.93 [En] (SB599.P7 v.1)

MEETING: Annual Meeting of the American Phytopathological Society, 66th -- Vancouver, Canada, Aug 11-15, 1974

Leaf spot of mungbean (Vigna radiata var. radiata) caused by Cercospora canescens is a disease of major importance in various mungbean growing areas of Southeast Asia. The pathogen produced conidia readily but not abundantly on potato-dextrose agar. Agar medium containing carrot leaf juice was best for sporulation by the pathogen followed by mungbean-leaf juice-oatmeal agar and autoclaved carrot root discs. From 15 to 28 C the number of conidia formed was directly correlated with temperature. Conidial production was promoted by light. When a spore suspension (2000 conidia/ml) was applied to mungbean at 3-trifoliolate leaf stage in the greenhouse or field, symptoms were noted within 7 days and lesions were suitable for disease evaluation in 10 to 12 days. Twenty-nine of 230 accessions of mungbean selected by AVRDC plant breeder through yield trials were resistant to C. canescens in the field with artificial inoculation. [AS]

*0395 Haware, M.P. ; Pavgi, M.S. 1976. **Host range of two Protomycopsis species from India.** SYDOWIA: ANNALES MYCOLOGICI, v.29:272-274. [En] (REP.MB-2765)

Of 23 plant species inoculated, only Vigna mungo, V. radiata and V. sinensis were susceptible to Protomycopsis phaseoli. [THH]

*0396 Haware, M.P. ; Pavgi, M.S. 1976. **Cytology of chlamydospore development in Protomycopsis species.** CYTOLOGIA, v.41:459-465. [En] [En Abst] (REP.MB-2389)

Observations on the nuclear behavior during chlamydospore development in Vigna mungo and Sesbania grandiflora Pers. by Protomycopsis patelii Pavgi and Thirumalachar and Protomycopsis thirumalacharii Pavgi, respectively, described in detail. The vegetative cells and/or conidia from diploid mycelia are pathogenic in the 2 species. Numerous chlamydospores typical of the species form the terminal sporogenous cells of the permeating hyphate within the infection epicenter. No vascular infection was noted. No haustoria were developed by any of the species. Pathological effects were observed on the host cells without any stimulation for cell multiplication and enlargement. Comparison was made on chlamydospore development in species of allied genera in the family Protomycetaceae. [AS]

*0397 Kotasthane, S.R. ; Agrawal, S.C. 1976. **Control of foliar diseases of mung bean (Phaseolus aureus) by fungicides.** PESTICIDES, v.10(8):35-36. [En]

(REP.MB-1567)

Four fungicides were tested for control of powdery mildew (Erysiphe polygoni) and leaf spot (Macrophomina phaseoli) on mungbean. Bavistin gave the best control of both diseases and the highest yield, and was followed by Benomyl. [EMS]

*0398 Rewal, H.S. ; Bedi, P.S. 1976. **Epidemiology and control of Cercospora leaf spot of "mung" in the Punjab.** INDIAN PHYTOPATHOLOGY, v.29(1):102-103. [En] (REP.MB-1740)

Leaf spot caused by Cercospora canescens is one of the important diseases of mungbeans in the Punjab. The disease generally appears on leaves in August. As a result of infection defoliation takes place which makes the plants weak and unthrifty. The disease was very severe under low temperature (14 C) and high humidity (85%) conditions. The sugar content of the plant also affected the disease incidence. The late sown crop contracted significantly less disease relative to that sown early. Three sprayings of the crop with Bavistin at the rate of 0.07% were found to be most effective, however, maturity of the crop was delayed. When the third spray was replaced with Dithane M-45, control was equally effective and no delay in maturity occurred. [THH]

*0399 Singh, D.V. ; Singh, R.R. 1976. **Chemical control of Cercospora leaf spot of green-gram.** INDIAN PHYTOPATHOLOGY, v.29(3):337-339. [En] (REP.MB-1903)

Field trials were conducted in 1973 and 1974 to evalute the effectiveness of six fungicides against Cercospora leaf spot (Cercospora canescens) of mungbean. Bavistin gave the highest yield, followed by miltox, Blue copper-50 and Dithane M-45; Dithane Z-78 was less effective. Brestan-60 was effective in controlling the disease, but was phytotoxic, and therefore, did not raise yield. [THH]

*0400 Singh, Kuldip ; Khatri, H.L. ; Bansal, R.D. 1976. **Chemical control of Cercospora leaf spot of Phaseolus aureus.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.5(1):108. [En] [En Abst] (REP.MB-2411)

A field evaluation of Zineb 83%, Blitox 50, Benlate 50W, captan and streptocycline for control of Cercospora leaf spot of mungbean (Cercospora cruenta) revealed that all four chemicals reduced the number of of spots/leaf. The best control was recorded in Benlate-treated plots. [THH]

*0401 Haware, M.P. ; Pavgi, M.S. 1977. **Cytology of chlamydospore germination and in vitro development of Protomycopsis species.** CARYOLOGIA, v.30(3):313-331. [En] [En Abst] (REP.MB-2443)

Observations are described on the nuclear behaviour relative to the chlamydospore germination, sporogenesis and in vitro chlamydospore development in Protomycopsis patelii Pavgi and Thirumalachar and Protomycopsis thirumalacharii Pavgi, respectively parasitic on Vigna mungo and Sesbania grandiflora Pers. Taxonomy and phylogenetic relationship of the genus

Protomycopsis Magnus and family Protomycetaceae are discussed in the light of these observations. [AS]

*0402 Menancio, D.I. ; Ramirez, D.A. 1977. **Genetic polymorphism and ontogenetic isozyme patterns of Cercospora leaf spot resistant and susceptible varieties of mungbean.** PHILIPPINE JOURNAL OF CROP SCIENCE, v.2(4):197-202. [En] [En Abst] (REP.MB-1823)
(NOTE: The article was also presented at the 1st International Mungbean Symposium, Aug 16-19, 1977)

Eleven varieties of Vigna radiata (L.) Wilczek and V. mungo (L.) Hepper were examined for peroxidase and catalase polymorphism at different ontogenetic stages using starch gel electrophoresis. Six varieties are resistant to Cercospora leaf spot and five are susceptible. Enzyme polymorphism was observed for peroxidase and catalase beginning the second week after germination. Six isoperoxidase patterns and two isocatalase patterns were detected in the 11 varieties. Identical isocatalase pattern was exhibited by the resistant and the susceptible varieties of V. radiata and was different from that of V. mungo. On the other hand, significant varietal differences in isoperoxidase patterns were observed and isoperoxidases 4 and 5 (Px 4 and Px 5) were found to be associated with resistance to Cercospora leaf spot. Peroxidase polymorphism may, therefore, be used as a selection index for resistance to Cercospora leaf spot of mungbean and that the selection process should be undertaken during the stages when Px 4 and Px 5 are detectable: vegetative and pod-bearing stages. [AS]

*0403 Singh, B.M. ; Sood, A.K. ; Saharan, G.S. 1978. **Occurrence of a leaf spot and blight of black gram caused by Colletotrichum dematium.** INDIAN PHYTOPATHOLOGY, v.31(1):100-101. [En] (REP.MB-2078)

A severe outbreak of a leaf spot of blackgram was observed during August, 1975, at the University farm of the College of Agriculture, Palampur. The pathogen was identified as Colletotrichum dematium which has not been reported as a pathogen of blackgram in India or elsewhere. [THH]

*0404 Singh, D.V. ; Singh, R.R. 1978. **Field evaluation of fungicides for the control of Cercospora leaf spot of green gram.** PESTICIDES, v.12(6):28-29. [En] [En Abst] (REP.MB-2419)

Leaf spot (C. canescens) of mungbean was effectively controlled by two sprayings of Bavistin or Benlate (0.5 kg/ha) at an interval of 15 days with corresponding increase in yield. Other fungicides, viz., captan and zineb also reduced the disease intensity, but were more or less similar to the control in yield. [AS]

*0405 Beniwal, S.P.S. ; Tripathi, H.S. 1979. **Leaf spot of urdbean caused by Fusarium equiseti (Corda) Sacc.** TROPICAL GRAIN LEGUME BULLETIN, no.16:15-16. [En] (A:PS)

A leaf spot fungus on blackgram was identified as Fusarium equiseti (Corda) Sacc. The pathogen causes round to irregular brown leaf spots, 2-3 mm in

diameter, and characterized by gray coloured centers and dark brown margins. [EMS]

*0406 Dwivedi, K. ; Shukla, P. 1979. **A new leaf spot disease of mung caused by Drechslera halodes.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.9(2):281. [En] (REP.MB-2278)

A new leaf spot disease of mungbean was identified as Drechslera halodes. [THH]

*0407 Suparyono 1979. **Study on the development of Cercospora leaf spot at different growth stages of mungbean plant.** Shanhua, Tainan : AVRDC. 10p. [En] (AVRDC Research Interns' Report) (REP.MB-2110)

The unifoliolate leaves and first trifoliolate leaf stages were the most susceptible in reaction to Cercospora leaf spot. [THH]

*0408 Dwivedi, K. ; Shukla, P. 1980. **Amino acid changes in mung foliage infested with Drechslera halodes.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.10(2):192-193. [En] (REP.MB-2301)

Infection of mungbean leaves with Drechslera halodes increased their cystine content, but decreased lysine, valine, leucine, threonine, and serine. Methionine, glycine, and glutamic acid remained unchanged. [EMS]

*0409 Grewal, J.S. ; Pal, M. ; Kulshrestha, D.D. 1980. **Control of Cercospora leaf spots of greengram by spraying bavistin.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.50(9):707-711. [En] [En Abst] (A:PS)

Bavistin 500 g/ha in 1,000 liters of water sprayed 30 and 45 days after sowing was superior to benomyl, Dithane Z-78 and captan for reducing the leaf spots caused by Cercospora canescens Ellis & Martin and C. cruenta Sacc. on mungbean [Vigna radiata (Linn.) Wilczek] to 10.5 to 12.5% compared with 45.1 to 75% in the control, increasing yield by 230 to 382 kg/ha over unsprayed plots. In 1977 and 1978, Bavistin 300 g/ha was statistically on a par with that at 500 g/ha. It reduced leaf spots to 12.4 to 15.6% and increased yield by 3.1 to 3.37 kg/ha. The cost:benefit ratio was 1:2.2. [AS]

*0410 Palmer, L.T. ; Sukanda, A. ; Suparyono 1980. **Fungicide control of Cercospora leaf spot on mungbeans.** FUNGICIDE AND NEMATICIDE TESTS, v.35:74. [En] (A:PS)

Three fungicides were tested against Cercospora leaf spot of mungbean and were sprayed 5 times at 10-day intervals. All 3 fungicides significantly reduced the disease severity and increased yield over the unsprayed plots. Benlate 50W was the most effective fungicide and was followed by B.f.n. 7789 and Dithane M45. [EMS]

***0411** Srivastava, M.P. 1980. **Occurrence of Myrothecium leaf spot of mung bean in Haryana.** INDIAN PHYTOPATHOLOGY, v.33(1):137. [En] (A:PS)

A leaf spot disease of mungbean was shown to be due to Myrothecium roridum Tode ex Fr. Symptoms consist of oval to circular, fading green to brown spots, 0.5-1.5 cm in diameter, and with characteristic concentric zonations impregnated with dot-like bodies. [EMS]

***0412** Dwivedi, K. ; Shukla, P. 1981. **Effect of interaction of nitrogen, phosphorus and potash on Drechslera leaf spot of mung.** INDIAN PHYTOPATHOLOGY, v.34(2):200-202. [En] [En Abst] (A:PS)

Studies on Drechslera leaf spot of mungbean (Vigna radiata) indicated that the plants receiving different dosages on N, P and K were infected by the pathogen (Drechslera halodes). However, it was found that the disease intensity was inversely proportional to potassium levels. Various dosages of phosphorus applied to mungbean crop did not play any role in disease susceptibility or resistance. Nitrogen increased the susceptibility, while potassium increased resistance against the disease in host plant. [AS]

***0413** Kalia, N.R. ; Sud, A.K. ; Gupta, V.P. 1981. **Effect of cultural practices in reducing yield losses due to Cercospora leaf spot in black gram (Vigna mungo (L.) Hepper).** PULSE CROPS NEWSLETTER, v.1(3):58. [En] (A:PS)

A factorial experiment involving three cultural practices, namely, straw mulching, hand weeding and no weeding, and 3 blackgram varieties was carried out to determine the effect of these factors on Cercospora leaf spot. Mulching was the most effective treatment both in reducing Cercospora leaf spot and increasing yield over the no weeding control. Hand weeding increased both yield and disease severity. Of the 3 blackgram varieties, No. 55 had the least infection. [EMS]

***0414** Kamthan, K.P. ; Gurha, S.N. ; Misra, D.P. 1981. **Fungicidal control of Cercospora leaf spot of urd bean, Vigna mungo (L.) Hepper.** MADRAS AGRICULTURAL JOURNAL, v.68(9):604-606. [En] [En Abst] (A:PS)

Thirteen fungicides were studied to control Cercospora leaf spot of blackgram. All were able to control the disease. However, the best control was obtained with Bavistin followed by Bordeaux Mixture, Dithane Z-78, Brassicol and Dithane M-45 with disease indices below 20% while other fungicides controlled the disease with disease indices 20% and above. [AS]

***0415** Kwon, S.H. ; Oh, J.H. 1981. **Sporulation of Cercospora canescens Ellis and Martin in culture.** KOREAN JOURNAL OF PLANT PROTECTION, v.20(1):21-24. [Ko] [En Ko Abst] (REP.MB-2296)

This study was conducted to obtain a supply of conidia sufficient for screening mungbean mutant lines for a source of resistance to Cercospora leaf spot caused by Cercospora canescens Ellis and Martin. Abundant sporulation occurred in cultures on mungbean decoction oatmeal agar(MOA) exposed to about 2,500 lux of fluorescent light, but it did not occur in continuous darkness.

The conditions that produced maximum number of conidia was not coincided with those for vegetative growth and pigmentation in culture medium. Removal of aerial mycelium in culture by brushing with sterile water so enhanced the conidial production that oatmeal agar medium(OA) could be useful for production of abundant conidia by the treatment. [AS]

*0416 Marimuthu, T. ; Sivaprakasam, K. 1981. **Effect of carbendazim on the growth of mungbean and disease incidence.** PULSE CROPS NEWSLETTER, v.1(2):67. [En] (A:PS)

Carbendazim spray caused reduction in plant height and number of leaves and flowers per plant in mungbean. The reduction was more pronounced at higher fungicide concentrations and/or spraying frequencies. However, because of its outstanding effectiveness in controlling Cercospora leaf spot, the fungicide is still recommended, but should be sprayed at lower rates and not more than twice at 20 days interval for control of the disease. [EMS]

*0417 Singburaudom, N. ; Parichartsombat, S. ; Wongwattanarutana, P. ; Jarupat, T. ; Pupipat, U. 1981. **Study on mungbean diseases in Thailand and their control.** KASETSART UNIVERSITY, RESEARCH REPORTS, p.17-18. [En] [Th] (S293.K3 1981)

Mungbean cultivars, CES 21 D and M 7 A, were used to study the disease incidence of Cercospora leaf spot (CLS). The experiment was conducted under the natural condition in the field with 3 levels of plant population density and 2 methods of planting, row planting and broadcasting. Cv. M 7 A showed decrease in leaf area, lower quantity of disease incidence and increase in yield in row planting when compared to broadcasting. The leaf area of CES 21 D was not affected by planting methods, while the disease incidence was low in row planting and high yield was found in broadcasting. A mix of benomyl and Delsene Mix was used to study the application time for controlling CLS. The fungicides were sprayed three times at 40, 50 and 60 days after emergence and two times at 40, 60 and 40, 70 days after emergence. The result indicated that three times of spraying fungicide was the best for control of this disease, only 7.01% of leaf area was affected by disease. Statistical significance was not detected on yield between three times and two times of application, but slight significance was found between spraying and non-spraying. The yield loss caused by Cercospora leaf spot was 68.3%. [PLH]

*0418 Menancio, D.I. ; Ramirez, D.A. 1982. **Biochemical basis of resistance to Cercospora leafspot in mungbean Vigna radiata L. Wilczek.** PHILIPPINE JOURNAL OF CROP SCIENCE, v.7(1):27-30. [En] [En Abst] (A:PS)
(NOTE: The abstract was presented at the 13th Annual Scientific Meeting of the Crop Science Society of the Philippines, Apr 28-30, 1982)

Four phytoalexin-like substances, designated as compounds 1,2,3 and 4 were isolated by thin-layer chromatography in benzene: methanol (9:1 v/v) from two resistant varieties of mungbean (V. radiata (L.) Wilczek) following infection with Cercospora canescens Ellis and Martin. The four compounds had Rf values of 0.43, 0.32, 0.27 and 0.04, respectively, and exhibited bright-blue and bright-purple fluorescence under ultraviolet light and orange and brown colors when sprayed with diazotized para-nitroaniline (DPNA). Bioassay results showed different inhibitory effects of the compounds on hyphal and mycelial growth of

C. canescens. In media containing any of the isolated compounds, the hyphal strands became shorter and wider and abnormal structures such as lobed tip, crooked strand and deformed hyphal branch were noted. In mycelial growth assay, smaller radial growth and lesser pigmentation and density of the colony were observed. The increasing order of magnitude of effects of compounds 1 or 4, 2 and 3 suggests that compound 3 is the main inhibitory compound of the resistant varieties studied. [AS]

*0419 Sivaprakasam, K. ; Marimuthu, T. 1982. **Fungicidal control of Cercospora leaf spot of mungbean.** INDIAN PHYTOPATHOLOGY, v.35(2):330-331. [En] (A:PS)

The fungicidal experiment was conducted against Cercospora leaf spot of mungbean. The chemicals were applied twice at fortnightly intervals. The first spray was done at first appearance of the disease. Bavistin + Dithane M-45, Bavistin and Benlate significantly reduced the disease, and increased yield over the untreated control. Bavistin and Benlate have been reported to be effective to foliar diseases of several crops under Indian condition. [THH]

*0420 Dwivedi, K. ; Shukla, P. 1983. **Evaluation of some fungicides and antibiotics against Drechslera halodes causing leaf spot of mung.** PESTICIDES, v.17(4):21-22. [En] [En Abst] (REP.MB-2553)

The pathogen, Drechslera halodes, was found to be sensitive to Thiram, Cuman liquid, ferbam, zineb, captan and Aureofungin in vitro. In pot culture experiment zineb was found highly effective as foliar spray. Captan, Aureofungin and Cuman also gave good result. In soil drenching Thiram and Brassical were found most effective. Mungbean suffers great loss due to a leaf spot disease caused by Drechslera halodes. [AS]

*0421 Dwivedi, K. ; Shukla, P. 1983. **Perpetuation of Drechslera halodes causing leaf spot disease of mung bean.** INDIAN PHYTOPATHOLOGY, v.36(3):427-430. [En] [En Abst] (A:PS)

The leaf spot disease of mungbean caused by Drechslera halodes was soil borne and perpetuated through diseased plant debris from one season to another under field condition for more than eight months. Survival of the pathogen was better at low temperature than at higher temperature. The seeds did not play any role in the primary infection of the disease. The secondary spread of the disease was through spores produced on diseased leaves and transmitted by air. [AS]

*0422 Eagleton, G. ; Sandover, S. 1983/84. **Cercospora leaf disease and seed yield in mungbean varieties.** WESTERN AUSTRALIA, DEPARTMENT OF AGRICULTURE, KUNUNURRA REGIONAL OFFICE, RESEARCH REPORT, AGRONOMY PROGRAMME, (Wet Season):64-66. [En] [En Abst] (A:PS)

Despite severe lodging, the experimental mungbean variety VC 1560A yielded 1900 kg/ha. Yields from King and Berken were substantially less, and were only slightly improved by fungicide application intended to control Cercospora leaf spot. [AS]

***0423** Prasad, K.S. ; Rao, P.R. ; Wadia, K.D.R. 1983. **Protomycopsis leaf spot of green gram.** INDIAN PHYTOPATHOLOGY, v.36(1):178. [En] (A:PS)

The causal agent of a severe leaf spot disease of mungbeans in Andhra Pradesh was identified as Protomycopsis phaseoli Ramakr. and Subram. (IMI 258510). [THH]

***0424** Telan, I.F. ; Lapis, D.B. 1983. **Chemical control of Cercospora leaf spot of mungbean [Abst.].** PHILIPPINE PHYTOPATHOLOGY, v.19(1/2):9. [En] (A:PS)

Bayleton 25% WP at concentration of 62.5, 125.0 and 187.5; Baycor at 90, 180 and 270 gram a.i./ha were evaluated against Cercospora leaf spot with Benlate as standard chemical. The results showed that fungicide treatments at different concentrations effectively controlled the disease. Disease severity was effectively reduced and the number of pods and weights of harvested seeds from chemically treated plots were considerably increased as compared to those of the control. [AS]

***0425** Maroon, C.J.M. ; Opina, O.S. ; Molina, A.B.,Jr. 1984. **Evaluation of crude plant extracts as fungicides for the control of Cercospora leafspot of mungbean [Vigna radiata (L.) Wilczek].** PHILIPPINE PHYTOPATHOLOGY, v.20(1/2):27-38. [En] [En Abst] (A:PS)

Crude water extracts of 12 out of 43 plant species screened for their fungicidal properties in vitro showed inhibitory activity against Cercospora cruenta Sacc. the pathogen of Cercospora leafspot of mungbean. The crude extracts of cassava (Manihot esculenta Crantz), spiny amaranth (Amaranthus spinosus L.), poinsettia (Euphorbia pulcherrima Willd.), ipil-ipil (Leucaena leucocephala (Lam.) de Wit.) and alas cuatro (Mirabilis jalapa L.) applied either as protectants or eradicants controlled the disease under screenhouse conditions. Tagetes (Tagetes erecta L.) extract was effective as protective spray while garlic (Allium sativum L.), mayana (Coleus scutellarioides L.), comfrey (Symphytum officinale L.) and ginger (Zingiber officinale Roxb.) extracts showed eradicative effects when applied after disease onset. Spiny amaranth and ipil-ipil extracts significantly reduced the development of the disease in the field but the former was more effective than the latter. Both plant extracts, however, were inferior to benomyl in controlling the disease. [AS]

***0426** Sud, V.K. ; Singh, B.M. 1984. **Effect of sowing date and row spacing on the development of leaf spot (Cercospora canescens) in urdbean.** INDIAN PHYTOPATHOLOGY, v.37(2):288-293. [En] [En Abst] (A:PS)

Leaf spot caused by Cercospora canescens developed rapidly in plots of blackgram cv. Kulu-4 and HPU-6 with close row spacing (20 cm). Infection rates and disease severities were higher in the early sown crop than in the later sown crop. The early sown crop with close plant spacing (20 cm) developed more disease than wide plant spacing (30 cm and 40 cm). The late sown crop, even at wide spacing, produced more grain yield due to less disease than the early sown crop at close plant spacing. [AS]

***0427** Sud, V.K. ; Singh, B.M. 1984. **Effect of environmental factors on the development of leaf spot (Cercospora canescens) in urdbean.** INDIAN PHYTOPATHOLOGY, v.37(3):511-515. [En] [En Abst] (A:PS)

The rapid development of leaf spot, caused by Cercospora canescens in blackgram (Vigna mungo), was favored by a mean temp. of 22.5-23.5 C, relative humidity of 77-85%, more than 5 sunshine hours/day and more rainy days. Intermittent rains were found to be favorable for disease development. Heavy rainfall or continuous dry spells were not conducive to disease development. Infection periods characterized by more rainy days combined with more sunshine hours were conducive for disease development. [AS]

***0428** Ahmad, Q. 1985. **Fungicidal control of Cercospora leaf spot of mungbean (Vigna radiata).** INDIAN PHYTOPATHOLOGY, v.38(3):418-422. [En] [En Abst] (A:PS)

Seed treatment with bavistin 50 WP (at the rate of 1 g/kg seed) followed by a single spray of bavistin 50 WP (0.05%) as soon as Cercospora leaf spot of mungbean (Vigna radiata) appeared, significantly reduced the disease intensity and increased the grain yield by 361 kg/ha over control. This provided a net additional income of Rs. 1220.46 per hectare over control. The return per rupee of total investment of bavistin was Rs. 3.36. [AS]

***0429** Rao, P.B. ; Mallaiah, K.V. 1985. **Factors affecting conidial germination in Cercospora canescens pathogenic to blackgram.** INDIAN PHYTOPATHOLOGY, v.38(3):559-560. [En] (A:PS)

Effect of some environmental factor on conidial germination of the Cercospora canescens are presented in this paper. Germination was observed at temperature from 10 to 30 C. Conidia failed to germinate at temperature 0, 5, and 40 C. Optimum temperature for conidial germination and germtube growth was 25 C. At 30 C though 96% germination was observed, the germtube growth was very less (84.14 um) when compared to 25 C (227.78 um). The apical cell are devoid of germtubes at 66 and 75% RH levels. Germination was higher in free water (96%) than at 100% RH level (86%). Maximum germtube growth (148.6 um) was observed in free water. White light favors conidial germination (92%) and germtube growth (181.44 um). Red light inhibited germination, no effect on germtube growth. Violet light favoured the emergence of germtubes from intercalary cells. The maximum germination (95%) was observed at pH 5.0 and 7.0, but germtube growth was favoured by pH 5.0 (301.14 um). [PLH]

***0430** Sud, V.K. ; Singh, B.M. 1985. **Relationship between severity of Cercospora canescens on urdbean (Vigna mungo) and loss in grain yield.** INDIAN PHYTOPATHOLOGY, v.38(3):435-441. [En] [En Abst] (A:PS)

Estimation of yield losses due to Cercospora canescens in blackgram cultivar Kulu 4 was made in field trials with simulated epidemics of early and late duration with slow and fast disease development. Yield losses were proportional to disease severities at 50% flowering in one year but varied considerably during others. Yield loss was proportional to disease severity at flowering stage for high and low progressions of disease but not for the intermediate growth curves. Increase in disease severity past 50% of the flowering does not significantly alter the yield. Infection rates were observed

to be poor indicators of yield loss due to variation in the onset of epidemic. Areas under the disease progress curve were better correlated with yield loss under normal situations. [AS]

- Powdery Mildew

***0431** Tai, F.L. 1936. **Notes on Chinese fungi. 6. Additional notes on Erysiphaceae of China.** BULLETIN OF THE CHINESE BOTANICAL SOCIETY, v.2(1):16-28. [En] (REP.MB-2386)

Sphaerotheca humuli (DC) Burr. var fuliginea is reported to infect Vigna mungo. [THH]

***0432** Uozumi, T. ; Yoshii, H. 1953. **Some observations on the mildew fungus affecting the cucurbitaceous plants.** PHYTOPATHOLOGICAL SOCIETY OF JAPAN, ANNALS, v.16(3/4):123-126. [Ja] [En Abst] (REP.MB-2454)

Erysiphe cichoracearum DC., Sphaerotheca fuliginea (Schlecht.) Poll., and S. humuli (DC.) Burr. are reported as the powdery mildew fungi attacking cucumber and other members of cultivated cucurbitaceous plants. S. fuliginea is the only cause of the mildew of the cucurbitaceous plants. The occurrence of perithecial formation of S. fuliginea on cucurbitaceous hosts is not uncommon in Fukuoka late in the fall, though it is said difficult to find the perithecia in other districts of Japan. The mildew fungi (E. cichoracearum and others) obtained from Nicotiana tabacum, Artemisia vulgaris, Sesamum indicum, and Bidens bipinnata are not infectious to cucumber, while the fungus from Arctium lappa (S. fuliginea) is pathogenic to cucumber. S. fuliginea from cucumber is infectious to Arctium lappa and Vigna radiata, but is not infectious to Solanum melongena, Chrysanthemum coronarium, Helianthus tuberosum, H. annuus, and Nicotiana tabacum. The difference of resistance due to the difference of ages of the leaves of cucumber against the infection by S. fuliginea has been observed. Young leaves which had past 0 to 3 days before the inoculation, in this experiment, were not affected when examined 5 days after inoculation, and the most susceptible leaves were those which had past 16 to 23 days before the inoculation. [AS]

***0433** Rao, P.G. ; Rao, N.R. 1955. **Preliminary observations on the control of powdery mildew in black and green grams.** ANDHRA AGRICULTURAL JOURNAL, v.2(6):317-319. [En] (REP.MB-2448)

All of the four fungicides (Ultra Sulphur, spersul, sulphur dust and Bordeaux mixture) evaluated against powdery mildew of mungbean and blackgram reduced infection in both crops, but only a slight yield increase occurred in blackgram. [EMS]

***0434** Wang, T.S. 1965. **Studies on powdery mildew diseases.** PLANT PROTECTION BULLETIN (R.O.C.), v.7(4):199-200. [Ch] (REP.MB-1161)

Mungbean is a new host of Sphaerotheca fuliginea in Taiwan. [THH]

***0435** Quebral, F.C. 1969. **Greenhouse test for controlling mung bean powdery mildew by incorporating chemical in soil.** PHILIPPINE PHYTOPATHOLOGY, v.5(1/2):52-54. [En] [En Abst] (REP.MB-1659)

Du Pont experimental fungicide 1991 [1-(butylcarbamoyl)-2-benzimidazole carbamic acid, methyl ester], when incorporated into 400 cubic cm soil at the rate of 0.5, 0.25, 0.15, and 0.07 g 50% active ingredient formulation, showed systemic activity in mungbean (Vigna radiata Wilczek) against powdery mildew. The different rates gave protection to the plants throughout the experiment. The test chemical was not phytotoxic. Based on results of this greenhouse test, F-1991 should be further tested in the field for the control of mungbean powdery mildew. [AS]

***0436** Quebral, F.C. ; Lantican, R.M. 1969. **Effect of Benlate on powdery mildew and yield of mungo.** AGRICULTURE AT LOS BANOS, v.9(1):13-14. [En] (REP.MB-1609)

A single spray with Benlate sufficed to effectively control powdery mildew in mungbean plots and significantly improve yield. [EMS]

***0437** Mathur, R.L. ; Daftari, L.N. ; Jhamaria, S.L. 1971. **Effectiveness and economics of fungicidal control of powdery mildew of urid (Phaseolus mungo L.).** RAJASTHAN JOURNAL OF AGRICULTURAL SCIENCE, v.2(1):21-23. [En] (REP.MB-1496)

All five fungicides tested significantly controlled powdery mildew on blackgram. Elosal gave the best control and was followed by Thiovit, whereas Morocide, Morestan, and Cosan were at par in controlling the disease. Thiovit, sprayed twice, gave the highest net return and was followed By Cosan and Elosal. [THH]

***0438** Soria, J.A. 1971. **Predicting the occurrence and development of powdery mildew of mungo.** IN: Proceedings [of the] second annual conference [on] corn, sorghum, soybean, mungo and peanut. Los Banos, Laguna : University of the Philippines. p.168-173 [En] (REP.MB-1489)

MEETING: Annual Conference [on] Corn, Sorghum, Soybean, Mango and Peanut, 2nd -- Laguna, UPCA, Philippines, Mar 22-27, 1971

Hourly concentrations of airborne conidia of the powdery mildew fungus were found to be more abundant at noontime than in the afternoon. The highest abundance of powdery mildew spores occurred in January 1970 when monthly mean temperature was 25.6 C; relative humidity 85%; wind speed 1.8 mph; total solar radiation 9976 gm-cal-cm2-day; and rainfall 1.61 inches. Under this condition experimental plants were infected 26 days after planting time, and the degree of infection was 98.33%. [THH]

***0439** Soria, J.A. ; Quebral, F.C. 1973. **Occurrence and development of powdery mildew on mongo.** PHILIPPINE AGRICULTURIST, v.57(3):153-177. [En] [En Abst] (REP.MB-1058)

This study shows the relationship of airborne conidia, host age, and degree

of infection to environmental conditions. The highest incidence of Erysiphe polygoni D.C. occurred in January, 1970 when montnly means of temperature, relative humidity, wind velocity, and total solar radiation and rainfall were 25.6 C, 85%, 1.8 mph, 9976 gm-cal-cm2-day and 1.61 inches, respectively. A forecasting system was made structured around measures of minimum and maximum means of temperature, relative humidity, wind velocity, solar radiation and rainfall recorded ten days before the occurrence of the disease. This tentative prediction schedule for predicting powdery mildew on mungbean was based primarily on the relationship between disease appearance and host age. Results of this study suggest that mungbean should be planted at the time when vegetative growth of the plant will not coincide with the environmental conditions most favorable for the occurrence and development of powdery mildev. Timely application of protectant fungicide should be made before large numbers of Erysiphe polygoni D.C. conidia occur in the area. [AS]

***0440** Gupta, R.B.L. ; Singh, G. ; Singh, R.R. ; Solanki, J.S. 1975. **Efficacy of different fungicides against powdery mildew of moong.** INDIAN PHYTOPATHOLOGY, v.28(2):164-166. [En] [En Abst] (REP.MB-0871)

Spraying of fungicides at fortnight intervals appreciably reduced powdery mildew incidence in mungbeans and significant disease control was obtained at 5% level of significance. Increased grain yield was also obtained by way of controlling disease by spraying fungicides like Cosan, Karathane W.D., Elosal and Thiovit. [AS]

***0441** Singh, S.D. ; Naik, S.M.P. 1977. **Field control of powdery mildew of urd by fungicides.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.6:99. [En] (REP.MB-2415)

Eight fungicides, namely, Bavistin, Benlate, Dithane Z-78, Calixin, Cuman, Thiovit, Derosal, and Difolatan, were sprayed twice at intervals of 15 days beginning with the initial symptoms of powdery mildew. All the fungicides were significantly superior to the check in controlling the diseases. Maximum control of disease incidence was recorded with Calixin, followed by Bavistin and Thiovit. [THH]

***0442** Hakim, L. 1979. **Effect of fungicide spraying on yield of six mungbean varieties at two population densities at AVRDC.** Shanhua, Tainan : AVRDC. 16p. (AVRDC Production Trainees' Report) (REP.MB-2112)

Milcurb-Super 25 EC effectively controlled powdery mildew of mungbean, but did not have any influence on yield. [EMS]

***0443** Gurha, S.N. ; Gangal, L.K. 1980. **Control of powdery mildew of greengram (Vigna radiata (L.) Wilczek).** MADRAS AGRICULTURAL JOURNAL, v.67(10):666-668. [En] [En Abst] (A:PS)

The study revealed that all fungicides except Elosal and Sulphen were found significantly superior in controlling the disease and gave higher yields as compared to control. Thiovit was the best followed by Bavistin, sulphur dust and Karathane. However, the highest yield was recorded with Bavistin followed

by Thiovit, sulphur dust and Karathane. The percentage disease index and the yields were found to have linear relationship with the fungicides. [AS/EMS]

*0444 Sumarsono, L. 1980. **Effect of fungicides in controlling powdery mildew and damping off on mungbean.** 5 leaves [En] (AVRDC Production Trainees' Report) (REP.MB-2132)

Powdery mildew and damping-off of mungbean were effectively controlled by Milcurb Super 25 EC and PCNB, respectively; however, none of the 2 fungicides increased yield. [EMS]

*0445 Sivaprakasam, K. ; Marimuthu, T. ; Radhakrishnan, T. ; Vairavan, K. 1981. **Influence of date of sowing and spacing on the incidence of powdery mildew of greengram and blackgram.** MADRAS AGRICULTURAL JOURNAL, v.68(1):65-67. [En] (A:PS)

Powdery mildew of mungbeans and blackgram is a disease of major importance in Tamil Nadu. An experiment was conduced under field condition at National Pulses Research Centre, Vamban with three dates of sowing, viz., 1-8-80, 20-8-80 and 10-9-80 and three spacings, viz., 30 x 5, 30 x 10, and 30 x 15 cm. The results showed that the crop sown on 1-8-80 and 20-8-80 (60-80 day-old plants) were highly susceptible to infection. The plants raised with wider spacing of 30 x 15 cm were found to record significantly less incidence than those with closer spacings. Mungbeans were more susceptible than that of blackgram. [THH]

*0446 Keswani, C.L. ; Mreta, R.A.D. 1982. **Effect of intercropping on the severity of powdery mildew on green-gram.** IN: Keswani, C.L. ; Ndunguru, B.J. Intercropping; proceedings of the second symposium on intercropping in semi-arid areas. Ottawa : International Development Research Centre. p.110-114 [En] (S573.K4)

MEETING: Symposium on Intercropping in Semi-Arid Areas, 2nd -- Morogoro, Tanzania, Aug 4-7, 1980

Severity of powdery mildew on mungbean was significantly higher in mungbean monoculture than when mungbean was intercropped with either sorghum or bulrush millet. No significant difference in disease severity was observed between two intercropped systems. Disease severity did not differ significantly between early- and late-planted plots. Mungbean yield was reduced in intercropped plots compared to monoculture. [THH]

*0447 Moghe, S.V. ; Utikar, P.G. 1982. **Effect of sowing dates on the incidence of powdery mildew diseases on green gram (Vigna radiata).** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.11:98-99. [En] (REP.MB-2329)

A field trial showed that the incidence of powdery mildew was minimum on mungbeans sown in mid-August and maximum on those sown in late July in Rahuri, India. [THH]

*0448 Moghe, S.V. ; Utikar, P.G. ; More, B.B. 1982. **Fungicidal control of powdery mildew (Erysiphe polygoni DC) of green gram (Vigna radiata (L.) Wilczek).** PESTICIDES, v.16(8):10-11. [En] (REP.MB-2552)

All eight fungicides tested, when sprayed three times at 8-day intervals, gave very effective (90-100%) control of powdery mildew. Yield increases over the control were as follows: 172% (Sulphur dust), 141% (Sulphen - 80), 114% (Nimrod), 82% (Sultaf), 69% (Morestan), 54% (Wettasul), 48% (Sulfavit), and 25% (Karathane). [EMS]

*0449 Agrawal, K.C. ; Philip, R. 1983. **Economic control of powdery mildew of urid (Phaseolus mungo) by wetsulf.** INDIAN PHYTOPATHOLOGY, v.36(2):359-361. [En] (A:PS)

A field trial on the effect of fungicide wetsulf (0.3%) against powdery mildew (Erysiphe polygoni) in blackgram was conducted. Increasing the number of sprays resulted in a decrease in the disease incidence. Three and two sprays increased yields 55% and 45%, respectively, over the unsprayed control. A spraying schedule of 3 sprays at 12-day intervals is recommended. [THH]

*0450 Nawaz, R.M.S. ; Narayanasamy, P. 1983. **Chemical control of powdery mildew disease of blackgram and greengram.** PESTICIDES, v.17(12):23-24, 26. [En] [En Abst] (REP.MB-2554)

The powdery mildew disease of blackgram (Vigna mungo Hepper) and mungbean (Vigna radiata Wilczek) caused by Erysiphe polygoni DC was found to be effectively controlled in vitro by Karathane, wettable sulphur, Sulfex and Benlate. But Bavistin, wettable sulphur, Karathane, Sulfex and Benlate were highly effective in controlling the disease under field conditions. Dithane Z-78 was also effective in controlling the disease in field conditions. [AS]

*0451 Nawaz, R.M.S. ; Narayanasamy, P. 1983. **Effect of powdery mildew infection on the nitrogen metabolism of blackgram.** MADRAS AGRICULTURAL JOURNAL, v.70(5):316-318. [En] [En Abst] (A:PS)

Changes in the total nitrogen and amino acid content of the infected leaves along with the protein content of the grain in the pods were studied. There was an overall increase in the total nitrogen and free amino acid contents of the infected leaves while the protein content of the infected grains in the pods decreased with increased intensity of infection. [AS]

*0452 Sivaprakasam, K. 1983. **Efficacy of some chemicals in the control of blackgram (Vigna mungo (L.) Hepper) powdery mildew (Erysiphe polygoni DC.).** MADRAS AGRICULTURAL JOURNAL, v.70(2):95-96. [En] [En Abst] (REP.MB-2592)

Benlate, sulphur dust and wettable sulphur controlled the powdery mildew of blackgram (Vigna mungo (L.) Hepper) better than other chemicals. Application of sulphur dust and wettable sulphur brought about an increase in yield by 47.3 and 45.9%, respectively, and resulted a net profit of Rs. 200 and 187 per ha, respectively, over the control. [AS]

***0453** Zote, K.K. ; Khalikar, P.V. ; Dandnaik, B.P. 1985. **Efficacy of fungicides against powdery mildew of mung.** PESTICIDES, v.19(8):42-43. [En] (REP.MB-2660)

Bavistin gave excellent control of powdery mildew caused by Erysiphe polygoni on mungbean, and was followed by Karathane, Sulfex, and Calixin. [THH]

- Blights

***0454** Arif, A.G. ; Munjal, R.L. 1955. **The causal fungi of the blight disease of Phaseolus in the Punjab.** PAKISTAN JOURNAL OF SCIENTIFIC RESEARCH, v.7(3):83-92. [En] [En Abst] (REP.MB-2442)

Economic importance and distribution in the Punjab of the fungal blight diseases caused by Phyllosticta phaseolina and Ascochyta phaseolorum on mungbean and blackgram are described. [THH]

***0455** Shukla, V.N. 1958. **Sclerotinia blight of mung and urid.** COLLEGE OF AGRICULTURE, NAGPUR MAGAZINE, v.32(1):30-32. [EN] (REP.MB-1584)

Mungbean and blackgram were attacked by a serious disease causing a pre- and post-emergence damping-off and a leaf blight on mature plants. The pathogen was identified as Sclerotinia sclerotiorum. [EMS]

***0456** Borthakur, D.N. 1960. **Blight of black gram caused by Sclerotinia sclerotiorum (Lib) de Bary.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.30(1):33-38. [En] [En Abst] (REP.MB-1623)

Sclerotinia sclerotiorum (Lib.) de Bary causes a blight of Vigna mungo in Assam. The fungus does not produce a Botrytis stage but a microconidial state is present. The perfect stage of the fungus, with fully matured asci, was found and it was seen that low temperature is a necessary factor for the production of the apothecial stalks. Infection of the host can be brought about by mycelia, sclerotia or ascospores through wounds or without wounds. The disease is mainly transmitted by the sclerotia, falling off on the ground or collected with the seeds, from the diseased plants. [AS]

***0457** Sohi, H.S. ; Sharma, S.L. ; Nayar, S.K. 1972. **New records of fungi from Himachal Pradesh, 4.** v.23(1/2):109-111. [En] (REP.MB-1595)

The paper deals with nine different fungi collected from Himachal Pradesh, including Mycosphaerella pinodes on Phaseolus vulgaris and Vigna mungo. [THH]

***0458** Saksena, H.K. ; Dwivedi, R.P. 1973. **Web blight of black gram caused by Thanatephorus cucumeris.** INDIAN JOURNAL OF FARM SCIENCE, v.1(1):58-61. [En] [En Abst] (REP.MB-2444)

The blackgram (Vigna mungo) crop in Uttar Pradesh has been found to suffer from a new fast spreading web-blight disease caused by an aerial strain of Thanatephorus cucumeris. The pathogen has a wide host range but is specific to aerial parts. The pathogen produces sclerotia in plenty on the affected parts and fallen leaves. Basidiospores are formed in nature on healthy tissues adjacent to lesions. Fruiting of the pathogen in vitro was successfully induced by making well nourished fungus grown on a less nutritive substratum. The modes of primary infection and secondary spread and possible methods of controlling the disease are discussed. [AS]

*0459 Dwivedi, R.P. ; Saksena, H.K. 1974. **Occurrence of web blight caused by Thanatephorus cucumeris on mung bean.** INDIAN JOURNAL OF FARM SCIENCE, v.2:100. [En] (REP.MB-1832)

During field surveys in 1973-74, mungbean was observed to be affected with web blight caused by Thanatephorus cucumeris (Rhizoctonia solani). In addition to previously reported hosts, the pathogen was found to cause leaf spots on Chenopodium album, Brassica oleracea, Sorghum vulgare, Zea mays, Saccharum officinarum, Triticum aestivum, Hordeum vulgare, Cicer arietinum, and Pisum sativum. [EMS]

*0460 Wang, T.C. ; Yang, C.Y. 1975. **Mungbean leaf blight: a new disease of mungbean in Taiwan.** PLANT PROTECTION BULLETIN (R.O.C.), v.17(4):8-9. [Ch] (REP.MB-0740)

MEETING: Annual Meeting of the Plant Protection Society of China -- Taichung, Taiwan, ROC, Dec 6-7, 1975

A new disease of mungbean found at AVRDC was identified as Thanatephorus cucumeris (Frank) Donk. The initial symptoms of necrosis and watersoaking expand very rapidly to all the trifoliate leaves of the whole plant. The lesions are green-brown to dark-brown. In a heavily infected mungbean field, the diseased leaves resemble frost damage and entire leaves can be defoliated over night. In the morning or under humid weather, a white, downy fungal growth and cobweb-like mycelia of Rhizoctonia can be observed on the necrotic area. A few days later, microsclerotia are produced abundantly. Occasionally, large brown sclerotia may also be observed. The same pathogen infects rice. One thousand mungbean accessions were screened at AVRDC and a few resistant lines were selected. [AS/EMS]

*0461 Barman, B. ; Hyder, A. ; Roy, A.K. 1976. **Leaf blight of green gram caused by Curvularia eragrostidis.** CURRENT SCIENCE, v.45(12):468. [En] (REP.MB-1138)

A leaf blight of mungbean causing small, irregular brown spots at the apices about 1-4 mm long, which later become necrotic and covered with a copious growth of fructifications, was identified as Curvularia eragrostidis. The pathogen attacked all 11 cultivars grown in a varietal trial, but with different intensities. The fungus has previously been reported only on members of Arachis. [THH]

*0462 Saikia, U.N. 1976. **Blight of mung caused by Corticium sasakii - a new disease recorded from Assam.** INDIAN PHYTOPATHOLOGY, v.29(1):61-62. [En] (REP.MB-1739)

A serious disease of mungbean was observed in the experimental fields of the Assam Agricultural Univ. and was identified as Corticium sasakii (Shirai) Matsumoto [=Thanatephorus cucumeris (Frank) Donk]. The disease symptoms are described. [EMS]

*0463 Vidhyasekaran, P. ; Arjunan, G. 1978. **Studies on leaf blight of urd bean caused by Macrophomina phaseoli.** INDIAN PHYTOPATHOLOGY, v.31:361-362. [En] (REP.MB-2187)

Root rot or maturity wilt caused by Macrophomina phaseoli is the most serious disease in blackgram. A severe leaf blight disease occurred in Tamil Nadu during 1974-75. Macrophomina phaseoli was identified as the causal agent. The present studies showed the presence of two entirely different strains of M. phaseoli, one attacking roots and the other attacking aerial parts. [THH]

*0464 Grover, R.K. ; Sakhuja, P.K. 1981. **Some pathological studies on Rhizoctonia bataticola leaf blight of mung bean.** INDIAN PHYTOPATHOLOGY, v.34(1):24-29. [En] [En Abst] (A:PS)

Rhizoctonia bataticola caused a severe blight of mungbean (Vigna radiata) foliage at 30-35 C when 4-8 days old inoculum was used and inoculated plants were kept for 8-24 h at high humidity. Roots and collar regions could be infected artificially by the foliage isolate. No cultivar or advance line was found resistant. On mungbean R. bataticola isolates from sesamum and castor were more aggressive than groundnut isolate. Host range of the pathogen was restricted. It was externally seed borne. [AS]

*0465 Hiremath, R.V. ; Shambulingappa, K.G. 1981. **Macrophomina stem blight of black gram and its effect in some varieties.** CURRENT RESEARCH (UNIVERSITY OF AGRICULTURAL SCIENCE, BANGALORE), v.10(1):11-12. [En] (REP.MB-2574)

Symptoms caused by Macrophomina phaseoli on blackgram are described. Ten blackgram cultivars were evaluated for their reaction to the pathogen. Cultivars with the lowest disease severity were K-3, PH-25, K-878, and T-9. Reduction in numbers of pods/plant ranged from 4.1 to 52.2% (av., 22.9%) and in 100-seed weight from 3.5 to 11.4% (av., 7.8%). Although the incidence on 3 cultivars (K-878, K-3 and T-9) was low, reduction in pods/plant was high because they were infected at an early stage. Variation in the performance of blackgram cultivars in different locations suggests the existence of distinct physiologic races. [THH]

*0466 Taneja, M. ; Grover, R.K. 1982. **Efficacy of benzimidazole and related fungicides against Rhizoctonia solani and R. bataticola.** ANNALS OF APPLIED BIOLOGY, v.100:425-432. [En] [En Abst] (REP.MB-2304)

Five formulations of four benzimidazole derived fungicides, carbendazim, benomyl, thiophanate methyl and methyl 4-[2-(dimethylamino acetamide)

phenyl]-3-thioallophanate were compared for their toxicity towards two pathogenic isolates of Rhizoctonia solani and three of R. bataticola. The isolates of two fungi showed significant differences in mycelial growth inhibition by the five fungicides. Benomyl and carbendazim were the most inhibitory to all isolates of both fungi while the sesame isolate of R. bataticola was the least sensitive to all fungicides. Disease control (90%) was obtained with low concentrations of benomyl against root rot of cowpea caused by R. solani, and with thiophanate methyl against root rot of sesame and sunflower, and leaf blight of mungbean caused by R. bataticola. The spread of stalk-end rot of sunflower heads was best checked with a spray of thiophanate methyl. The results suggest that benzimidazole fungicides having similar toxophores act differently for disease control in different host-parasite combinations. [AS]

***0467** Saikia, U.N. ; Phookan, A.K. 1983. **Efficacy of different fungicides against Corticium sasakii, the causal organism of blight of mung.** INDIAN PHYTOPATHOLOGY, v.36:752-754. [En] (A:PS)

Blight, caused by Corticium sasakii (=Thanatephorus cucumeris), is one of the serious diseases of both summer and rabi mungbean in Assam. Eleven fungicides were tested under field condition. Mungbeans were artificially inoculated when they were 35 days old. Fungicides were sprayed 48 h after inoculation. Second spray was given at 10 days interval. Bavistin and Benlate were the most effective fungicides. [THH]

***0468** Hooda, I. ; Grover, R.K. 1984. **Fungicidal control of Macrophomina phaseolina altered in pathogenicity by substrate nutrients.** ANNALS OF APPLIED BIOLOGY, v.104(1):69-78. [En] [En Abst] (REP.MB-2517)

The presence of different carbon and nitrogen sources and bivalent metal compounds in the substrate medium influenced the mycelial growth of Macrophomina phaseolina and in vitro susceptibility to fungicides. The inoculum from such substrate media showed differences in pathogenicity on mungbean (Vigna radiata). Sucrose and asparagine significantly increased the mycelial growth as well as pathogenicity of the fungus. Absence of bivalent metal ions, viz., Fe^{++}, Zn^{++} and Mg^{++} in the medium produced inoculum which caused maximum seedling mortality and foliage blight. Carbendazim and thiophanate-M as seed treatments were significantly less effective when the inoculum was from a medium containing glucose than when the inoculum was from a medium containing sucrose. Captafol and thiram gave significantly better disease control on mungbean when the inoculum used for soil inoculations was from media containing asparagine and ammonium nitrate compared to the inoculum grown on a medium containing sodium nitrate. Carbendazim, thiophanate-M, PMA, captafol and thiram gave good disease control when the inoculum used was raised on a medium devoid of bivalent metal ions. Carbendazim and thiophanate-M were the best fungicides as foliar treatments and controlled the disease irrespective of carbon, nitrogen and bivalent metal ion status of the substrate medium used for the production of inoculum. [AS]

***0469** Alam, S.S. ; Qureshi, S.H. ; Bashir, M. 1985. **A report on web blight of mungbean in Pakistan.** PAKISTAN JOURNAL OF BOTANY, v.17(1):165. [En] (A:PS)

Mungbean (Vigna radiata (L.) Wilczek) plants showed light-colored, irregular spots of variable size which soon turned white with narrow reddish-brown margins. Under severe infection, premature defoliation occurred. The fungus was identified as Rhizoctonia solani Kuhn. There does not appear to be any previous record of R. solani Kuhn causing web blight of mungbean in Pakistan. [AS/EMS]

- Rots, Wilts and Damping-Off

***0470** McRae, W. 1930. **India: new diseases reported during the year 1928.** INTERNATIONAL BULLETIN OF PLANT PROTECTION, v.3(2):21-22. [En] (REP.MB-2437)

Rhizoctonia bataticola was observed to cause a wilt of Vigna mungo, Arachis hypogaea, and Hibiscus cannabinus. A pycnidial stage of this fungus (Macrophomina phaseoli) occurred on all these hosts and the interrelationship between these two forms was established in cultures. [EMS]

***0471** Moore, E.S. 1931. **Internal boll disease of cotton in South Africa.** SOUTH AFRICA, DEPARTMENT OF AGRICULTURE TECHNICAL SERVICES, SCIENTIFIC BULLETIN, v.94:11-18. [En] [En Abst] (REP.MB-2473)

Internal boll disease in the cotton belt of South Africa is caused in the first instance by micro-organisms, amongst which Nematospora gossypii is the most important, whilst N. coryli also occurs. The incidence of these two fungi is associated with the punctures of the indigenous species of stainers, which probably act as carriers of infection. Other hosts of Nematospora include beans of several varieties, including kidneybean, soybean and mungbean, Bauhinia Galpini and Sterculia platanifolia. [AS]

***0472** Sideris, C.P. 1932. **Taxonomic studies in the family Pythiaceae. 2. Pythium.** MYCOLOGIA, v.24(1):14-61. [En] (REP.MB-2457)

Among the species of Pythium, P. splendens var. hawaiianum is reported parasitic on Vigna radiata. [THH]

***0473** Vlitos, A.J. ; Preston, D.A. 1949. **Seed treatment of field legumes.** PHYTOPATHOLOGY, v.39(9):706-714. [En] [En Abst] (REP.MB-2130)

Mungbean seed treated with Phygon, Arasan, Dow 9B, and Spergon responded significantly to the treatment, with Phygon at all dosages being most effective and yielding plants that were taller than seedlings from seed treated with other chemicals. Nodulation was not inhibited by chemical treatment of seed of alfalfa, mungbean, yellow hop clover, Chinese red cowpea, hairy vetch, and Austrian winter pea, when chemical treatment was followed by seed inoculation with "Nitragin" bacterial inoculum. [AS/EMS]

***0474** Lai, M.T. ; Wu, L.C. 1963. **Some observations on the infection of mung**

bean seedling by Rhizoctonia solani Kuhn. PLANT PROTECTION BULLETIN (R.O.C.), v.5(3):386-397. [En] [En Abst] (REP.MB-1041)

Isolate of Rhizoctonia solani pathogenic to mungbean, Chinese cabbage, kenaf, pea, peanut, and wheat was used for the studies on the infection of mungbean seedlings. Inoculum produced on potato dextrose agar caused much heavier infection of seedlings than that produced on water agar, while inoculum produced on Czapek's agar was slightly inferior to the former. The seedlings from pregerminated seeds were found to be more susceptible than that from ungerminated seeds. Optimum temperature for infection was between 28 C and 31 C. No visible symptoms were observed on the seedlings incubated at 13 C, 34 C, and 37 C, respectively. Under experimental conditions, all plant parts appeared to be susceptible to the infection of the fungus. The most fragile part was found to be the basal parts of hypocotyl where the fungus was frequently isolated as well as cotyledons. Eight days old stationary culture of the fungus showed inhibitory effect on the growth of mungbean seedlings. The toxic substances were heat stable. Phytotoxic effect on mungbean seedlings was also demonstrated in water extract of diseased plants. [AS]

*0475 Sohi, H.S. ; Jain, S.S. ; Sharma, S.L. ; Verma, B.R. 1964. **New records of plant diseases from Himachal Pradesh.** INDIAN PHYTOPATHOLOGY, v.17:42-45. [En] (REP.MB-2543)

A severe wilting of blackgram was observed in 1962. A species of Fusarium was isolated from the diseased roots. [THH]

*0476 Beyries, A. ; Messiaen, C.M. 1965. **Activite de differents fongicides en desinfection du sol, vis-a-vis du couple hote-parasite Rhizoctonia solani - Phaseolus mungo var. aureus. = Activity of various fungicides on soil disinfection with respect to the host parasite pair Rhizoctonia solani and Phaseolus mungo var. aureus** PHYTIATRIE - PHYTOPHARMACIE, v.14(4):193-197. [Fr] (REP.MB-0503)

In greenhouse tests the best control of Rhizoctonia solani was obtained by treating soil with 30% quintozene (as a dust), quintozene + ethoxytrichloromethylthiadiazole (emulsion), and quintozene + trichloromethylthiobenzoxazolone (dust). [EMS]

*0477 Bhargava, S.N. 1965. **Studies on the charcoal rot of potato.** JOURNAL OF PHYTOPATHOLOGY, v.53(1):35-44. [En] [En De Abst] (REP.MB-2397)

The potato charcoal rot caused by Macrophomina phaseoli was studied in detail. The isolate of potato was pathogenic on Vigna radiata and Vigna mungo, among other plant species. [THH]

*0478 Messiaen, C.M. ; Beyries, A. 1965. **Estimation du taux d'infestation d'echantillons de terre par des souches virulentes de Rhizoctonia solani: application a l'etude de l'effet d'amendements organiques. = Estimation of the infestation of soil samples by virulent strains of Rhizoctonia solani: application to the study of the effect of organic amendments** PHYTIATRIE - PHYTOPHARMACIE, v.14(4):183-191. [Fr] (REP.MB-2436)

The parasite-host association Vigna radiata - Rhizoctonia solani was used to study the effect of various organic amendments on infestation of soil samples by R. solani. Incorporating straw into the soil markedly increased infestation, which was further increased by adding N green manure, especially when using a susceptible species such as mungbean as green manure. [EMS]

***0479** Wu, L.C. 1965. **Physiology of parasitism. 1. Growth, pathogenicity, and toxin production of Rhizoctonia solani Kuehn.** BOTANICAL BULLETIN OF ACADEMIA SINICA, v.6:144-152. [En] [En Ch Abst] (REP.MB-C483)

In the present studies, the growth, pathogenicity, and toxin production of an isolate of R. solani were found to be directly correlated when the cultures of this fungus were incubated at different temperatures. Plant extracts obtained from infected seedlings provided further evidence of the important role of Rhizoctonia-toxin in the disease incidence. A possible reversal of Rhizoctonia-toxin by gibberellic acid was illustrated. [AS]

***0480** Kraft, J.M. 1966. **Effects of nutrients and inoculum density on the virulence of Pythium aphanidermatum and Pythium ultimum to mungbean seedlings.** Ann Arbor, MI : Univ. Microfilms International. 67 leaves [En] [En Abst] (Thesis - Ph.D. (Plant Pathology)) (TH-087)

P. aphanidermatum and P. ultimum grew best in a liquid, synthetic medium at pH 5.8-5.9. Excellent pH control was obtained with 0.05M KH_2PO_4 - K_2HPO_4 buffer. Optimum growth of P. aphanidermatum occurred only when casein hydrolysate was used as a source of nitrogen. In contrast, P. ultimum utilized a wide range of inorganic and amino acid sources of nitrogen. When casein hydrolysate was included in the basal medium on which both fungi were grown, P. aphanidermatum and P. ultimum caused a higher incidence of disease than when casein hydrolysate was omitted. When 8 mm agar and mycelium discs were used to inoculate seeds or seedlings of mungbean, the incidence of disease was high with either adequate or subadequate nutrients in the inoculum. When 4 mm agar and mycelium discs were used, a much lower incidence of disease occurred when nutrients in the inoculum were subadequate than when they were adequate for growth. When sources of nitrogen which P. aphanidermatum or P. ultimum failed to utilize for growth were used in the media on which the inoculum was grown, much less infection resulted than when casein hydrolysate was used. At 12 C, P. ultimum caused a high incidence of disease of mungbean seedlings but P. aphanidermatum could not infect mungbean seedlings at 12 C. In contrast to P. ultimum, P. aphanidermatum caused a high incidence of disease at 39 C with an adequate or subadequate source of nutrients. Germinating mungbean seeds exuded larger quantities of sugars and amino acids at an extremely low (12 C) and high (42 C) temperature than at intermediate temperatures. The exudates obtained from seeds germinated at 12 and 42 C also stimulated a greater growth response of P. aphanidermatum and increased disease incidence caused by this fungus especially when the inoculum contained a low number of zoospores. [AS/THH]

***0481** Lai, M.T. 1966. **Respiration and permeability changes in Phaseolus aureus Roxb. associated with infection by Rhizoctonia solani Kuhn.** Ann Arbor, MI : Univ. Microfilms International. 85 leaves [En] [En Abst] (Thesis - Ph.D. (Plant Pathology)) (TH-086)

Both a virulent and an avirulent isolate of Rhizoctonia solani were able to produce in vitro a substance phytotoxic to mungbean seedlings. The substance is dialyzable and heat stable. Infection with Rhizoctonia solani consistently increased respiration of mungbean plant tissues at least two fold. Infection also increased host cell membrane permeability. A substance responsible for increased membrane permeability was isolated from droplets which collected on lesion surfaces. The substance was heat-labile and non dialyzable and appeared to be a pectolytic enzyme of the endo-PG type. [EMS]

*0482 Lai, M.T. ; Weinhold, A.R. ; Hancock, J.G. 1966. **Cell permeability increases in mung bean during infection by Rhizoctonia solani [Abst.].** PHYTOPATHOLOGY, v.56:886. [En] (REP.MB-1071)

MEETING: Annual Meeting of the American Phytopathological Society, 58th -- Denver, CO, USA, Aug 20-24, 1966

Increases in cell membrane permeability were detectable (30-80% greater rate of electrolyte leakage) in mungbean (Vigna radiata) hypocotyls 12-18 h after inoculation with Rhizoctonia solani. Initial symptoms developed after 20-24 h. After 24-48 h, droplets collected on lesion surfaces; this liquid contained a heat-labile, nondialyzable substance that induced increases in permeability when infiltrated into healthy hypocotyl tissues; i.e., the rate of electrolyte and amino acid leakage was twice as high as that of the controls, and cell deplasmolysis time was 36% less than the control. Fractionation by gel filtration yielded a component that separated from the bulk of the protein and was active in altering permeability. The lesion liquid contained two pectolytic enzymes (endo-polygalacturonase [PG] type) with different mobilities on Sephadex G-200 columns. The permeability-altering factor coincided exactly with one of the PG fractions. The fraction containing the second endo-PG, commercial PG, and culture filtrates containing PG had a slight effect on the rate of electrolyte and amino acid leakage. These results indicate that increased cell membrane permeability is an initial host response to infection by R. solani and that a permeability-altering factor (perhaps an enzyme) is associated with infected tissues. [AS]

*0483 Kraft, J.M. ; Erwin, D.C. 1967. **Stimulation of Pythium aphanidermatum by exudates from mung bean seeds.** PHYTOPATHOLOGY, v.57:866-868. [En] [En Abst] (REP.MB-0908)

Germinating mungbean seeds exuded greater quantities of sugars and amino acids when incubated at 12 and 42 C than at intermediate temperatures. Exudates from seeds germinated at 12 and 42 C stimulated slightly more mycelial growth in a zoospore suspension of Pythium aphanidermatum than did exudates from seeds incubated at intermediate temperatures. When zoospores were supplemented with exudates, virulence of the fungus to mungbean seedlings was increased. [AS]

*0484 Wu, L.C. 1967. **Physiology of parastism. 2. Biochemical changes in the mung bean seedling infected with Rhizoctonia solani Kuehn.** BOTANICAL BULLETIN OF ACADEMIA SINICA, v.8:271-283. [En] [En Ch Abst] (REP.MB-0480)

Infection of mung bean by Rhizoctonia solani caused an increase in both reducing sugar and amino acid fractions during the early stages of disease development. Three days after inoculation, reducing sugar content in inoculated

plants was more than twice over that in healthy plants, whereas free amino acid rose to the level 1.4 times over that in the control plants followed by an appearance of characteristic symptoms on hypocotyls and roots one day later. Changes in reducing sugars and free amino acids during the early period of disease development may be very meaningful. The infection by the fungus reduced the nucleic acid and protein contents in diseased plants. Different dilutions of culture filtrate revealed different effect on the treated plants in their chemical changes. It seemed likely that the culture filtrates contained more than one biologically active substances. And the plants grown on water agar impregnated with 5% culture filtrate showed similar trend of reducing sugar, nucleic acid, and protein patterns to those mungbean seedlings infected with Rhizoctonia solani per se. Thus, the establishement of infection was thought to be determined by a complex of metabolites secreted by the fungus during the critical period of pathogenesis. [AS]

***0485** Kraft, J.M. ; Erwin, D.C. 1968. **Effects of inoculum substrate and density on the virulence of Pythium aphanidermatum to mung bean seedlings.** PHYTOPATHOLOGY, v.58(10):1427-1428. [En] (REP.MB-0163)

The results of in vitro study showed that a favorable source of nitrogen was necessary for infection of mungbean seedlings by Pythium aphanidermatum at low inoculum densities. [THH]

***0486** Lai, M.T. ; Weinhold, A.R. ; Hancock, J.G. 1968. **Permeability changes in Phaseolus aureus associated with infection by Rhizoctonia solani.** PHYTOPATHOLOGY, v.58:240-245. [En] [En Abst] (A:PS)

Increases in cell membrane permeability were detectable (100% greater rate of electrolyte leakage) in mungbean (Vigna radiata) hypocotyls 14-18 h after inoculation with Rhizoctonia solani. Initial symptoms did not develop until 20-24 h. After 24-48 h, droplets collected on lesion surfaces; this liquid contained a heat-labile, nondialyzable substance that induced increases in permeability when infiltrated into healthy hypocotyl tissues, i.e., the rate of electrolyte and amino acid leakage was twice as high as the controls, and cell deplasmolysis time was 33% less than the control. Fractionation by gel filtration yielded a component that separated from the bulk of the protein and was active in altering cell membrane permeability. The lesion liquid contained two pectolytic enzymes (endopolygalacturonase type) with different mobilities on Sephadex G-200 columns. The permeability-altering factor coincided exactly with one of the endopolygalacturonase fractions. The fraction containing the second endopolygalacturonase and commercial polygalacturonase had no effect on rate of electrolyte and amino acid leakage. These results suggest that increased cell membrane permeability is an initial host response to infection by R. solani and that a permeability-altering factor (perhaps an enzyme) is associated with infected tissues. [AS]

***0487** Ragunathan, V. 1968. **Damping-off of green gram, cauliflower, daincha, ragi and clusterbean.** INDIAN PHYTOPATHOLOGY, v.21(4):456-457. [En] (A:PS)

Pythium indicum, causal agent of damping-off of mungbean, causes light brown water soaked lesions near the hypocotyl region, spreading towards roots which become yellowish to dark brown and are constricted at the ground level. Immediate collapse of the seedlings is noticed. [AS]

*0488 Wu, L.C. 1968. **Nitrogen mobilization in mung bean seedling infected with Rhizoctonia solani.** PLANT PHYSIOLOGY, v.43:S-9. [En] (REP.MB-1275)

MEETING: Annual Meeting of the American Society of Plant Physiology -- Amhert, MA, USA, Aug 20-23, 1968

It is well documented that external symptoms are the result of the pathologically altered metabolism in the host plants. To approach this problem, mungbean Rhizoctonia has been utilized as the host-parasite model in this paper. Infection of mungbean by R. solani causes an increase in both reducing sugar and amino acid fractions during the early stage of disease development whereas the nucleic acid and protein contents are reduced as whole plants are analyzed. When the determinations of free amino acid and protein are made with cotyledon and root-shoot separately, protein content in root-shoot of infected seedling becomes higher than that of healthy one as soon as the characteristic symptom appears. Meanwhile, the reduction of cotyledon protein is lessened in the infected seedling. Free amino acid contents in cotyledons of healthy and infected seedlings are more or less the same, while, in root-shoot, free amino acid content of infected seedling is less than that of healthy one. The electrophoretic patterns of the soluble proteins are also shifted. These results show the important role of nitrogen mobilization in mungbean seedling for the establishment of disease development. [AS]

*0489 Beyries, A. ; Messiaen, C.M. 1969. **Virulence and specialization of some strains of Rhizoctonia solani isolated from vegetable plants.** ANNALES DE PHYTOPATHOLOGIE, v.1(1):37-54. [Fr] [Fr En Abst] (REP.MB-2406)

The strains of Rhizoctonia solani gathered in Southern France can be tentatively classified in the following way: Group I - Strains showing an optimal growth at 30 C, very virulent from 18 to 30 C towards beans (Phaseolus vulgaris and Vigna radiata), lettuce, radish, cucumber, slightly on tomato and potato stems. Group II - A heterogeneous collection of strains aggressive towards a number of plants, but lacking virulence for lettuce or radish. Temperature requirements are similar to those of group I for some strains, with a better adaptation to growth at 10 C for others. Group III - Strains actively growing at 10 C, and faster at 25 than at 30 C, highly virulent towards radish, slightly virulent or not at all with other hosts. Group IV - Temperature requirements similar to those of group III, strains virulent towards potato stems and tubers from 10 to 25 C, slightly on tomato stems. Group V - Strains which do not produce black, well differentiated scleroted sclerotia, like groups I, II, III, IV, but have loose, white or light buff ones. Without any virulence in the trials, they are probably secondary invaders on roots. Implications of R. solani with diseases on beans, lettuce, crucifers, cucumber, potato and tomato are discussed. The need of further studies with additional hosts and criteria (basidial stages, CO2 tolerance) is outlined. [AS]

*0490 Beyries, A. 1969. **Efficacite de quelques fongicides systemiques contre Rhizoctonia (corticium) solani Kuhn par traitements de semences de haricot et de radis.** PHYTIATRIE - PHYTOPHARMACIE, v.18(2):107-116. [Fr] (REP.MB-2435)

Four systemic fungicides were compared with PCNB in laboratory and field tests against Rhizoctonia on bean, blackgram and radish. Seed and soil treatments were used. Oxathiin D.735 (carboxin) was the best. In view of its low toxicity (LD50, 3200 mg/Kg) it could be used in market gardening. [EMS]

*0491 Philip, C.T. ; Kartha, K.K. ; Joshi, R.K. ; Nema, K.G. 1969. **A Rhizoctonia disease of 'mung' (Phaseolus aureus Roxb.) in Madhya Pradesh.** JNKVV RESEARCH JOURNAL, v.3(1):40-43. [En] [En Abst] (REP.MB-2449)

Pathogenicity of Rhizoctonia bataticola (Taub.) Butler associated with root-rot of Vigna radiata Wilczek in field was established experimentally. It infects nine other hosts. In mungbean the pathogen infects the roots, hypocotyl region and leaf. Seed transmission of the pathogen was also established. Soil factors affecting the incidence of the disease have been studied. Infected seed and pycnidia formed on roots seem to be the cause of primary infection in the field. [AS]

*0492 Ragunathan, V. 1969. **Damping-off of Phaseolus mungo seedlings.** AUARA: ANNAMALAI UNIVERSITY AGRICULTURAL RESEARCH ANNUAL, v.1:120-122. [En] (REP.MB-1897)

A Pythium damping-off of Vigna mungo was identified as Pythium deliense, which has been reported as one of the fungi associated with damping-off of tobacco, but it has not been reported to occur on Vigna mungo. [THH]

*0493 Wu, L.C. 1969. **Physiology of parasitism. 4. Rhizoctonia metabolites — Amino acids and others.** BOTANICAL BULLETIN OF ACADEMIA SINICA, v.10(2):109-123. [En] [Ch En Abst] (REP.MB-1154)

Changes in hydrogen concentrations and carbohydrates were not very striking during the growth of Rhizoctonia solani. They tended to decline with age of the culture. Phytotoxic activity of the filtrate appeared as early as in four days old culture. However, it was not predominant until 20 days after inoculation. In the initial stage amino acid level was very low while the accumulation of amino acids was brought about by significant increase in the dry weight of mycelium, i.e. 12 days after inoculation. Fifteen amino acids were detected in the present experiment. Among the 15 amino acids, the concentrations of alanine and glutamic acid were the highest. Amino acids seemed to regulate the growth of mungbean in vitro. DL-threonine stimulated the growth whereas DL-alanine, L-serine, L-cystine, and DL-methionine displayed the inhibitory effect on the growth of mungbean. The effect of amino acids varied with different assay conditions. Auxin- and gibberellin-like substances were identified in the culture filtrates of R. solani. Chromatographic and spectrophotometric analyses together with bioassay showed the presence of some compounds of different nature in culture filtrates and mycelium of R. solani. [AS]

*0494 Wu, L.C. 1969. **Physiology of parasitism. 3. Nitrogen mobilization in mung bean seedling infected with Rhizoctonia solani.** BOTANICAL BULLETIN OF ACADEMIA SINICA, v.10(2):95-108. [En] [En Ch Abst] (REP.MB-1155)

There was a slight change in the dry weight of cotyledons between day 0 and day 2, and an abrupt decline occurred between days 2 and 5. On the other hand, the dry weight of axial parts gradually increased up to day 5. Moisture contents of whole plants were increased rapidly between day 0 and day 1 and the rate of increase was slower thereafter. Changes in the dry weight and moisture content of healthy and diseased plants were essentially the same. A marked decrease in cotyledon proteins was observed in early stage of pathogenesis whereas the protein content of the axial parts started to increase as soon as

the typical lesions appeared. The difference in electrophoretic patterns between the healthy and diseased plants was found to be greater in the buffer-soluble proteins from hypocotyls. Changes in free amino acid content and distribution indicated that the amino acid pool was considerably affected in the early stage of disease development. Fourteen amino acids were identified in the alcohol extracts of healthy and diseased seedlings by an amino acid autoanalyzer. Among 14 amino acids, the amounts of lysine, histidine, glycine, tyrosine, and phenylalanine were increased in diseased mungbean whereas those of glutamic acid and alanine were decreased. Apparently, an increase in the contents of certain amino acids is in company with a decrease in a number of others. A flow of the amino acids from cotyledons to axial parts was affected by Rhizoctonia infection. The flows of leucine and phenylalanine were lessened while those of histidine, arginine, alanine, and methionine were enhanced by infection. The mobilization of arginine and methionine was particularly remarkable. No qualitative differences, however, were observed in the compositions of free amino acids between healthy and diseased plants. [AS]

*0495 Kaiser, W.J. ; Okhovat, M. ; Mossahebi, G.H. 1970. **Mungbean (Phaseolus aureus) damping-off and stem canker (Rhizoctonia solani).** FUNGICIDE AND NEMATICIDE TESTS, v.26:75. [En] (REP.MB-0473)

Dexon-Terraclor and Terraclor gave the best protection of mungbean seedlings against damping-off due to Rhizoctonia solani, and were followed by Demosan and thiabendazole. [EMS]

*0496 Kaiser, W.J. 1970. **Rhizoctonia stem canker disease of mungbean (Phaseolus aureus) in Iran.** PLANT DISEASE REPORTER, v.54(3):246-250. [En] [En Abst] (REP.MB-0202)

A damping-off and stem canker disease of mungbean (Vigna radiata) incited by Rhizoctonia solani reduced plant populations by 4-57% in experimental field plots at Karaj, Iran. Mortality of seedlings resulted when hypocotyl lesions enlarged or coalesced to girdle the stem. In the fields with a high incidence of disease the inoculum potential of R. solani was highest in the top 10 cm of soil and decreased rapidly with depth. The fungus could not be detected below 40 cm. No resistance was exhibited in 40 mungbean types in greenhouse tests. [AS]

*0497 Ragunathan, V. 1970. **Root rot of Arachis hypogaea seedlings caused by Pythium debaryanum.** CURRENT SCIENCE, v.39(2):44. [En] (REP.MB-2463)

Pythium debaryanum causing root rot of peanuts also infected Brassica juncea, B. oleracea, Crotalaria juncea, Cyamopsis tetragonoloba, and Vigna mungo. [THH]

*0498 Grewal, J.S. ; Pal, M. 1971. **Report of the work done on diseases of arhar and dry root rot of mung during 1970.** IN: Proceedings [of the] fifth workshop on pulse crops. Hissar : Haryana Agricultural University. p.109-111 [En] (REP.MB-0874)

MEETING: Workshop on Pulse Crops, 5th -- Hissar, India, Mar 18-20, 1971

Nine fungicides, viz., Demosan, Brassicol, Puraseed, Agrosan GN, Thiram, Spergon, captan, Rhizoctol and Vitavax, were tested in the field against dry root rot of mungbean (Macrophomina phaseoli). The lowest disease incidence and the highest germination and yield was recorded in Demosan-treated plots. [THH]

***0499** Kaiser, W.J. ; Okhovat, M. ; Mossahebi, G.H. 1971. **Etiology and control of damping-off and root rot of pea (Pisum sativum) in Iran.** PLANT DISEASE REPORTER, v.55(3):244-248. [En] [En Abst] (REP.MB-0920)

In trials with nonpasteurized field soil and infested greenhouse soil, Pythium aphanidermatum reduced emergence of mungbean by 14.7% and 36.7%, respectively. fungus causes a serious damping-off and root rot of pea in Southwestern Iran. [THH]

***0500** Kanlong, S. ; Prasartsee, C. ; Brown, W.M.Jr. 1971. **Outbreaks of pests and diseases [in Thailand].** F.A.O. SOUTHEAST ASIA AND PACIFIC REGION PLANT PROTECTION COMMITTEE, QUARTERLY NEWSLETTER, v.14(3/4):15. [En] (REP.MB-2462)

A stem rot of mungbean caused by Sclerotium rolfsii is reported. [THH]

***0501** Jain, N.K. ; Khare, M.N. ; Sharma, H.C. 1972. **Variation among the isolates of Rhizoctonia bataticola from urid plant parts and soil. 2. Temperature and pH requirements.** JNKVV RESEARCH JOURNAL, v.6(2):165-166. [En] (REP.MB-1972)

Six isolates of Rhizoctonia bataticola were grown on artificial medium under various temperatures (0 to 35 C) and pH values (4.5 to 10.5). Growth occurred over all pH values and a temperature range of 15 to 35 C and was optimal at 25 C and pH 5.5. The isolates differed significantly with respect to their pH and temperature requirements. [EMS]

***0502** Jain, N.K. ; Khare, M.N. 1972. **Chemical control of Rhizoctonia bataticola causing diseases of urid.** v.6(4):461-465. [En] [En Abst] (REP.MB-1963)

Nine fungicides were tested in vitro and in vivo against Rhizoctonia bataticola causing diseases of blackgram. Out of them Vitavax, Demosan, Benlate, and Ceresan wet were found to be the best fungicides for controlling the disease through seed treatment. [AS]

***0503** Jhooty, J.S. ; Bains, S.S. 1972. **Evaluation of different systemic and non-systemic fungitoxicants for the control of damping-off of mung (Phaseolus aureus) caused by Rhizoctonia solani.** INDIAN PHYTOPATHOLOGY, v.25(4):509-512. [En] [En Abst] (REP.MB-0181)

Systemic and non-systemic fungitoxicants were evaluated for the control of Rhizoctonia damping-off of mungbean. The dosages required for 50% (kill) and

complete inhibition of R. solani mycelial growth in vitro were low in case of systemic fungitoxicants as compared with the non-systemic fungitoxicants. Inhibition of mycelial growth of Rhizoctonia in vitro did not always relate with the disease control provided by different fungitoxicants. Brassicol among the non-systemic and benomyl from the systemic fungitoxicants effectively controlled the pre- and post-emergence damping-off of mungbean caused by R. solani. [AS]

*0504 Dhingra, O.D. ; Khare, M.N. 1973. **Biological control of Rhizoctonia bataticola on urid bean.** JOURNAL OF PHYTOPATHOLOGY, v.76(1):23-29. [En] [En Abst] (REP.MB-1105)

There were 38 fungi isolated from the rhizoplane, rhizosphere and nonrhizosphere soils of blackgram (Vigna mungo) over one year. All fungi were tested for their antagonism to Rhizoctonia bataticola in vitro and in vivo. Arachniotus sp., Aspergillus aculeatus, Cephalosporium humicola and Trichoderma lignorum were most active in vitro. The antagonistic properties were due to toxic materials produced by the antagonists. T. lignorum did not show activity in nonautoclaved field soil in soil columns. Arachniotus sp. or Aspergillus aculeatus applied to the seed controlled pre- and post-emergence damping-off of blackgram, giving a total stand of 73% and 69.7%, respectively, in nonautoclaved field soil, as compared to 1.2% in controls. Soil infestation with either, gave total stands of 59% and 65.5%, respectively, as compared with 3.7% in controls. [AS]

*0505 Jain, N.K. ; Khare, M.N. ; Sharma, H.C. 1973. **Variation among the isolates of Rhizoctonia bataticola from urid plant parts and soil. 1. In pathogenicity, morphology and growth pattern.** MYSORE JOURNAL OF AGRICULTURAL SCIENCES, v.7:411-418. [En] [En Abst] (REP.MB-1964)

Rhizoctonia bataticola was found associated with root, stem, leaf, pod and seeds of blackgram. The isolates from various plant parts and soil exhibited differences in virulence. The soil isolate proved most pathogenic. The isolates differed in their growth pattern and sclerotial size. The leaf isolate developed the largest sclerotia and the seed and soil isolates the smallest. When grown on different media the isolates varied in their growth pattern and rate of growth. The soil isolate had the least amount of growth in almost all media and the pod isolate the most. [AS]

*0506 Kataria, H.R. ; Grover, R.K. 1973. **Comparison of fungicides for the control of Rhizoctonia solani causing damping-off of mungbean (Phaseolus aureus).** ANNALS OF APPLIED BIOLOGY, v.88:257-263. [En] [En Abst] (REP.MB-2321)

Of 41 fungicides tested in the laboratory, copper carbonate, copper sulphate, mercuric chloride, Agrosan GN, quintozene, kasmicrogramamycin, carboxin, pyracarbolid, carbendazim, chloroneb, benomyl, Ohric, RH 893 (2-n-octyl-4-isothiazole-3-one) and Terrazole were the most inhibitory to the mycelial growth of Rhizoctonia solani on Czapek's agar plates and EC50 values of less than 1 microgram a.i./ml, while copper oxychloride, Udonkor, zineb, ziram, F 319 (3-hydroxy-5-methyl isoxazole) and anilazine were much less toxic, ziram being the least inhibitory with an EC50 of 214 microgram a.i./ml. Of 17 fungicides tested in the greenhouse as seed treatments, thiabendazole,

carbendazim, benomyl, thiophanate-methyl, dichlozoline and Ohric gave 80-90% control of damping-off of mungbean seedlings. A single soil drench with thiophanate-methyl and two drenches with benomyl gave about 90% disease control. More seedlings with R. solani infection survived when thiophanate-methyl was used as a post-inoculation soil drench than when benomyl or chloroneb were used. [AS]

***0507** Malhan, I. ; Tyagi, P.D. ; Grover, R.K. 1973. **Systemic activity of benomyl in urd bean (Phaseolus mungo L.).** ACTA PHYTOPATHOLOGICA ACADEMIAE SCIENTIARUM HUNGARICAE, v.8(3/4):295-300. [En] [En Abst] (REP.MB-0209)

Uptake of benomyl by germinating seeds and its subsequent translocation to roots, stems and leaves of blackgram (Vigna mungo) was studied by bioassay method using Rhizoctonia solani as the test organism. The fungitoxicant, when used as a seed treatment, first accumulated in a short time in the seed coat and then moved into the cotyledons. Later on the chemical was found in the roots, stems and leaves, maximum accumulation being in roots followed by stems and leaves. [AS]

***0508** Ranganathan, K. ; Jaganathan, T. ; Palanisamy, A. ; Narayanasamy, P. 1973. **Rhizoctonia root rot on blackgram, lab-lab and French bean.** MADRAS AGRICULTURAL JOURNAL, v.60(7):588. [En] (REP.MB-0317)

Blackgram, lablab bean and kidney bean were seriously affected by a collar rot disease during 1970-71. The pathogens isolated were identified as Rhizoctonia solani Kuhn. Further, the isolates were inoculated to Vigna mungo, Dolichos lablab, D. biflorus, Phaseolus vulgaris, V. radiata, Cicer arietinum, Glycine max, V. sinensis and Cajanus cajan. Though the isolates of R. solani produced similar diseases, there were some differences in the sclerotial size, number per unit area and also in pathogenicity. Among the host plants tested, V. radiata, V. sinensis, G. max and C. cajan are new hosts for this fungus. [THH]

***0509** Tseng, T.C. ; Lee, S.L. 1973. **Sclerotium rolfsii phosphatidase induced permeability change in mung bean (Phaseolus aureus) hypocotyls.** BOTANICAL BULLETIN OF ACADEMIA SINICA, v.14(1):41-47. [En] [En Abst] (REP.MB-0283)

Sclerotium rolfsii phosphatidase B was purified 100 fold by ammonium sulfate fractionation and DEAE cellulose chromatography. The purified enzyme was able to induce electrolyte leakage from mungbean hypocotyls. [AS]

***0510** Wu, L.C. 1973. **Changes in some enzymes of mung bean seeds germinated on mycelical macerates of Rhizoctonia solani.** PHYSIOLOGICAL PLANT PATHOLOGY, v.3(1):19-27. [En] [En Abst] (REP.MB-0147)

Two hours' exposure of mungbean seeds to an inoculum of Rhizoctonia solani Kuhn caused marked increases in phosphorylase and glutamate dehydrogenase activities in the cell-free extracts from inoculated seeds. Thereafter, the differences between the extracts from healthy and diseased mungbean seedlings in the activities of these two enzymes gradually diminished. In contrast,

aldolase activity declined in the infected plants during disease development, while glucose-6-phosphate dehydrogenase activity decreased at the beginning, then rose in the infected plant when the characteristic symptoms appeared on the mungbean hypocotyls. Although amylase activity in both healthy and diseased seedlings showed similar patterns, activity in the diseased plant was always higher than that in the healthy plant. The data suggest that in the early stages of attack by Rhizoctonia, the increased amount of reducing sugar present is caused by a marked reduction of carbohydrate metabolism due to the inhibition of aldolase and glucose-6-phosphate dehydrogenase activities accompanied by the enhanced activities of phosphorylase and amylase. In a later stage of infection, the rapid increase of glucose-6-phosphate dehydrogenase activity suggests that the hexose monophosphate pathway then plays a major role in carbohydrate metabolism in the diseased seedlings. [AS]

*0511 Jaganathan, T. ; Narayanasamy, P. ; Palanisamy, A. ; Ranganathan, K. 1974. **Studies on the damping-off disease of blackgram (Phaseolus mungo L.).** MADRAS AGRICULTURAL JOURNAL, v.61(6):156-159. [En] [En Abst] (REP.MB-0416)

A pathogen causing damping-off of blackgram (Vigna mungo) was identified as Pythium aphanidermatum. An in vitro host range study revealed that Cicer arietinum, Dolichos biflorus, D. lablab, Vigna radiata and Vigna sinensis could all be infected by the pathogen. [EMS]

*0512 Tseng, T.C. ; Chang, L.H. 1974. **Sclerotium rolfsii phosphatidase B. 1. Inhibition of mung bean mitochondrial oxygen uptake by the phosphatidase.** BOTANICAL BULLETIN OF ACADEMIA SINICA, v.15(1):8-13. [En] [En Abst] (REP.MB-0284)

Sclerotium rolfsii phosphatidase B, both crude and purified enzymes, was able to inhibit mungbean mitochondrial oxygen uptake. [AS]

*0513 Kataria, H.R. ; Grover, R.K. 1975. **Effect of chloroneb (1,4-dichloro-2,5-dimethoxy benzene) and pentachloronitro benzene on metabolic activities of Rhizoctonia solani Kuhn.** INDIAN JOURNAL OF EXPERIMENTAL BIOLOGY, v.13(3):281-285. [En] [En Abst] (REP.MB-1554)

Chloroneb and pentachloronitrobenzene (PCNB) inhibited 50% growth of R. solani at concentrations of 5.0 and 2.5 micromolar respectively. Chloroneb impaired O2 uptake and reduced mitochondrial and cytochrome c oxidase activities. PCNB did not inhibit mitochondrial activities but induced leakage of electrolytes from treated cells. Incorporation of 3H-thymidine and 14C-uracil were reduced by chloroneb only. It appears that chloroneb blocks electron transport chain, thus disturbing the entire metabolic machinery of cells while PCNB immobilizes R. solani primarily on account of disruption of semipermeable membrane and lysis of the cells. [AS]

*0514 Kataria, H.R. ; Grover, R.K. 1975. **Inhibition of infection structures of Rhizoctonia solani by fungitoxicants.** ZEITSCHRIFT FUR PFLANZENKRANKHEITEN UND PFLANZENSCHUTZ, v.82(4):226-232. [En] [En De Abst] (REP.MB-1312)

The ED50 for mycelial growth of Rhizoctonia solani was lowest in case of

PCNB (1.5 micromolar) followed by benomyl (2 micromolar), chloroneb (4 micromolar) and thiophanate-methyl (65 micromolar). Four fungitoxicants were found to be fungistatic. Formation of dome-shaped infection cushions on cotton threads soaked in variable concentration of four fungitoxicants was inhibited best by benomyl (2.5 micromolar) while higher concentrations were required of thiophanate-methyl (100 micromolar), chloroneb (10 micromolar) and PCNB (10 micromolar) for the same. On the other hand, when the roots of 5-day-old Vigna radiata seedlings were dipped in graded concentration of these fungitoxicants for variable lengths of time and subjected to invasion by R. solani, it was found that benomyl and thiophanate-methyl prevented the development of infection structures (cushions) on the hypocotyls of treated seedlings when these had received dip treatment at 250 micromolar for 30 min. Similar inhibition of cushion formation was obtained in case of chloroneb at 250 micromolar for 120 min or 500 micromolar for 60 min and PCNB at 500 micromolar for 240 min. Studies on inhibition of cushion formation on fungitoxicant treated seedlings could be correlated with the level of control of R. solani root rot and damping-off in pot culture tests when these fungitoxicants were used as seed treatment. [AS]

***0515** Purkayastha, R.P. 1975. **Influence of colchicine on the disease susceptibility of gram seedlings to Fusarium orthoceras.** SCIENCE AND CULTURE, v.41(11):546-547. [En] (REP.MB-2459)

Seed treatments with 0.25% colchicine increased the susceptibility of chickpea and blackgram to Fusarium orthoceras. [THH]

***0516** Sharma, O.P. ; Tiwari, A. ; Kulkarni, S.N. 1975. **Effect of seed treatment with systemic and non-systemic fungicides on the control of seedling blight of mung (Phaseolus aureus) caused by (Rhizoctonia solani).** INDIAN PHYTOPATHOLOGY, v.28(1):114-115. [En] (REP.MB-0678)

Seedling blight symptoms caused by Rhizoctonia solani in mungbean are described. Out of seven fungicides used as seed treatment for control of the disease, benomyl was the best. [EMS]

***0517** Dublish, P.K. ; Pande, P.C. 1976. **Effect of culture filtrates of certain rhizosphere fungi on seed germination and seedling growth of Phaseolus mungo Linn., Luffa cyclindrica M. Roem. and Cucumis sativus Linn.** BANGLADESH JOURNAL OF BOTANY, v.5(1/2):39-42. [En] [En Abst] (REP.MB-1723)

Bioassay tests of the culture filtrates of common rhizosphere fungi were performed to study their phytotoxic or promoting effects on germination percentage, speed of germination index and length of seedlings of Vigna mungo, Luffa cylindrica and Cucumis sativus. The culture filtrates of Cladosporium herbarum and Trichoderma lignorum had a marked adverse effect on percentage germination of test seeds while Aspergillus niger and Fusarium oxysporum reduced the root and shoot growth of some of the crops. Percentage germination and speed of germination index was definitely promoted by some of the fungi. [AS]

***0518** Huang, C.S. ; Mew, I.P. ; Yang, C.Y. 1976. **Screening for varietal**

resistance to Rhizoctonia damping-off in mungbean and other legumes. PLANT PROTECTION BULLETIN (R.O.C.), v.17(4):8. [Ch] (REP.MB-0739)

One hundred accessions of bean species, including 92 mungbean and two blackgram accessions were screened for damping-off due to Rhizoctonia sp. both in the field and in the greenhouse. Four mungbean accessions were identified as resistant in the field trial and six accessions in the greenhouse. Only one accession was resistant in both tests. [EMS]

*0519 Kataria, H.R. ; Grover, R.K. 1976. **Fungitoxicity of mineral oils against Rhizoctonia solani causing damping-off of mung bean (Phaseolus aureus).** ANNALS OF APPLIED BIOLOGY, v.83:79-85. [En] [En Abst] (REP.MB-2659)

Three mineral oils, BSO, EWOS and E9267 and one vegetable oil (mustard oil), did not appreciably inhibit the mycelial growth of Rhizoctonia solani. However, treatment of 100 g seeds of mungbean with 2 ml EWOS and E9267 oils controlled more than 90% of the pre- and post-emergence damping-off and protected seedlings in soil inoculated with R. solani 5 days after sowing. Soaking seeds in solutions of these oils or drenching the soil did not control damping-off. Mustard oil controlled only pre-emergence damping-off. [AS]

*0520 Suhag, L.S. 1976. **Fungal flora of moong (Phaseolus aureus) seeds: pathology and control.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.5:165-168. [En] [En Hi Abst] (REP.MB-2410)

The fungi isolated from mungbean seeds were Alternaria tenuis, Aspergillus nidulans, Cladosporium fulvum, Curvularia lunata, Fusarium sp., Rhizoctonia bataticola, Rhizopus nigricans and some unidentified isolates. Species of Alternaria, Cladosporium, Fusarium and Rhizoctonia were found to cause seed deterioration, loss of germination and development of disease on emerged seedlings. Out of 9 fungicides tried, Agallol, Ceresan, captan and thiram proved better in reducing the number of associated fungi and in promoting the germination of seeds. [AS]

*0521 Arora, Y.K. ; Bajaj, K.L. 1977. **Effect of Ethrel on the phenolics of mung (Phaseolus aureus) infected by Rhizoctonia solani.** ACTA PHYTOPATHOLOGICA ACADEMIAE SCIENTIARUM HUNGARICAE, v.12(3/4):269-271. [En] [En Abst] (REP.MB-1872)

Infected hypocotyls of Vigna radiata were treated with 50 ppm of Ethrel. Samples were taken at 24, 48, 72 and 96 hours interval. Total phenolic contents were determined at each interval and compared with those of infected samples. Ethrel treatment resulted in about two-fold increase in the total phenolic contents. [AS]

*0522 Chohan, J.S. ; Kaur, J. 1977. **Cultural studies on Rhizoctonia bataticola causal agent of root rot of sunflower.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.6:140-144. [En] [En Hi Abst] (REP.MB-2429)

Cultural studies on four isolates of Rhizoctonia bataticola, viz., RB-1, RB-2, and RB-3 from sunflower, and RB-4 from blackgram (Vigna mungo) indicated

that RB-2 was relatively slow-growing and the mean size of sclerotia of RB-2 was also the lowest. All the isolates were pathogenic on all the varieties of sunflower tested. Host-range studies showed that RB-1, RB-2 and RB-3 were highly aggressive on brinjal, cotton and blackgram (Vigna mungo) whereas they were non-aggressive on maize and groundnut; all the isolates were slightly to highly aggressive on bhindi, bittergourd, sarson and cowpeas. Isolate RB-1 grew the best at 30 C. Plants advanced in age were severely infected. The November-sown crop was severely affected as compared with the March-sown crop. Sclerotia within the tissue were inactivated at 50 C for 10 minutes. [AS]

*0523 Grover, R.K. ; Chopra, B.L. 1977. **Seed, soil and foliage treatments with carboxin and oxycarboxin for control of Rhizoctonia species and their toxicity to other fungi.** PESTICIDES, v.11(9):38-41. [En] [En Abst] (REP.MB-2470)

Root rot of Vigna mungo caused by Rhizoctonia solani and of Abelmoschus esculentus caused by R. bataticola were effectively controlled by carboxin when used as seed treatment. Oxycarboxin seed treatment was effective in controlling R. bataticola only. Some downward translocation of carboxin was observed 6 days after foliage spraying. Soil drenching was not effective in controlling the root rots by either of the fungitoxicants. Among the nineteen species of fungi including four isolates of R. solani tested against carboxin and oxycarboxin, it was found that carboxin was inhibitory to Cladosporium fulvum, C. oxysporum and Colletotrichum capsici, besides Rhizoctonia species at 1-10 microgram/ml. Carboxin was most inhibitory to C. oxysporum only. Differential tolerance to carboxin was exhibited by different isolates of R. solani. [AS]

*0524 Ilag, L.L. ; Marfil, V.E. 1977. **Diplodia pod rot of mungbean.** PHILIPPINE AGRICULTURIST, v.61(5/6):186-191. [En] [En Abst] (REP.MB-2007)

A hitherto unreported disease of mungbean (Vigna radiata) in the Philippines is described. The disease is characterized by the rotting of pods. The initial symptom is a soft rot which progresses rapidly causing the entire pod to collapse within 5-7 days. The infected pod later darkens and hardens. The disease is caused by Diplodia natalensis Pole Evans. Among ten mungbean varieties that were tested for resistance to the disease, three were moderately resistant, one was moderately susceptible and the rest were susceptible. In inoculation experiments conducted under controlled conditions, the fungus also infected cowpea (V. sinensis), garden bean (P. vulgaris) and sitao (V. sinensis Savi x V. sesquipedalis). [AS]

*0525 Arora, Y.K. ; Bajaj, K.L. 1978. **Phenolic changes in mung (Phaseolus aureus) infected by Rhizoctonia solani.** ACTA PHYTOPATHOLOGICA ACADEMIAE SCIENTIARUM HUNGARICAE, v.13(3/4):337-341. [En] [En Abst] (REP.MB-2201)

Mungbean (Vigna radiata) hypocotyls infected by Rhizoctonia solani were analysed for qualitative and quantitative changes in phenols. The healthy tissues contained larger quantities of total phenols than the inoculated ones. In the inoculated tissues there appeared two new compounds. Tentative identification of the phenolic compounds has also been reported. [AS]

*0526 Rath, G.C. ; Routray, G.N. 1978. **Internally seed transmitted diseases of moong and urid.** SCIENCE AND CULTURE, v.44(1):40-41. [En] (REP.MB-2408)

Four pathogens, viz., Alternaria tenuis, Macrophomina phaseoli, Fusarium equiseti and Colletotrichum truncatum, were found in mungbean and blackgram seeds. [THH]

*0527 Jalali, I. ; Grover, R.K. 1979. **Uptake of chloroneb by urd bean and its use as seed treatment for disease control.** INDIAN PHYTOPATHOLOGY, v.32(4):564-567. [En] [En Abst] (A:PS)

Chloroneb was absorbed by the germinating seeds of Vigna mungo and moved systemically to growing plant parts. Maximum accumulation was in the roots followed by stem and leaves in 12 day old seedlings. In the disease control studies chloroneb was found effective against the root rot caused by Rhizoctonia solani. [THH]

*0528 Saxena, R.M. ; Sinha, S. 1979. **Field mycoflora of Vigna radiata (L.) Wilczek var. radiata and Vigna mungo (L.) Hepper in relation to pre-emergence and post-emergence mortalities.** SEED RESEARCH, v.7(2):159-164. [En] [En Abst] (REP.MB-2638)

Species of Aspergillus, Ascotricha, Botrytis, Curvularia, Chaetomium, Colletotrichum, Cercospora, Drechslera, Fusarium, Helminthosporium, Macrophomina, Mucor, Myrothecium, Nigrospora, Penicillium, Phoma, Pleospora, Trichothecium and Verticillium are associated with the seeds of Vigna radiata (L.) and V. mungo (L.). Under glasshouse conditions, the test organisms produced five main types of mortality symptoms, viz., inhibition of seed germination, seed rot, radicle necrosis, seedling necrosis and damping off of seedlings. [AS]

*0529 Scholefield, S.M. ; Griffin, M.J. 1979. **Charcoal rot (Macrophomina phaseolina) on mung bean.** PLANT PATHOLOGY, v.28(3):155-156. [En] (A:PS)

A sample of mungbean sprouts with about 1 cm long blackish lesions was found infected with Macrophomina phaseolina. When a seed sample obtained from the same producer was examined, M. phaseolina was recovered from about 2% of the seeds. It seems that the outbreak of charcoral rot on mungbean sprouts originated from infected imported seed. [THH]

*0530 Reddy, M.R.S. ; Subbayya, J. 1981. **Macrophomina phaseolina on seed health of blackgram (Phaseolus mungo L.).** CURRENT RESEARCH, v.10(4):58. [En] (REP.MB-2675)

Black rot of blackgram (Macrophomina phaseolina) initiates as small discoloured spots at the hypocotyl region, which gradually shrinks and becomes black. This extends on either side to the plumule and radicle and leading to collapse of the seedlings. Among five fungicides tried in vitro, Benlate, thiram, Ceresan and Vitavax were found highly effective in preventing colonization of seed with the fungus. [THH]

***0531** Hooda, I. ; Grover, R.K. 1982. **Studies on different isolates, age and quantity of inoculum of Rhizoctonia bataticola in relation to disease development in mung bean.** INDIAN PHYTOPATHOLOGY, v.35(4):619-623. [En] [En Abst] (A:PS)

Isolates of Rhizoctonia bataticola obtained from different plant species and plant parts of the same host differed in their morphological and cultural characteristics. However, there was no correlation between these characteristics and their pathogenicity on mungbean. Young inoculum (3-5 day old) was more infective than the old one (7-34 day old). Disease intensity increased with increasing inoculum concentration. [AS]

***0532** Kush, A.K. 1982. **Interaction between symbiosis and root pathogenesis in green gram (Vigna radiata L. Wilczek).** PLANT AND SOIL, v.65(1):133-135. [En] [En Abst] (A:PS)

A pot experiment, using cowpea Rhizobium and 1% inoculum of Rhizoctonia bataticola (Taub.) Butler was carried out on mungbean (Vigna radiata cv. PS 16) to study the interaction between symbiosis and root rot in terms of plant growth and nitrogen fixation. The microtomy of the infected roots showed distortion of the outer layers of root as a possible cause for antagonistic interaction of these two bio-processes. [AS]

***0533** Nik, W.Z. ; Janggu, N. 1982. **Studies of Rhizoctonia solani Kuhn on mungbean (Vigna radiata (L.) Wilczek).** MALAYSIAN APPLIED BIOLOGY, v.11(2):103-110. [En] [En Abst] (A:PS)

A study on some aspects of the pathogenicity and control of three isolates of Rhizoctonia solani Kuhn (the imperfect state of Thanatephorus cucumeris (Frank) Donk) has been investigated. Isolates of Rhizoctonia were taken from infected root, leaf and the seed of mungbean cv., U Thong. Isolates from root and leaf were found to be highly pathogenic and virulent to mungbean, causing severe pre- and post-emergence damping off, and pod rot. However, the dry weights of plants inoculated with the three isolates of the fungus differ significantly. An in vitro study of the efficacy of fungicides showed that Brassicol gave the best inhibition of growth of Rhizoctonia, followed by Thiram, captan, and Busan. LS 74-783 was found to be least effective. [AS]

***0534** Bains, S.S. ; Jhooty, J.S. 1983. **Sensitivity to fungitoxicants, cultural behaviour and pathogenicity of Rhizoctonia solani isolates naturally occurring in Punjab.** INDIAN JOURNAL OF ECOLOGY, v.10(2):274-278. [En] [En Abst] (REP.MB-2602)

Rhizoctonia solani isolates varied in their response to systemic and non-systemic fungitoxicants. No single chemical was equally effective against all isolates. An isolate least pathogenic to different crops was the least sensitive to systemic and non-systemic fungitoxicants. This isolate was distinct in colour and in site of sclerotia formation in Petri plates on potato dextrose agar. Another isolate with a narrow host-range was also less sensitive to fungitoxicants but had sclerotial characters similar to other isolates. There was no relation among growth rate, hyphal thickness, level of sclerotia formation and pathogenicity of different isolates. On an average, benomyl and quintozene from systemic and non-systemic fungitoxicants respectively were most

effective against R. solani. [AS]

***0535** Elazegui, F.A. ; Mew, T.W. 1983. **Comparative effects of fungicides on pre-emergence damping-off of grain legumes caused by Rhizoctonia solani, Sclerotium rolfsii and Pythium debaryanum.** TROPICAL GRAIN LEGUME BULLETIN, no.27:2-7. [En] (A:PS)

Seed treatment experiments were carried out in the greenhouse to find suitable fungicides to protect damping-off of mungbean, soybean and cowpea seedlings. In the trial on Rhizoctonia damping-off. PCNB + thiadiazole proved most promising. On the two Sclerotium damping-off trials, Carboxin + captan was the most effective. For control of damping-off caused by P. debaryanum, the most effective fungicides were CGA 48988 and Orthocide RE-26745. [THH]

***0536** Hooda, I. ; Grover, R.K. 1983. **Nutritionally mediated virulence of Rhizoctonia bataticola on mung bean (Vigna radiata).** INDIAN PHYTOPATHOLOGY, v.36(4):662-666. [En] [En Abst] (A:PS)

The virulence of Rhizoctonia bataticola inoculum in causing seedling mortality and leaf blight of mungbean (Vigna radiata) was pre-conditioned by the nutritional status of the substrate medium. Glucose and sucrose as carbon sources increased the virulence as well as mycelial growth of the fungus. Among nitrogen sources, asparagine significantly increased the virulence of the inoculum. So was the case when the medium was devoid of bivalent metal ions, viz., Fe^{++} Zn^{++} and Mg^{++}. Addition of Fe^{++} and Mg^{++} individually or in combination with Zn^{++} to the medium produced inoculum of low virulence. [AS]

***0537** Charya, M.A.S. ; Reddy, S.M. 1984. **Inhibition of production of pectic enzymes of Phoma exigua, seed-rot fungus of Vigna radiata.** INDIAN PHYTOPATHOLOGY, v.37(3):537-539. [En] (A:PS)

The influence of gibberellic acid, yeast extract, Catechol, gallic acid, Antracol, and Panoctine on in vitro production of pectolytic enzymes by Phoma exigua was investigated. All those substances more or less inhibited all enzymes (PG, PMG, PAL, and PL) except yeast extract which enhanced exo-PMG production. The inhibitory action of the two phenols and two fungicides increased with increased concentration. [EMS]

***0538** Anderson, T.R. 1985. **Root rot and wilt of mung bean in Ontario.** CANADIAN PLANT DISEASE SURVEY, v.65(1):3-5. [En] [En Fr Abst] (A:PS)

Root rot and wilt of mungbean caused severe losses in a field and a nursery in 1979 and 1980. Root rot was prevalent during the early growing season on clay soil. Wilt occurred during the flowering and late pod filling stages on clay and sandy soil. Rhizoctonia solani, Thielaviopsis basicola, Fusarium oxysporum and a Fusarium sp. isolated from diseased plants were evaluated for pathogenicity in the greenhouse. R. solani and T. basicola caused distinct lesions on roots and lower stems similar to those observed in the field. F. oxysporum and Fusarium sp. were non-pathogenic in greenhouse experiments. [AS]

***0539** Tsuchiya, S. ; Yanagawa, M. ; Ogoshi, A. 1986. **Formae speciales differentiation of Phytophthora vignae isolates from cowpea and adzuki bean.** PHYTOPATHOLOGICAL SOCIETY OF JAPAN, ANNALS, v.52(4):577-584. [En] [En Ja Abst] (A:PS)

The pathogenicity of 17 isolates of Phytophthora vignae Purss from Phaseolus radiata var. aurea [Vigna radiata] and 4 isolates from cowpeas was compared. Isolates from V. radiata were virulent to V. radiata, but not to cowpeas, while isolates from cowpeas were virulent to cowpeas, but not to V. radiata. The soluble proteins and isoenzymes patterns of these isolates, compared by zone electrophoresis, showed no qualitative differences between V. radiata and cowpea isolates. Although the pathogens of both V. radiata and cowpeas have been treated as P. vignae, two formae specialis are proposed for these two fungi on the basis of their specific pathogenicity: P. vignae f.sp. adzukicola Tsuchiya, Yanagawa et Ogoshi for the former and P. vignae f.sp. vignae Tsuchiya, Yanagawa et Ogoshi for the latter. Furthermore, from differences in pathogenicity to six cultivars of V. radiata, three races (1, 2 and 3) were recognized within f.sp. adzukicola. [AS/THH]

- Rusts and Anthracnose

***0540** Pavgi, M.S. ; Mukhopadhyay, A.N. 1965. **Anthracnose of butterfly pea.** JOURNAL OF PHYTOPATHOLOGY, v.53(2):167-173. [En] [En De Abst] (REP.MB-2387)

Vigna mungo is a host of Colletotrichum dematium which caused an anthracnose disease on an herbaceous medical plant (Clitoria ternatea Linn.). [THH]

***0541** Kannaiyan, S. ; Rao, A.V. 1974. **Fungicidal control of rust disease of blackgram : mung.** AGRICULTURAL RESEARCH JOURNAL OF KERALA, v.12(1):72-73. [En] (REP.MB-1664)

Six fungicides were tested against rust of blackgram - Uromyces appendiculatus. Only one spraying was given at 45th day after sowing. All fungicides reduced the disease incidence; they were, in order of decreasing efficacy: sulfur dust, Benlate, E.L. 273, thiram, Vitavax, and wettable sulfur. [EMS]

***0542** Ilag, L.L. 1977. **Mungbean rust in the Philippines: symptomatology and etiology.** KALIKASAN: THE PHILIPPINE JOURNAL OF BIOLOGY, v.6(3):199-202. [En] [En Abst] (REP.MB-2401)

The symptoms and causal fungus of rust on mungbean [Vigna radiata (L.) Wilczek] in the Philippines are described. The disease is characterized by the presence on the leaves of lesions that are pinhead in size and are cinnamon brown due to the uredinia of the pathogen, Uromyces vignae Barcl. Each lesion is usually surrounded by a yellow halo. Severely infected leaves often dry up prematurely and fall off. [AS]

*0543 Tripathi, H.S. ; Beniwal, S.P.S. 1977. **Anthracnose of urdbean caused by Colletotrichum capsici.** INDIAN PHYTOPATHOLOGY, v.30(2):273-274. [En] (REP.MB-1910)

A leaf spot disease fungus on blackgram was identified as Colletotrichum capsici (Syd.) Butler and Bisby (IMI 206847). [EMS]

*0544 Magallon, R.D. ; Franje, N.S. 1979. **Response of improved mungbean varieties to different levels of inoculum concentration of Colletotrichum lindemuthianum [Abst.].** PHILIPPINE PHYTOPATHOLOGY, v.15:105. [En] (A:PS)

MEETING: Annual Meeting of the Philippine Phytopathology Society, 16th -- Manila, Philippines, May 2-5, 1979

MG 50-10A, CES 35, CES 14, and ARV 20 were the varieties used in the experiment. Among the five varieties only ARV 20 reacted as moderately resistant. CES 14, though susceptible to anthracnose gave the highest average grain yield of 180.37 g per plot of sq. m at varying inoculum level. CES 35 gave the least average yield with only 77.78 g/plot. Decrease of functional leaf area, premature drying of leaves and pod abortion caused the reduction in yield. The control plants (not inoculated) gave the highest average number of pods/plant, number of seeds per pods, plant height and grain yield/plot while the plants inoculated with the highest inoculum density gave the least. Reduction yield due to the disease was directly proportional to the inoculum level. [AS]

*0545 Vallente, L.M. ; Franje, N.S. 1982. **Incidence of anthracnose disease (Colletotrichum lindemuthianum) on mungbean as influenced by plant population density.** CMU JOURNAL OF AGRICULTURE, FOOD AND NUTRITION, v.4(4):338-358. [En] [En Abst] (A:PS)

Two mungbean varieties, M-576 and CES-87 exhibited different reactions to anthracnose. In both varieties, plant population density affected plant height at different stages of crop development. The height of the plant increased with increasing planting densities. Among the two varieties evaluated, CES-87 was more susceptible to the disease than M-576. The number of pods/plant differed between varieties and planting densities. The higher number of pods was obtained from planting densities of 15, 20, 25 and 30 plants/linear meter in both varieties. Likewise, number of seeds/pod varied at different plant population densities. The occurrence of anthracnose increased with increasing densities; however, differences in varietal characteristics contributed much to the susceptibility and resistance of the crop. Regardless of the variety used, the yield of mungbean was observed to increase with increasing densities up to 30 plants/linear meter. [AS/EMS]

*0546 Muthusamy, S. ; Ragupathy, N. 1983. **Efficacy of fungicides in the control of blackgram rust.** MADRAS AGRICULTURAL JOURNAL, v.70(5):345-346. [En] (A:PS)

Eight fungicides were tested against blackgram rust (Uromyces appendiculatus). Baycor 200 EC (750 ml/ha) was significantly superior to the other treatments with 98.8% reduction in rust incidence and also gave a marked increase in yield. [THH]

- **Mungbean Scab**

***0547** Nattrass, R.M. 1941. **Plant diseases in Kenya during 1940.** EAST AFRICAN AGRICULTURAL JOURNAL OF KENYA, TANGANYIKA, UGANDA AND ZANZIBAR, 7(1):57. [En] (REP.MB-2452)

During 1940, scab, caused by Elsinoe phaseoli, appeared for the first time in Kenya on mungbean. The leaves, stems and pods of the plant were seriously infected. [THH]

***0548** Kajiwara, T. ; Mukelar, A. 1976. **Mung bean scab caused by Elsinoe in Indonesia.** CONTRIBUTIONS CRIA, no.23:1-12. [En] [En In Abst] (REP.MB-2226)

A fungus "scab" disease of mungbean occurred in Bogor, Indonesia. The disease seriously affected leaves, stems, and pods of most native mungbean varieties, including Indonesian improved and promising varieties. Symptoms of the disease, including morphology and pathogenicity of the pathogen, are examined and discussed. The pathogen is identified as Elsinoe iwatae, a new species. [AS]

***0549** Mukelar, A. ; Sudjadi, M. ; Kajiwara, T. 1976. **Effects of fungicides to mung bean scab.** LAPORAN KEMAJUAN PENELITIAN SERI HAMA/PENYAKIT (RESEARCH PROGRESS REPORT), no.3:102-104. (REP.MB-2062)

Seven fungicides were tested against mungbean scab (Elsinoe sp.). The fungicides were applied 4 times at 10 days intervals. The three best fungicides were Topsin M, Bavistin and Benlate. maneb, captan, and Daconil were also effective, but far less than the first three. Sicarol was ineffective. [EMS]

***0550** Mukelar, A. ; Sudjadi, M. ; Kajiwara, T. 1976. **Chemical control for mung bean scab.** CONTRIBUTIONS CRIA, v.24:1-7. [En] [En In Abst] (REP.MB-2227)

Severe mungbean scab, caused by Elsinoe iwatae, occurred in Bogor, Indonesia. A field test of chemical control of the disease was done in the wet season of 1974/1975 at the Cikeumeuh Substation, CRIA. Of chemicals applied, Topsin M 70WP, Bavistin 50WP, and Benlate 50WP were very effective in controlling mungbean scab. The disease ratings of scab were decreased significantly by four applications of these fungicides and the yield of plots receiving these fungicides was increased by about 2.5 times that of the control. [AS]

***0551** Kajiwara, T. ; Mukelar, A. 1977. **Occurrence of mung bean scab in Indonesia.** LAPORAN KEMAJUAN PENELITIAN SERI HAMA/PENYAKIT (RESEARCH PROGRESS REPORT), no.8:26-29. [In] [En Abst] (REP.MB-1879)

The paper describes a fungus disease of mungbean, which is identified as scab due to Elsinoe sp. The pathogen is very similar to Elsinoe canavaliae, previously reported on sword bean (Canavalia gladiata), but cross-inoculation

tests have yet to be performed to establish the identity of the two fungi. [EMS]

*0552 Amir, M. 1978. **Mungbean scab in Indonesia.** IN: The 1st International Mungbean Symposium. Shanhua : AVRDC. p.161-164 [En] (SB205.M8I5)

MEETING: International Symposium on Mungbean, 1st -- Los Banos, Philippines, Aug 16-19, 1977

Scab of mungbean, due to Elsinoe iwatae, causes lesions on leaves, leaf stalks, stems, and pods. When plants are severely infected young leaves curl and plants stunt. The disease caused yield loss of about 60%. The pathogen has a restricted host range, it is only severe on mungbean, and weakly pathogenic on hyacinth bean and adzuki bean. All mungbean commercial cultivars, including improved Indonesian lines are susceptible; however, an intensive screening program has revealed some sources of resistance. Three selected fungicides, Thiophanate, Bavistin and Benlate are effective in controlling the disease. [EMS]

*0553 Anonymous [n.d.]. **Scab of mung bean.** IN: Report of Japan-Indonesia joint food crop research program (Oct 1970-Oct 1975). Tokyo : Japan International Cooperation Agency. p.117-124 [En] (REP.MB-2798)

This paper gives a detailed description of a new species of Elosinoe, which was identified as the causal fungus of mungbean scab in Indonesia, which was given the name E. iwatae. Bavistin, Benlate, and Topsin M are very effective in controlling this disease. [EMS]

- Seed-Borne Fungi and Stored Fungi

*0554 Lambat, A.K. ; Neergaard, P. 1970. **Seed-borne fungi of cowpea and mung.** IN: Proceedings [of the] fourth workshop on pulse crops. New Delhi : Indian Council of Agricultural Research. p.192. [En] (REP.MB-1457)

MEETING: Workshop on Pulse Crops, 4th -- Ludhiana, India, Apr 7-10, 1970

Seeds of cowpea and mungbean were tested for seed borne fungi by blotter test according to the recommendations of the International Seed Testing Association. Fourteen different fungi were found associated with cowpea seeds. Out of these, Alternaria longissima, Curvularia aragrostidis, Drechslera tetramere, Fusarium semitectum, F. scirpi and F. moniliforme are new records on this host. Eight different fungi were detected on the mungbean seeds and four of them namely, D. tetramera, D. rostrata, F. moniliforme and F. equaeti are new records. [AS]

*0555 Nath, R. ; Mathur, S.B. ; Neergaard, P. 1970. **Seed-borne fungi of mungbean (Phaseolus aureus Roxb.) from India and their significance.** INTERNATIONAL SEED TESTING ASSOCIATION, PROCEEDINGS, v.35(1):225-241. [En] [En Fr De Abst] (REP.MB-1370)

Seed washings of a seed lot of mungbean revealed conidia of Alternaria tenuis, Curvularia lunata, Drechslera rostrata, Fusarium equiseti and F. semitectum. Normal seeds were green, well filled and germinated well. Normal but slightly pale seed were found infected with D. rostrata, F. equiseti and M. phaseoli, Grey to brown, wrinkled and badly deformed seeds were heavily infected by F. equiseti. In using the blotter and agar plate procedures a large number of fungi, namely Alternaria tenuis, Botryodiplodia palmarum, Cercospora kikuchii, Choanephora sp., Colletotrichum truncatum, Corynespora cassiicola, Curvularia lunata, Diaporthe phaseolorum var. sojae, Drechslera rostrata, Fusarium equiseti, F. moniliforme, F. semitectum, F. solani, Macrophomina phaseoli, and Myrothecium roridum were found. F. equiseti and M. phaseoli were the predominant fungi. Only M. phaseoli is reported to attack Vigna radiata in the field. All the other fungi isolated from the seed are new records of pathogens for mungbean. In infection experiments Cercospora kikuchii, Colletotrichum truncatum, Corynespora cassiicola, and Myrothecium roridum caused serious leaf spotting in mungbean. In soil inoculation experiments Botryodiplodia palmarum, Fusarium equiseti and Macrophomina phaseoli were the most severe parasites producing seed rot and seedling blight. Diaporthe phaseolorum var. sojae, F. moniliforme and F. solani also reduced seed germination, while Myrothecium roridum had no effect on germination of seeds. Seedlings, however, suffered a severe collar rot. [AS/THH]

***0556** Husain, S.S. ; Ahmad, M.A. 1971. **Studies on stored food grain fungi. Part 4. Fungi from pulses.** PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH, v.14(6):507-511. [En] [En Abst] (REP.MB-2471)

The present investigation relates to the microorganisms infesting certain pulses like Cyamopsis psoralioides DC (Guara), Vigna mungo Hepper (blackgram), V. radiata Wilczek (mungbean), Cajanus indicus Spreng (Arhar), Lens esculenta Moench (Masoor), Cicer arietinum L. (Desi chana), and Cicer arietinum L. (Kabuli chana). Thirty-six species belonging to sixteen genera were isolated from the above-mentioned pulses. Fungi Imperfecti was the most dominant group with an occurrence of 86%. The genus Aspergillus was most frequent in contributing 12 species with a total prevalence of 60%. A. flavus, among the species of Aspergillus accounted for maximum damage 24%. Cicer arietinum (Desi chana) was the most heavily infested pulse with an infestation of 98% of the samples investigated while V. radiata was the least infested pulse with an infestation of 45% of the samples studied. [AS]

***0557** Agarwal, V.K. ; Mathur, S.B. ; Neergaard, P. 1972. **Some aspects of seed health testing with respect to seed-borne fungi of rice, wheat, blackgram, greengram and soybean grown in India.** INDIAN PHYTOPATHOLOGY, v.25:91-100. [En] [En Abst] (REP.MB-1326)

Seeds of rice, wheat, blackgram, mungbean and soybean when tested for seed-borne fungi by the blotter and the agar plate method, were found to be associated with a range of fungi including some important pathogens known to cause diseases of economic importance. The blotter method proved better than the agar plate method for most of the fungi. The three different incubation conditions (20 C NUV, 28 C NUV and 28 C DL) proved equally effective. Pretreatment with NaClO (2% available chlorine) in the agar plate method reduced the percentage incidence of some pathogens. Thiram or captan as seed treatment did not control the fungi completely although reduced seed-borne fungi sufficiently. Thiram is not 100% fungicidal in action but acts also as a

fungistatic against some pathogens. Higher counts of seed-borne fungi were detected from discoloured seeds of rice than from those of normal colour. Alternaria triticina was also found to be associated with normal healthy seeds. Shrivelling in case of cultivar Jalgaon-781 of mungbean was not found to be associated with seed-borne fungal infection. [AS]

***0558** Singh, Iqbal ; Chohan, J.S. 1973. **Seed borne fungi in greengram (Phaseolus aureus) in the Punjab.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.3(2):199. [En] (REP.MB-1562)

Seed-borne fungi of mungbean were detected by standard blotter and agar method. The fungi found were Aspergillus flavus, A. niger, Chaetomium olivaceus, Fusarium oxysporum, Penicillium chrysogenum, Rhizopus arrhizus, Rhizoctonia bataticola, and Sporotrichum sp. Fungi of pathogenic capabilities are discussed. [THH]

***0559** Bilgrami, K.S. ; Prasad, T. ; Jamaluddin ; Roy, A.K. 1976. **Studies on the deterioration of some pulses by fungi.** INDIAN PHYTOPATHOLOGY, v.29(4):374-377. [En] [En Abst] (REP.MB-1906)

A large number of fungi were found to be associated with the seeds of mungbean (Vigna radiata Wilczek) and blackgram (V. mungo Hepper) in storage. The frequency of occurrence of A. flavus was the highest. This fungus caused a loss in weight of the seeds and it also changed sugar, amino acid and organic acid constituents of the seeds. In general there was a loss in sugar and amino acid contents but few amino acids and organic acids were synthesized by A. flavus during deterioration of seeds. [AS]

***0560** Tandon, R.N. 1976. **Achaetomium: a new record of seed-borne pathogen of Phaseolus aureus.** INDIAN PHYTOPATHOLOGY, v.29(4):464-465. [En] (REP.MB-1905)

A fungus isolated from the sterilized seeds and the cotyledons was identified as Achaetomium strumarium. The pathogenicity test indicated that 58% seedlings showed the symptoms of pre-emergence and post emergence seedling rot and seedling blight. [THH]

***0561** Vidhyasekaran, P. ; Arjunan, G. 1976. **Fungicide treatments of blackgram seeds for the control of storage fungi.** MADRAS AGRICULTURAL JOURNAL, v.63(5/7):393-395. [En] (REP.MB-1768)

Blackgram seeds treated with five fungicides were stored for several months. Up to the initial storage period of three months, the effect of fungicide treatments on the yield potential of the stored seeds was not exhibited. But thiram and captan treatments maintained the potential for five months or more, while that of seeds treated with other fungicides or untreated, declined markedly. [AS]

***0562** Khan, A.L. ; Alam, K.B. ; Talukdar, M.J. 1977. **Seed-borne fungi of**

pulses in Bangladesh. BANGLADESH JOURNAL OF AGRICULTURE, v.2(1):163-166. [En] [En Abst] (REP.MB-2014)

Fungi associated with the seeds of eight pulse crops viz., blackgram, gram, khesari, lentil, mungbean, pea, pigeon pea and soybean collected in 1976 from Dacca, Jessore and Pabna districts were detected. A total of 34 fungi representing 23 genera, was recorded. The important pathogenic fungi encountered were Botryodiplodia theobromae, Botrytis cinerea, Cercospora sp., Colletotrichum dematium, C. graminicola, C. lindemuthianum, Fusarium moniliforme, F. oxysporum. F. solani, Macrophomina phaseolina and Rhizoctonia solani. Importance of seed health of pulses has been emphasized. [AS]

***0563** Saxena, R.M. ; Sinha, S. 1977. **Seed-borne infections of Vigna mungo in Uttar Pradesh.** INDIAN PHYTOPATHOLOGY, v.30(4):582-583. [En] (REP.MB-2090)

Three unreported fungal diseases were observed in mungbean fields in Uttar Pradesh. Ascotricha chartarum, Colletotrichum truncatum and Fusarium semitectum were identified as the causal agents. Symptoms induced by these fungi are described. The fungi are seed-transmitted. [THH]

***0564** Singh, Iqbal ; Chohan, J.S. 1977. **Seed borne fungi in black gram (Phaseolus mungo) in the Punjab.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.6:80. [En] (REP.MB-2413)

Seed-borne fungi of blackgram were detected by standard blotter and agar method. Fungi were Aspergillus niger, Curvularia sp., Fusarium equiseti, F. oxysporum, Penicillium crustosum and Phoma glomerata. Reduction in seed germination and seedling vigour resulted from infection with some of these fungi. [THH]

***0565** Suhag, L.S. ; Suryanarayana, D. 1977. **Some aspects of seed health testing with respect to seed borne fungi of pulse crops grown in Haryana.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.6:32-36. [En] [En Hi Abst] (REP.MB-2414)

Seeds of blackgram, masoor and moth were found associated with a range of fungi including some important pathogens. The blotter method proved better than the agar and moist sand methods for detecting all the isolated fungi. Some of the seed borne fungi, viz., the species of Alternaria, Cladosporium, Macrophomina, and Fusarium on artificial inoculation reduced the vigour and viability of seeds. Out of the 4 fungicidal seed treatments, none eliminated the seed borne fungi completely; however, the number of fungi were reduced. [AS]

***0566** Bilgrami, K.S. ; Sinha, R.K. ; Prasad, T. 1978. **Effect of fungal flora on the seed contents of moong.** INDIAN PHYTOPATHOLOGY, v.31(4):476-479. [En] [En Abst] (REP.MB-2179)
(NOTE: Abstract was presented at the 30th Annual Meeting of Indian Phytopathological Society)

Quantitative changes in protein, starch and reducing sugars in mungbean seeds (Vigna radiata var. Pusa Baisakhi) due to fungal flora were recorded.

Initially, protein declined in its contents which subsequently increased in due course of incubation. Reducing sugars increased considerably due to infestation while starch showed a decreasing trend. Qualitatively glucose and fructose, two hexose sugars, were spotted which exhibited an increasing tendency throughout the incubation. Out of ten free and bound amino acids some disappeared while others either increased or decreased. Succinic acid, Fumaric acid and Tartaric acid were duly detected from the alcoholic fraction of the seed which showed varying degree of concentrations during different incubation periods. [AS]

*0567 Saxena, R.M. ; Sinha, S. 1978. **Seed borne infections on Vigna radiata (L) Wilczek var. radiata in Uttar Pradesh - new records.** SCIENCE AND CULTURE, v.44(8):377-379. [En] (REP.MB-2402)

A survey for seed-borne fungal diseases of mungbean was conducted in Uttar Pradesh. The seeds collected from the diseased plants showed the presence of Ascotricha chartarum, Colletotrichum truncatum and Fusarium oxysporum. All 3 fungi were pathogenic and produced leaf spots on mungbean seedlings. Symptoms of the diseases are described. [THH]

*0568 Saxena, R.M. ; Gupta, J.S. 1979. **Field fungi associated with the seeds of Vigna radiata (L.) Wilczek var. radiata and V. mungo (L.) Hepper and their persistence during storage.** INDIAN NATIONAL SCIENCE ACADEMY, PROCEEDINGS (SECTION B), v.45(6):636-638. [En] (REP.MB-2274)

Freshly harvested seeds of Vigna radiata and V. mungo were stored for one year under the laboratory conditions to observe the presence and persistence of the field fungi associated with the seeds. The paper lists the mycoflora detected on the seed samples, which comprised about 31 fungi for mungbean and 29 for blackgram. Most of the field fungi persisted on the seeds for as long as 120 days of storage at a relative humidity (R.H.) between 45 and 78% and temperature between 6.2 and 29.6 C. The maximum number of field fungi were replaced by the storage mycoflora between 120 and 300 days of storage at R.H. 28.2 to 87.0% and temperature 8.00 to 39.40 C. After one year of storage, only 13 field fungi persisted on V. radiata and 12 on V. mungo seeds. [THH]

*0569 Charya, M.A.S. ; Reddy, S.M. 1980. **Production of cell wall degrading enzymes by two seed-borne fungi.** CURRENT SCIENCE, v.49(14):557-558. [En] (REP.MB-2573)

Cellulolytic, pectinolytic, amylolytic, and proteolytic enzymes were produced in vitro by Phoma exiqua and Graphium penicillioides, isolated from decaying seeds of Vigna radiata and Cyamopsis tetragonaloba, respectively. [EMS]

*0570 Nik, W.Z. ; Kwee, L.T. 1980. **Seedborne pathogens of some selected grain legumes in Malaysia.** IN: Proceedings of legumes in the tropics. Serdang, Selangor : Universiti Pertanian Malaysia. p.259-266 [En] [En Abst] (SB204.S93)

A survey of the seed mycoflora of soybean and mungbean was undertaken. A total of 34 cultivars of soybean and 5 cultivars of mungbean were examined. Among 36 species of fungi isolated from soybean, 13 were reported pathogens

belonging to the genera of Choanephora, Diaporthe, Myrothecium, Fusarium, Corynespora, Colletotrichum, Botryodiplodia, Phoma, Phyllosticta and Rhizoctonia. Two species of fungi, Didymosphaeria donacina and Nodulisporium sp. isolated from soybean were new records. In the case of mungbean, among 25 species of fungi isolated, 9 were pathogens and belonged mainly to the same genera as those found on soybean. The percentage of pathogenic species to the total seed mycoflora also showed similarity, in that they ranged from 36-40%. The results emphasizes the need for regular seed health testing and adoption of stricter quarantine measures in the import and movement of legume seeds. [AS/EMS]

***0571** Charya, M.A.S. ; Reddy, S.M. 1981. **Deterioration of mung (Vigna radiata Wilczek) seeds due to certain seed-borne fungi.** INDIAN JOURNAL OF BOTANY, v.4(1):80-82. [En] [En Abst] (REP.MB-2605)

There was a marked increase in free fatty acids and reducing sugars and decrease in protein content due to Colletotrichum capsici, Rhizoctonia solani, Phoma exigua and Alternaria alternata infection of mungbean seeds in storage. There was a sharp rise in total phenols which, however, decreased in the later phase of incubation. [AS]

***0572** Saxena, R.M. ; Sinha, S. 1981. **Storage mycoflora of Vigna radiata var. radiata and Vigna mungo in relation to pre-emergence and post-emergence mortalities.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.10(1):120-121. (REP.MB-2281)

Freshly harvested seed samples of mungbean and blackgram were stored for one year in bamboo paper bags under laboratory conditions. The storage mycoflora was investigated after 60, 120, 180, 240, 300 and 360 days of storage by routine mycological techniques and screened for pre- and post-emergence mortalities. The paper lists the mycoflora detected on mungbean and blackgram, and describes the various pre- and post-emergence damage caused by the parasitic species. [THH]

***0573** Gupta, P.K. ; Gupta, J.S. ; Singh, S. ; Deo, P.P. 1982. **Studies on aflatoxin production by some new strains of Aspergillus flavus associated with stored seeds of mung (Phaseolus aureus) in Agra market.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.12(3):315-316. [En] (REP.MB-2611)

Out of 16 cultures of Aspergillus flavus isolated from 78 mungbean seed and "dal" samples collected from nearby mills and markets, 12 were found aflatoxigenic. [EMS]

***0574** Saxena, R.M. ; Gupta, J.S. 1982. **Effect of seed leachates on spore germination of seed borne fungi of Vigna radiata.** INDIAN PHYTOPATHOLOGY, v.35(2):236-240. [En] [En Abst] (A:PS)

Leachates obtained after 6, 12 and 18 hours of soaking seeds produced both inhibitory and stimulatory effects on the spore germination of the seed mycoflora. Leachates of both Vigna radiata and V. mungo retarded the spore germination of Aspergillus flavus, Alternaria alternata, Ascotricha chartarum,

Colletotrichum truncatum, Fusarium moniliforme, F. semitectum, F. oxysporum, F. poae, Rhizopus arrhizus and Trichotecium roseum ranging between 0.1-61.3%. The inhibitory influence was 100 per cent in the leachates of 12 h duration, in both of the crops. The stimulation of the spore germination of the seed fungi was found to be 1.9-16.3%. Six sugars, 12 amino acids and 5 organic acids were present in the seed leachates of V. radiata and V. mungo. [AS]

***0575** Zote, K.K. ; Mayee, C.D. 1982. **Influence of fungicidal seed treatment during storage on seed borne fungi of mungbean.** PESTICIDES, v.16(4):10-12. [En] (REP.MB-2351)

Thirteen fungicides were evaluated for their effect on seed germination, seedling vigour and seed-borne fungi of mungbean. All fungicides significantly improved germination, seedling vigour except Difolatan. Bavistin, thiram and Dithane M-45 were the best. All fungicides inhibited fungal growth on stored seeds. [EMS]

***0576** Gupta, K.P.K. ; Gupta, J.S. ; Deo, P.P. 1983. **Seasonal variations in mycoflora of mung (Phaseolus aureus Roxb.) seeds and dals collected from Agra Mandi.** INDIAN JOURNAL OF AGRICULTURAL RESEARCH, v.17(1/2):42-46. [En] [En Abst] (A:PS)

Mycoflora of mungbean (Vigna radiata Wilczek) showed variations in percentage incidence of fungi in rainy, winter and summer seasons. Maximum average percentage incidence of fungi was noted in rainy season while minimum in summer. Aspergillus flavus exhibited highest average percentage incidence and infested all the seed lots. [AS]

***0577** Nik, W.Z. 1983. **Seed borne fungi of soybean (Glycine max (L.) Merrill) and mungbean (Vigna radiata (L.) Wilczek) and their pathogenic potential.** MALAYSIAN APPLIED BIOLOGY, v.12(1):21-28. [En] [En Abst] (A:PS)

Fungi associated with seed of soybean and mungbean were investigated. Fifteen genera comprising of 21 species of fungi were isolated from 25 samples of 21 soybean cultivars harvested from 6 localities in Malaysia. Samples of 18 mungbean cultivars obtained from 5 localities revealed the presence of 12 genera comprising of 18 species. Fungi isolated from mungbean seeds belonged mainly to the same genera as that of soybean. Pathogenic fungi encountered were Botryodiplodia theobromae, Colletotrichum dematium, Diaporthe phaseolorum, Fusarium equiseti, F. moniliforme, F. semitectum, F. solani, Macrophomina phaseolina, Myrothecium roridum, Phoma sorghina and Pestalotia sp. [AS]

***0578** Charya, M.A.S. ; Reddy, S.M. 1984. **Antifungal activity of some fungicides against four seed borne fungi. part 2.** PESTICIDES, v.18(1):38-39. [En] (REP.MB-1878)

Seven fungicides were assayed in vitro against four mungbean seed-borne fungi: Alternaria alternata, Curvularia lunata, Drechslera rostrata and Fusarium oxysporum. Bavistin, Brassicol, and dithane compounds were effective in inhibiting these fungi, whereas copper fungicides were less effective. [THH]

*0579 Gutierrez, E.M. 1985. **Survey and identification of seedborne fungi and viruses of field legumes [Abst.].** PHILIPPINE PHYTOPATHOLOGY, v.21(1/2):4. [En] (A:PS)

Seven fungal genera were isolated from the seeds of mungbean, cowpea, peanut and soybean using the blotter test and 11 genera were isolated using the agar plate test. Results showed that more storage fungi were isolated than field fungi. Seed transmission test was done to identify viruses of peanut (Arachis hypogeae L.). A virus causing leaf mottle was identified and studied. It was found to be transmitted by sap and by aphid (Aphis craccivora Koch). Vigna sesquipedalis L., V. unguiculata Walp, V. sinensis and P. lunatus were local lesion hosts of the virus and Capsicum annuum was a systemic host. The virus was no longer infectious after 3 days storage at dilutions between 1.0E-3 and 1.0E-4 and after 60 C heat exposure for 10 minutes. [AS]

NEMATODES
- General

*0580 Prasad, S.K. ; Mishra, S.D. ; Gaur, A.C. 1972. **Effect of soil amendments on nematodes associated with wheat followed by mung and maize.** INDIAN JOURNAL OF ENTOMOLOGY, v.34(4):307-311. [En] [En Abst] (REP.MB-0807)

Microplot studies with wheat-straw, farm yard manure, neem seed cake and NPK provided maximum reduction in the population of plant parasitic nematodes (Helicotylenchus, Tylenchorhynchus and Pratylenchus) in the case of wheat-straw+neem seed cake+NPK and wheat-straw+neem seed cake+1/2 NPK. These, however, recorded high numbers of free-living nematodes. The effectiveness of soil amendments could be better evaluated 75 days after the treatments. [AS]

*0581 Singh, Inderjit ; Prasad, S.K. 1973. **Effect of some nematicides on nematodes and soil micro-organisms.** INDIAN JOURNAL OF NEMATOLOGY, v.3(2):109-133. [En] [En Abst] (REP.MB-1503)

Field and pot tests were conducted to determine the effect of DD, EDB, DBCP, aldicarb, dazomet, carbofuran, thionazin, phorate, fensulfothion, disulfoton, dimethoate and thionazin+phorate, on nematodes and soil microorganisms associated with mungbean and wheat. Dazomet was most effective in reducing the nematode population and in preventing the build up of plant parasitic nematodes. It was also most suppressive and inhibitory to soil microorganisms. With DD there was a high initial reduction in the nematode population but subsequent build up was rapid. EDB, dimethoate, aldicarb, disulfoton, DBCP and phorate were moderately effective in reducing the population of soil microorganisms and also in keeping down their population at low levels. DBCP, carbofuran, phorate, fensulfothion and aldicarb were moderately effective in reducing the nematode population, but subsequently they prevented their buildup only for a short period. Azotobacter, Nitrosomonas and Nitrobacter were most susceptible to nematicidal treatment and took time to re-established. [AS/THH]

*0582 Castillo, M.B. ; Alejar, M.S. ; Litsinger, J.A. 1977. **Pathologic reactions and yield loss of mung bean to known populations of Rotylenchulus reniformis and Meloidogyne acrita.** PHILIPPINE AGRICULTURIST, v.61(1/2):12-24.

[En] [En Abst] (REP.MB-1924)

Nematode-free mungbean plants and plants germinated in soil infested with a combination of approximately 1,200 R. reniformis and 90 M. acrita were transplanted in pots and microplots containing baked soil and in the field with very low nematode populations. In a similar experiment, approximately 600 M. acrita alone were used as inoculum under pot and field conditions only. Plant reactions to inoculation with R. reniformis-M. acrita complex consisted of reduced seedling emergence, leaf chlorosis, severe necrosis and light galling of roots, stunting, early flowering and reduced pod size, plant stand and weights of roots, tops and yield. Percentage yield reductions in pot, microplot and field were 63.9, 69.8 and 61.5, respectively, with no significant differences among locations. Computed yield loss in field due to nematode inoculation amounted to PHP2,387/ha. Inoculation with M. acrita alone caused reduced seedling emergence, leaf chlorosis particularly under moisture stress, very severe root necrosis and galling, stunting and reduced plant stand and weights of tops and yield. Percentage yield reductions in pot and field were 40.5 and 28.9, respectively, with that in the former being significantly higher. Yield loss in field due to nematode inoculation was computed to be PHP438/ha. [AS]

***0583** Castillo, M.B. ; Litsinger, J.A. 1978. **Plant parasitic nematodes of mungbean in Philippines.** IN: The 1st International Mungbean Symposium. Shanhua, Tainan : AVRDC. p.195-200 (SB205.M815)

MEETING: International Symposium on Mungbean, 1st -- Los Banos, Philippines, Aug 16-19, 1977

The plant parasitic nematode genera Rotylenchulus and Meloidogyne are the only important pests of mungbean in the Philippines. In upland areas, mixed populations of these two genera are found in almost any field where mungbean is grown, and heavy root infections are frequently associated with crop decline. Conversely, very low nematode populations are observed in lowland areas where mungbean usually follows paddy rice. Symptoms, population dynamics and control methods of the pests are discussed. Of the hundreds of varieties, including local lines and those from AVRDC, which were screened resistance to root-knot nematodes, only one line, a multifoliate mutant, showed some resistance to M. acrita, M. incognita, and M. javanica, but was susceptible to M. arenaria. [THH]

***0584** Kaushik, H.D. ; Bajaj, H.K. 1980. **Nematodes associated with pulse crops in Haryana.** INDIAN JOURNAL OF NEMATOLOGY, v.10(1):92-96. [En] [En Abst] (REP.MB-2275)

Analysis of samples, collected around roots of Cajanus cajan (pigeonpea), Vigna radiata (mungbean), V. mungo,(blackgram), V. aconitifolius (mothbean) and V. unguiculata (cowpea) from fifteen villages of Hissar district revealed the presence of nematodes, including Paraphelenchus amblyurus Steiner, 1934 and male of Longidorus siddiqii Aboul-Eid, 1970 which are being recorded for the first time from India. [AS]

***0585** Reddy, K.C. ; Soffes, A.R. ; Prine, G.M. 1986. **Tropical legumes for green manure. 1. Nitrogen production and the effects on succeeding crop yields.** AGRONOMY JOURNAL, v.78(1):1-4. [En] [En Abst] (A:PS)

The objective of this study was to evaluate the ability of selected green manure crops to furnish N and to reduce plant-parasitic nematode populations on succeeding crops. This study evaluated seven tropical legumes and a marigold (Tagetes erecta) cv. Cracker Jack grown under fumigation and nonfumigation. Average top growth N yields in kg/ha were 40 for PI 305070 mungbean (Vigna radiata), 250 for Norman pigeonpea (Cajanus cajan), 190 for FL 81d pigeonpea, 170 for showy crotalaria (Crotalaria spectabilis), 220 for hairy indigo (Indigofera hirsuta), 170 for jointvetch (Aeschynomene americana), 190 for velvetbean (Mucuna deeringiana), and 60 for marigold. The dry matter yield of legumes with higher N yields usually exceeded 10,000 kg/ha for full-season production in all 3 yr. Fumigation increased dry matter yield of legumes and marigold, but not their N yield. The grass crops, rye (Secale cereale), ryegrass (Lolium multiflorum), maize (Zea mays) and wheat (Triticum aestivum) produced significantly higher dry matter (up to 100%) when planted after green-manure summer legumes than when planted after summer fallow. Calculated uptake of N from green manure by these grass crops was relatively low, averaging from 2 to 23 kg/ha. Applying 50 and 100 kg N/ha as ammonium nitrate to the green-manured plots did not increase recovery of N from green manure by wheat. [AS/NMC]

***0586** Reddy, K.C. ; Soffes, A.R. ; Prine, G.M. ; Dunn, R.A. 1986. **Tropical legumes for green manure. 2. Nematode populations and their effects on succeeding crop yields.** AGRONOMY JOURNAL, v.78(1):5-10. [En] [En Abst] (A:PS)

The effects of tropical legumes, grown as summer green manure crops, on populations of four plant parasitic nematodes were compared with follow and Cracker Jack marigold. One cultivar, Norman, and one line, FL 81d, of pigeonpea (Cajanus cajan), showy crotalaria (Crotalaria spectabilis), hairy indigo (Indigofera hirsuta), jointvetch (Aeschynomene americana), velvetbean (Mucuna deeringiana) and marigold reduced soil populations of root-knot nematodes (Meloidogyne incognita) in each year planted; PI 305070 mungbean did not. Fumigation, fallowing and rotation with jointvetch, hairy indigo and crotalaria reduced sting nematode (Belonolaimus longicaudatus Ran.) populations. Rotation with hairy indigo or marigold consistently reduced the lesion nematodes [Pratylenchus brachyurus (Godfrey) Goodey] in all the succeeding crops. Fumigation generally reduced ring nematode (Criconemoides spp.) populations. Root-knot nematode and the incorporated green manure had the greatest influence on snap bean [Phaseolus vulgaris (L.) cv. Blue Lake Bunch] dry matter yield. [AS/NMC]

- Root-Knot Nematode

***0587** Prasad, S.K. ; Chawla, M.L. ; Kumar, S. ; Saxena, H.P. 1971. **Root-knot nematode, Meloidogyne javanica (Treub, 1885) Chitwood, 1949 and stem borer, Stomopteryx nertaria Meyrick affecting green gram, Phaseolus aureus.** INDIAN JOURNAL OF ENTOMOLOGY, v.33(1):55-60. [En] [En Abst] (REP.MB-0508)

On the basis of an examination of 989 plants from an area of 0.02 hectare the plants were sorted out into four categories, viz., (i) infested with nematode (Meloidogyne javanica) alone, (ii) infested with borer (Stomopteryx nertaria) alone, (iii) infested with nematode and borer, and (iv) non-infested

plants. The root-knot index was calculated and correlation coefficients were worked out. The salient results are, (i) the severity of nematode infestation is more in absence of borer, (ii) the borer plays a greater part in reduction of grain yield and pod numbers, (iii) the reduction in pod numbers and corresponding depression in grain yield in the successive classes of root-knot index are not related to each other. The pests i.e., nematodes and borer have a greater impact on grain formation than on pod setting, (iv) the threshold of root-knot index for a significant reduction in grain yield was 1.5 in the presence of borer and 3.5 in the absence of borer, (v) treatment with aldicarb @ 0.5 kg active ingredient per hectare increased yield by 3.5 times, and (vi) the results are a pointer to the likely associations between pests resulting in disease severity and crop losses. [AS]

*0588 Singh, R.N. 1972. **Root knot disease of urd (Phaseolus mungo) and mung (P. aureus) in India.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.2(1):87. [En] (REP.MB-1649)

A natural infestation of Meloidogyne javanica and M. incognita on Vigna radiata and V. mungo under field conditions is reported. [THH]

*0589 Mathur, R.L. ; Handa, D.K. ; Mathur, B.N. 1973. **Resistance of varieties of cowpea, green gram and guar to root knot nematodes (Meloidogyne javanica and M. incognita).** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.3(2):182-183. [En] (REP.MB-1497)

Twenty varieties each of mungbean, cowpea and 8 varieties of cluster bean were evaluated for their reactions to the root-knot nematodes Meloidogyne javanica and M. incognita under natural infection. None of the cowpea varieties was immune or tolerant. Mungbean variety T 44 was immune; T 2 showed moderately tolerant and the others were susceptible and highly susceptible. B-19-1-55 and KGC 114 of cluster bean were immune. [THH]

*0590 Catibog, C.S. ; Castillo, M.B. 1975. **Pathogenicity of Meloidogyne javanica on mung bean Phaseolus aureus Roxb.** PHILIPPINE AGRICULTURIST, v.59(5/6):189-195. [En] [En Abst] (REP.MB-1121)

Most of the mungbean plants grown in sand and inoculated aseptically with 5, 15, 25, and 50 egg masses of Meloidogyne javanica died one month after inoculation. Their root systems were galled and necrotic. Inoculations with 5, 20 and 50 nematode larvae neither caused death nor root necrosis; galls formed only in plants inoculated with 50 larvae. Greenhouse plants grown in soil inoculated with 10, 25, 50 and 100 egg masses showed increasing gall ratings with increasing levels. Significant differences in weights of roots, tops and pod yields were not observed, although a trend towards increasing root weight and decreasing top and yield weights with increasing inoculum levels were noted. The large numbers of egg masses observed on inoculated roots and the high nematode recoveries from the soil indicated the high susceptibility of the crop to the nematode. Longitudinal sections of infected roots showed giant cells usually in the vascular region. [AS]

*0591 Hussaini, S.S. ; Seshadri, A.R. 1975. **Interrelationships between**

Meloidogyne incognita and Rhizobium sp on mung bean (Phaseolus aureus). INDIAN JOURNAL OF NEMATOLOGY, v.5:189-199. [En] [En Abst] (REP.MB-2828)

Meloidogyne incognita, besides being pathogenic to mungbean, was found to interfere with bacterial nodulation and hamper nitrogen fixation. Inoculation experiments have shown that irrespective of the time of inoculation of the two organisms, the inclusion of nematode in any of the treatments at any levels of population caused significant decrease in height of plants, fresh and dry weights of shoot and root, number of nodules in primary and secondary root systems and in nitrogen content of the shoot and root compared to the uninoculated control. Reduction of nitrogen content may be due to overall reduction in root nodulation, anatomical changes in nodules and the altered physiology of the host. [AS]

***0592** Bopaiah, B.M. ; Patil, R.B. ; Reddy, D.D.R. 1976. **Effect of Meloidogyne javanica on nodulation and symbiotic nitrogen fixation in mung, Vigna radiata.** INDIAN JOURNAL OF NEMATOLOGY, v.6:124-130. [En] [En Abst] (REP.MB-2829)

Effect of Meloidogyne javanica on growth, nodulation and nitrogen fixation in mungbean plants was investigated. Inoculation of root-knot nematode alone, simultaneously or 2 to 7 days preceding Rhizobium inoculation had deleterious effect on plant growth compared to plants inoculated with Rhizobium alone. The nematode inoculation prior to rhizobia resulted in maximum reduction of nodules. In plants where Rhizobium inoculation preceded nematode inoculation or inoculated with Rhizobium alone, growth and nodulation were normal. The infestation by the nematode interfered with nitrogen fixation and reduced the nitrogen content of shoot and root. [AS]

***0593** Jain, M.K. ; Rewari, R.B. 1977. **A report on the infestation of urid (Phaseolus mungo) crop by root knot nematode.** INDIAN JOURNAL OF MYCOLOGY AND PLANT PATHOLOGY, v.7:94. [En] (REP.MB-2426)

The root-knot nematode, Meloidogyne incognita, was found to infest the roots of blackgram (variety MK 18) inoculated with Rhizobium in pots culture experiment. At the end of the experiment no Rhizobium was found in infected pots, which suggests that the nematode was antagonistic to Rhizobium. [THH]

***0594** Singh, Inderjit ; Sharma, S.K. ; Sakuja, P.K. ; Sharma, N.K. 1979. **Efficacy and persistence of some nematicides against root-knot nematode, Meloidogyne incognita on pulses.** TROPICAL GRAIN LEGUME BULLETIN, v.16:3-6. [En] (A:PS)

Five nematicides at 2 to 3 concentrations each were evaluated for control of root-knot nematode (Meloidogyne incognita) on mungbean. DBCP, D-D and hexanema (6 kg/ha) were the most effective in reducing root galling. Significant increases in yield over the control were observed, for all treatments except hexanema, aldicarb, and fensulfothion when used at the lower concentrations. In a subsequent chickpea crop, only hexanema, fensulfothion and aldicarb when used at the higher concentrations had enough residual action to significantly increase the yield over the control. [EMS]

*0595 Mishra, S.D. ; Gaur, H.S. 1981. **Efficacy of nematicidal seed treatment in the control of root-knot nematode, Meloidogyne incognita on mungbean Vigna radiata.** INDIAN JOURNAL OF NEMATOLOGY, v.11(1):127. [En] (REP.MB-2322)

The efficacy of seed treatment with three nematicides viz., aldicarb sulphone, carbofuran and Thimet at 1, 2 and 3% a.i. (w/w) was studied for mungbean in 4 sq.m field plots infested with Meloidogyne incognita at initial density of 5 second stage juveniles per cc of soil. Aldicarb sulphone at 1% was found to be most effective in increasing grain yield. Aldicarb sulphone at 2 and 3% and carbofuran and Thimet at 3% did cause marked reduction in nematode population but failed to cause proportionate increase in yield due to phytotoxic effects and decreased germination percentage. [AS]

*0596 Das, P. ; Phukan, P.N. 1982. **Reaction of certain mung cultivars to root-knot nematode (Meloidogyne incognita).** INDIAN JOURNAL OF NEMATOLOGY, v.12:204-205. [En] (REP.MB-2774)

Seventeen pot-grown mungbean cultivars were screened for resistance to root-knot nematode (Meloidogyne incognita). All of them were found susceptible. [EMS]

*0597 Darekar, K.S. ; Bhosale, D.J. 1985. **Reaction of some green gram cultivars to root-knot nematode.** JOURNAL OF MAHARASHTRA AGRICULTURAL UNIVERSITIES, v.10(2):227. [En] (REP.MB-2736)

Out of 24 mungbean cultivars grown in pots and inoculated with Meloidogyne incognita, ML 62 and ML 80 were observed to be resistant. [THH]

*0598 Gnanapragasam, N.C. ; Sivapalan, P. ; Dharmasena, W.A.M. 1985. **Screening of different cultivars of black gram (Phaseolus mungo L.), green gram (Phaseolus aureus Roxb.) and cowpea (Vigna catjang Walp.) for resistance/susceptibility to Meloidogyne species.** INTERNATIONAL NEMATOLOGY NETWORK NEWSLETTER, v.2(4):22-25. [En] (A:PS)

A number of varieties of mungbean (17 varieties), blackgram (7) and cowpea (13) were screened in the field for resistance to root-knot nematode, Meloidogyne incognita. Two mungbean and 3 cowpea varieties remained free of infection. Another 4 mungbean, 5 cowpea, and 1 blackgram variety only had light infections. All others were moderately to heavily infected. [EMS]

*0599 Vijayalakshmi, K. ; Goswami, B.K. 1986. **Effect of seed treatments with neem cake and neem oil on the germination of moong (green gram) and its vulnerability to root-knot nematodes.** INTERNATIONAL NEMATOLOGY NETWORK NEWSLETTER, v.3(1):8-9. [En] (A:PS)

Germination of mungbean seed was not affected by the gum (check) and neem cake, but neem oil delayed and suppressed germination. Both neem cake and neem oil were effective in reducing root penetration by Meloidogyne incognita juveniles at 3 days as well as 6 days after germination. The cake was more effective. The number of juveniles penetrating was only 25% and 36% of that on

the control for cake and oil, respectively. [THH]

- Reniform Nematode

***0600** Castillo, M.B. 1971. **Reniform nematode, Rotylenchulus sp. in mungo, soybean and peanut soils at the UPCA Central Experiment Station.** PHILIPPINE PHYTOPATHOLOGY, v.7(1/2):61-63. [En] (REP.MB-1658)

A nematode survey in mungbean, soybean and peanut at the UPCA Central Experiment Station revealed the prevalence of the reniform nematode, Rotylenchulus sp. Mungbean appeared to be the most favored host and peanut the least favored. The average number of nematodes in 300 cc of soil samples from mungbean, soybean and peanut was 1395, 808 and 129, respectively. In all the crops, nematode infestation was observed to be associated with root necrosis. More egg masses were observed in stained mungbean roots. Trace infestations of other plant parasitic and non-parasitic nematodes were also observed. In mungbean soils, the parasitic nematodes were Meloidogyne and Hemicycliophora. [THH]

***0601** Bajet, N.B. ; Castillo, M.B. 1974. **Effects of Rotylenchulus reniformis inoculations on mung bean, soybean and peanut.** PHILIPPINE PHYTOPATHOLOGY, v.10:50-55. [En] [En Abst] (REP.MB-2801)

In simultaneous pot experiments, inoculations with field populations of the reniform nematode, Rotylenchulus reniformis, at approximately 20,000 larvae per plant, resulted in yield reductions of 41.5%, 21.3% and 27.7% in mungbean, soybean and peanut, respectively. In mungbean, the reduction was statistically significant at P=0.05; yield reductions in soybean and peanut were significant only at P=0.10. Weights of tops and roots of mungbean were also reduced by 30.5% (significant at P=0.10) and 48.9% (significant at P=0.01) respectively. Reductions in weights of tops and roots of soybean and peanut were not significant. Other than these gross effects, no other symptoms of nematode damage, including root necrosis, were apparent on inoculated plants. [AS]

***0602** Castillo, M.B. ; Bajet, N.B. ; Harwood, R.R. 1976. **Nematodes in cropping patterns. 1. Population of Rotylenchulus reniformis on successively monocultured crops.** PHILIPPINE AGRICULTURIST, v.59(7/8):288-294. [En] [En Abst] (REP.MB-0026)

Marked differences in active population of Rotylenchulus reniformis resulted after successive monocultures of different crops. Two croppings of corn or sorghum or three fallow periods checked the population; three croppings of mungbean or soybean or two croppings of sweet potato favored population build-up, with nematode counts increasing with number of croppings. Apparent but less increase was also noted after two croppings of bush sitao or peanut. When the seven aforementioned crops were replanted in their respective plots, population was drastically suppressed, regardless of the crop, when two post-plant applications of carbofuran 3G, an insecticide-nematicide chemical (at the rates of 1.5 and 6.0 kg a.i./ha), were made. However, one subsequent cropping of the susceptible mungbean on these plots increased the population, with more apparent increases when preceding crops were monocultured soybean and

mungbean. When the previously fallowed plot was divided into eight subplots and each of the same seven crops and radish was randomly assigned to them, the active nematode population after one cropping remained checked also regardless of the crop. Likewise, after one subsequent cropping of mungbean on all subplots, the population increased, with increases also being more evident when soybean or mungbean was the preceding crop. We conclude that the nematode, particularly the egg population, could only be checked partly and temporarily by nonhosts, carbofuran 3G and fallow. [AS]

*0603 Vilsoni, F. ; Heinlein, M. 1982. **Host range and reproductive capacity of the reniform nematode Rotylenchulus reniformis on some crop cultivars in Fiji.** FIJI AGRICULTURAL JOURNAL, v.44(2):61-66. [En] [En Abst] (A:PS)

A total of 69 crop cultivars [including mungbean, blackgram, peppers, soybean, sweet potato and tomato] in 20 plant families were tested in the greenhouse to determine their host status to the reniform nematode (Rotylenchulus reniformis Linford and Oliveira, 1940). Of the crops tested, 15 were found to be non-hosts; these included broomcorn, maize, peanut, pineapple, rice, sorghum, sugarcane, peppers and Xanthosoma. The number of eggs produced per eggmass varied greatly among the susceptible crops examined. [AS]

*0604 Vilsoni, F. ; Heinlein, M. 1982. **Influence of initial inoculum levels of the reniform nematode on the growth of mung, pawpaw, pigeon pea and sweet potato.** FIJI AGRICULTURAL JOURNAL, v.44(2):67-70. [En] [En Abst] (A:PS)

At an inoculum level of 40,000 larvae per pot, Rotylenchulus reniformis, significantly reduced the growth of mungbean, pawpaw, pigeonpea, and sweet potato in the greenhouse. Lower inoculum levels were inconsistent in their effect, causing reduction in some plants only. Initial inoculum levels and final population counts were always negatively correlated. [AS]

*0605 Gaur, H.S. 1986. **Invasion and reproduction of the reniform nematode on some cultivars of cowpea and green gram.** INTERNATIONAL NEMATOLOGY NETWORK NEWSLETTER, v.3(3):8-10. [En] (A:PS)

One mungbean variety and seven cowpea varieties were evaluated for their reaction to the reniform nematode (Rotylenchulus reniformis) using artificial inoculation. Mungbean was the most suitable host allowing maximum invasion, female development and egg production. Reaction of the cowpea cultivars ranged from highly resistant to susceptible. [EMS]

*0606 Routaray, B.N. ; Sahoo, H. ; Das, S.N. 1986. **Evaluation of greengram and blackgram varieties against reniform nematode, Rotylenchulus reniformis.** INDIAN JOURNAL OF NEMATOLOGY, v.16(1):27-29. [En] [En Abst] (REP.MB-2894)

Relative susceptibility of seventeen mungbean as well as blackgram varieties against Rotylenchulus reniformis were tested in replicated pot culture experiments. The mungbean varieties, ML-80, ML-62, TT-8E, Pusa-103, PDM-14 and blackgram cultivars, Ratnapur-1, UG-201, and UG-135 showed resistant reaction. Reactions of other varieties were moderately resistant to highly susceptible. [AS]

***0607** Epps, J.M. ; Chambers, A.Y. 1959. **Mung bean (Phaseolus aureus), a host of the soybean cyst nematode (Heterodera glycines).** PLANT DISEASE REPORTER, v.43(9):981-982. [En] [En Abst] (REP.MB-0016)

Mungbean (Vigna radiata) is reported to be a suitable host for the soybean cyst nematode (Heterodera glycines). Two varieties, Oklahoma 12 and Kiloga, were very susceptible, while a jumbo strain was free of white females when grown under conditions favorable for nematode development. [AS]

***0608** Acharya, A. ; Das, S.N. 1983. **Host range and pathogenicity of Macroposthonia ornata on ragi (Eleusine coracana Gin).** INDIAN JOURNAL OF NEMATOLOGY, v.13(1):9-15. [En] [En Abst] (REP.MB-2644)

Among nineteen selected crop plants, tested as possible hosts of Macroposthonia ornata only rice was found to be an excellent host; while cabbage, cauliflower, corn, okra, cowpea, sorghum, bajra, mustard and ragi were good hosts; brinjal, garden pea, chilli, blackgram, mungbean, soybean and tomato were fair hosts; and cucumber and niger were considered to be the poor hosts. [AS]

***0609** Egunjobi, O.A. 1984. **Effects of intercropping maize with grain legumes and fertilizer treatment on populations of Pratylenchus brachyurus Godfrey (Nematoda) and on the yield of maize (Zea mays L.).** PROTECTION ECOLOGY, v.6(2):153-167. [En] [En Abst] (REP.MB-2528)

In tropical Nigeria, the population structure of Pratylenchus brachyurus is significantly affected by food source, cropping systems, the use of NPK fertilizer, the seasons and the years. Reproduction is continuous throughout the year, but most evident at crop growth periods. The low moisture intercrop periods between January and February usually act as natural checks. NPK fertilizer application increases the numbers of P. brachyurus more in soil under monoculture maize plots than in plots sown with maize in association with cowpea, groundnut or mungbean. When applied only once annually on the early crop, it improved the early season maize yield but reduced the yield in the late seasons. The late crop yield decline is coincidental with increases in the nematode population, and the nematode appears to constitute one of the limiting factors. Growing maize in association with cowpea, groundnut or mungbean also increases P. brachyurus populations, with no detrimental consequences for maize yield. [AS]

***0610** Fagbenle, H.H. ; Edwards, D.I. ; Malek, R.B. 1986. **Cyst production by two geographical isolates of Heterodera lespedezae on selected legumes.** PLANT DISEASE, v.70(7):643-644. [En] [En Abst] (A:PS)

Cyst production by isolates of Heterodera lespedezae from Illinois and North Carolina populations was compared on 14 species of legumes. Twelve species [including adzuki bean, green bean, mungbean, and garden pea] were hosts for both isolates, ranging from good to very poor. There were significant differences between isolates on four species. The Illinois isolate produced

more cysts on striate lespedeza and red clover and fewer cysts on alsike clover. The North Carolina isolate produced a few egg-bearing cysts on soybean, which was a nonhost for the Illinois isolate. Only common vetch was a nonhost for both isolates. [AS]

*0611 Walia, R.K. ; Seshadri, A.R. 1986. **Pathogenicity of root-lesion nematode on greengram.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.56(11):792-795. [En] [En Abst] (REP.MB-2919)

Six or more root-lesion nematodes (Pratylenchus zeae Graham) per g soil significantly reduced the germination of Pusa Baisakhi mungbean [Vigna radiata (Linn.) Wilczek]. The growth of seedlings was adversely affected by an initial population of 4 nematodes per g soil. One thousand P. zeae per kg soil was found to be the pathogenic level. The nematode multiplication was the highest at inoculum level of nematodes per g of soil. [AS]

PHYSIOLOGICAL DISORDERS

*0612 Ryan, G.F. ; Greenblatt, G. ; Al-Delaimy, K.A. 1961. **Seedling albinism induced by an extract of Alternaria tenuis.** SCIENCE, v.134:833-834. [En] [En Abst] (REP.MB-2393)

The chlorophyll deficiency in citrus seedlings known as albinism was observed in mungbean seedlings. [THH]

*0613 Smith, F.W. ; Imrie, B.C. ; Pieters, W.H.J. 1983. **Foliar symptoms of nutrient disorders in mung bean (Vigna radiata).** CSIRO, DIVISION OF TROPICAL CROPS AND PASTURES, TECHNICAL PAPER, no.24:1-11. [En] [En Abst] (REP.MB-2677)

Foliar symptoms of nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, copper, zinc, manganese, and boron deficiencies and manganese and boron toxicities in mungbean (Vigna radiata cv. Berken) are described. Photographs of the foliar symptoms of these nutrient disorders accompany the descriptions. The symptoms described are those developed in water culture. [AS]

INSECT PESTS - GENERAL

*0614 Bindra, O.S. 1965. **Insect pests of pulse crops.** INDIAN FARMING, v.17(11):12-14,56. [En] (REP.MB-1625)

Chickpeas, pigeonpea, mungbean, blackgram, lentil, pea, cowpea, moth bean and horse gram are imporant pulse crops in India. More than 150 species of insects are known to attack these crops. Of them about 25 important pests which cause serious damage either in the field or in the storage are described. Both prophylactic and remedial measures for controlling them are suggested. [THH]

***0615** Rangarao, P.V. 1967. **Pests of pulses.** IN: Proceedings [of] first Annual Workshop Conference on Pulse Crops. New Delhi : Indian Council of Agricultural Research. 10 leaves (REP.MB-1716)

MEETING: Annual Workshop Conference on Pulse Crops, 1st -- New Delhi, India, Feb, 1967

Six species of insects infested pigeonpea, chickpea, moth bean, blackgram, soybean, pea and mungbean, and the percentages of yield loss are tablated. Fourteen varieties of mungbean, 10 of blackgram and 4 of cowpea were screened for resistance to the flea beetle (Monolepta nigrobilineata) and the jassid (Empoasca kerri). All varieties were found susceptible to both pests. Chemical control of pod borers was conducted during 1963-1966. There was significant reduction in pod borer incidence in the treatments, while the yields of the treated were not significantly different from the untreated checks. [THH]

***0616** Gupta, D.S. ; Mishra, R.C. 1970. **Carbaryl affects germination of seeds.** INDIAN JOURNAL OF ENTOMOLOGY, v.32(4):396-397. [En] (REP.MB-0187)

In a study to determine the persitence of carbaryl, a soil insecticide, it was found that this insecticide reduces the germination of mungbean. At a concentration of more than 30 ppm, both the germination and survival of the plants decreased markedly. [THH]

***0617** Gupta, N.N. ; Saxena, H.P. 1971. **Chemical control of pests of moong (Phaseolus aureus) leaf to spectacular rich plant growth and high yield.** IN: Proceedings [of the] fifth workshop on pulse crops. New Delhi : ICAR. p.118-119 [En] (REP.MB-0872)

MEETING: Workshop on Pulse Crops, 5th -- Hissar, India, Mar 18-21, 1971

Various insecticides were tested for controlling galerucid beetle (Madurasia obscurella Jocoby) and jassid (Empoasca kerri Pruthi), the serious pests of kharif season pulses, viz., mungbean, blackgram, cowpea and pigeonpea in northern India. In a replicated mungbean field trial, insecticides were applied in soil at the time of sowing. They included mephosfolan 10 G; disulfoton 5 G; phorate 10 G; and Sevidol 4 G at 2.0 kg; 1.5 kg; 1.5 kg; and 2.0 kg/ha, respectively. Spraying with carbaryl 0.25% WP; monocrotophos 0.05% EC; endosulfan 0.05% EC and lindane 0.1% EC was done twice when the crop was 4 weeks and 6 weeks old. The insecticidal treatments resulted not only in the reduction of the damage and in population of the pests, but also contributed to spectacular plant growth and increase in the grain yield. Phorate was the most effective in reducing the damage caused by the galerucid beetle, followed by mephosfolan. For the control of the jassid, disulfoton was the best treatment. [THH]

***0618** Naresh, J.S. 1971. **Insecticidal trial for the control of insect pests of Urd bean (Phaseolus mungo).** IN: Proceedings [of the] fifth workshop on pulse crops. New Delhi : Indian Council of Agricultural Research. p.132-135 (REP.MB-0954)

MEETING: Workshop on Pulse Crops, 5th -- Hissar, India, Mar 18-20, 1971

During the 1970 kharif season, insecticidal trials were carried out for controlling insect pests of blackgram, i.e., beanfly (Ophiomyia phaseoli). galerucid beetle (Madurasia obscurella), and whitefly (Bemisia tabaci), and mungbean yellow mosaic virus. Three systemic insecticides, viz., aldicarb 10% 1 kg a.i./ha, phorate 10% 1 kg a.i./ha, and monocrotophos 5% 0.75 kg a.i./ha, were applied in soil at the time of sowing. Three insecticides, viz., monocrotophos 60%, metasystox 25%, and phosphamidon 100%, were sprayed twice, first at 300 ml a.i./ha and second at 500 ml a.i./ha, at 30 and 42 days after sowing. Treatments of aldicarb + metasystox gave the best control of insect pests and the treatment of monocrotophos + monocrotophos (granules + sprays) increased the yield. [THH]

*0619 Pablo, S.J. ; Pangga, G.A. 1971. **Granular systemic insecticides in the control of pests affecting mungo bean.** PHILIPPINE JOURNAL OF PLANT INDUSTRY, v.36(1/3):21-28. [En] [En Abst] (REP.MB-1201)

Five granular systemic insecticides were tested in the control of pests affecting mungbean. Phosfolan, disulfoton, mephosfolan, disulfoton (Solvirex) and phorate at 1.5 kg a.i./ha were effective in preventing pest infestation at the early stage of growth of the mungbean. The application of the systemic insecticides in the soil increased the yield of shelled mungbean from 100 to 500 kg based on the computed yield per hectare. [AS]

*0620 Sanchez, F.F. ; Rosales, G.F. 1971. **Screening of insecticides for the control of insect pests of mungo and soybean.** IN: Proceedings [of the] second annual conference [on] corn, sorghum, soybean, mungo and peanut. College, Laguna : U.P. College of Agriculture. p.202-206 (REP.MB-1486)

MEETING: Annual Conference [on] Corn, Sorghum, Soybean, Mungo and Peanut -- Laguna, Philippines, Mar 22-27, 1971

Fourteen insecticides were screened for their effectiveness against pest insects of mungbean and soybean. In the mungbean trial, methomyl was the most effective against leaf folders and corn borers, followed by dimethoate, Ambithion and carbaryl. Carbofuran gave the best control of leaf miners and leaf rollers, followed by aldicarb. Mungbean plants were stunted and dried prematurely when the plants were treated with leptophos. In the soybean trial, all insecticides tested gave significant control of leaf folders. Mephosfolan gave the best control of cutworms and grasshoppers. [THH]

*0621 Dalvi, R.R. ; Singh, B. ; Salunkhe, D.K. 1972. **Influence of selected pesticide on germination and associated metabolic changes in wheat and mung bean seeds.** JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY, v.29(5):1000-1003. [En] [En Abst] (REP.MB-0275)

Germination of wheat and mungbean seeds was used for bioassay to demonstrate the toxic effects of menazon (S-[4,6-diamino-s-triazin-2-yl)methyl)]0,0-dimethyl phosphorodithioate), disulfoton [0,0-diethyl S- [2-(ethylthio)ethyl] phosphorodithioate]), and GS-14254 (2-methoxy-4-isopropylamino-6-butylamino-s-triazine). At certain concentrations these pesticides suppressed germination and seedling growth of these species as a result of impaired respiration, starch, and protein degradation. Further studies revealed that the pesticides inhibited development

of amylase and ATPase activities during germination. The effects were more pronounced in wheat than in mungbean. [AS]

***0622** Naresh, J.S. ; Thakur, R.P. 1972. **Efficacy of systemic granular and spray insecticides for the control of insect pests of black-gram (Phaseolus mungo Roxb.).** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.42(8):732-735. [En] [En Abst] (REP.MB-0213)

Aldicarb (Temik 10% granules) at the rate of 1 kg a.i./ha, phorate (Thimet 10% granules) at the rate of 1 kg a.i./ha and monocrotophos (Azodrin 5% granules) at the rate of 0.75kg a.i./ha, were applied in soil before sowing. Monocrotophos (Azodrin 60% water-soluble concentrate), oxydemeton-methyl (Metasystox R 25% emulsifiable concentrate) and phosphamidon (Dimecron 100% water-souble concentrate), each at the rate of 300 and 500 ml a.i./ha, were sprayed at 28 and 48 days after sowing blackgram (Vigna mungo). All the 3 granular insecticides gave a significant control of the beanfly (Melanagromyza phaseoli Tryon.), galerucid beetle (Madurasia obscurella Jacoby), whitefly (Bemisia tabaci Gennadius) and reduced the yellow-mosaic incidence and increased the grain production significantly over the control. The residual toxicity of these insecticides was noticed up to 48 days after application. The interactions between granular and spray insecticides were also significant. The combinations of aldicarb granules followed by oxydemeton-methyl or monocrotophos sprays, phorate granules followed by oxydemeton-methyl sprays, and monocrotophos granules followed by monocrotophos sprays reduced the yellow-mosaic incidence and increased the grain yield of blackgram (V. mungo) significantly over other treatments and the control. [AS]

***0623** Naidu, K.P.S. ; Rao, A.S.H. 1973. **Screening of moong varieties for important insect pests [resistance] during 1972 kharif season at the Agricultural Research Institute, Rajendrangar, Hyderabad - A.P.** IN: Proceedings [of the] ninth workshop (kharif pulses). New Delhi : ICAR. p.127-131. (REP.MB-1474)

MEETING: Workshop on (kharif Pulses), 9th -- New Delhi, India, Jun 7-9, 1973

Mungbean is subjected to attack by about a dozen pests when it is grown either as monoculture or in rice fallows in Andhra Pradesh. Nine mungbean varieties were screened for resistance to important pests prevalent in the region during 1972-73 kharif season. All varieties were attacked by galerucid beetle, jassid, leaf miner, whitefly, pod borer and stem borer at different degrees. The application of soil insecticide, aldicarb, at the rate of 1.5 kg a.i./ha at the time of sowing followed by foliar spraying of endosulfan at 0.07% concentration at the 4th and 6th week after sowing gave very good control of mungbean pests and yielded five times more than untreated check. [THH]

***0624** Ooi, P. 1973. **Some insect pests of green gram, Phaseolus aureus.** MALAYSIAN AGRICULTURAL JOURNAL, v.49(2):131-142. [En] [En Abst] (REP.MB-0567)

The most important pest of Vigna radiata is the beanfly Ophiomyia phaseoli Tryon, while the other important pests are Prodenia litura F., Lamprosema diemenalis Guen., Apogonia spp., Pagria sp. and Riptortus linearis F. Aserica sp., Lepadoretus sp., Atractomorpha sp., Elimaea sp., Homoeocerus serrifer Westw., Coptosoma sp. and Bothrogonia ferruginea F. also feed on this plant but

do relatively little damage. A parasite, Plutarchia sp. (Eurytomidae) was found to parasitize the beanfly while Lamprosema diemenalis Guen. was parasitized by a braconid Apanteles sp. Prodenia litura F. takes 40.2 days to develop from egg to adult. [AS]

***0625** Saxena, H.P. ; Singh, Y. ; Phokela, A. 1973. **Effect of date of sowing on pest incidence.** IN: Proceedings [of the] ninth workshop (kharif pulses). New Delhi : Indian Council of Agricultural Research. p.115. (REP.MB-1471)

MEETING: Workshop [on] kharif Pulses, 9th -- New Delhi, India, Jun 7-9, 1973

Four weekly sowings of blackgram S.1 was carried out in four replicated plots of 1.5 m x 3.0 m each. The crop was not protected with insecticides. Observations on the damage to the leaves due to the galerucid beetle were recorded twice in the crop sown on different dates. The maximum damage was observed during the second observation. Later, infestation of jassid (Empoasca kerri Pruthi) was also observed in the crop sown on different dates and a number of nymphs and adults of the jassids per plant were counted. Damages to pods by blue butterfly larvae were recorded at the time of maturity. [AS]

***0626** Singh, S.R. 1973. **Entomological research activities at IITA.** IN: ©[pProceedings of the first IITA grain legume improvement workshop. Ibadan : International Institute of Tropical Agriculture. p.279-281 [En] (REP.MB-1055)

MEETING: IITA Grain Legume Improvement Workshop, 1st -- Ibadan, Nigeria, Oct 29-Nov 2, 1973

The susceptibility of 7 species of grain legumes to pest insects was evaluated. Cajanus cajan, Vigna mungo, and V. umbellata were significantly less damaged by Laspeyresia ptychora and coreid bugs than were V. unguiculata, Phaseolus lunatus, V. radiata and Glycine max. [THH]

***0627** Agnihotri, N.P. ; Pandey, S.Y. ; Jain, H.K. 1974. **Persistence of BHC and aldrin in soil and translocation in mung (Phaseolus aureus L.) and lobia (Vigna sinensis siva).** INDIAN JOURNAL OF ENTOMOLOGY, v.36(4):261-267. [En] [En Abst] (REP.MB-1344)

Lindane and aldrin dusts were applied in furrows at the rate of 10 kg a.i./ha at the sowing time which resulted in residues of 16 ppm lindane and 12 ppm aldrin. At the end of 100 days, 97.5% lindane and 87.9% aldrin was lost from the soil. Aldrin was found to be converted into dieldrin and the maximum concentration was reached on the 30th day after treatment; 80.8% of this recovered dieldrin degraded during the subsequent 70 days period. Residues of lindane and aldrin translocated in mungbean and cowpea. The translocation was faster in cowpea than in mungbean. The absorption of aldrin was slightly higher than lindane. Aldrin moved in plants principally in the form of dieldrin which degraded rapidly in stem, leaves and pods. At the harvest time, in aldrin treated plots, mungbean contained 0.12 ppm aldrin and 0.03 ppm dieldrin and the relative concentration in cowpea was 1.12 ppm aldrin and 0.09 ppm dieldrin. In lindane treated plots, mungbean and cowpea contained 0.04 and 3.75 ppm lindane, respectively. [AS]

***0628** Joplin, C.E. 1974. **Pulse crops of the world and their important insect pests.** Burnaby, B.C. : Simon Fraser University. vii, 134p. [En] [En Abst] (Thesis - M.Sc. (Pest Management)) (SB608.L4J6)

Pulse crops (grain legumes) are an increasingly important source of protein for a majority of the world's people. This paper provides background information and selected references that a pest manager would find useful when working with an unfamiliar cropping system of pulses and their insect pests. The first chapter summarizes agronomic, economic, and nutritional data on 14 major species of pulses. References are provided to sources of information on these and 15 other important species. The second chapter identifies the insect genera and species that are important pests of pulses. Approximately 220 species of insects and related arthropods are catalogued indicating common name, commonly damaged pulse crop hosts, and selected references. Three species that are representative of common types of pest problems are described more thoroughly in terms of their biology, ecology, and control. These are Bemisia tabaci (Genn.) (Homoptera: Aleyrodidae), Heliothis armigera (Hubner) (Lepidoptera: Noctuidae), and Ophyiomia (=Melanagromyza) phaseoli (Tryon) (Diptera: Agromyzidae). The concluding chapter discusses the status and possibilities of pest management on pulse crops and provides information on several internationally important institutions that are conducting such work. [AS]

***0629** Ahmad, M. 1975. **Important insect pests of summer legumes in the Punjab Pakistan.** PAKISTAN JOURNAL OF SCIENTIFIC AND INDUSTRIAL RESEARCH, v.18(5):230-231. [En] (REP.MB-2686)

The present investigation was initiated to identify the pest insects of summer legumes, i.e., mungbean, blackgram, mothbean, cowpea and soybean grown in Punjab, Pakistan, during the summers of 1973 and 1974. The following pest insects were found infesting these legumes: whitefly, Bemisia tabaci; aphids, Aphis craccivora, Acyrthosiphon pisum; leafhoppers, Empoasca devastans and others; thrips, Caliothrips indicus and Thrips tabaci; Surface grasshoppers, Chrotogonus spp., Aiolopus spp., Acrida spp., Atractomorpha spp.; and storage pulse beetles, Callosobruchus maculatus, C. analis, and C. chinensis. A. craccivora, A. pisum and C. indicus were recorded for the first time in Pakistan. The whitefly, B. tabaci, ranks as the most destructive pest of pulse crops because it acts as a vector of yellow mosaic virus affecting blackgram, mungbean, mothbean and soybean in Pakistan. [THH]

***0630** Iswaran, V. 1975. **Seed pelleting with systemic insecticide (Aldicarb) for the control of pests of mungo (Phaseolus aureus L.).** ZENTRALBLATT FUER BAKTERIOLOGIE, PARASITENKUNDE, INFEKTIONSKRANKHEITENUND HYGIENE. ABT. 2: ALLGEMEINE LANDWIRTSCHAFTLICHE UND TECHNISCHE MIKROBIOLOGIE, v.130(S.):365-366. [En] [En De Abst] (REP.MB-1379)

In a field experiment it was shown that pelleting of Vigna radiata Wilczek seeds with systemic insecticide aldicarb (Temic 10 G) and activated charcoal together with Rhizobium inoculation resulted not only in significant increase in bean yield but also controlled pest infestation up to six weeks without spraying with any insecticides in the early stages. [AS]

***0631** Lumaban, M.D. ; Raros, R.S. 1975. **Yield responses of cabbage and**

mungo to injury by important insect pests in relation to insecticidal control efficiency. PHILIPPINE ENTOMOLOGIST, v.2(6):445-452. [En] [En Abst] (DBM-181)

Evaluation of cabbage yield in relation to the effects of insecticidal protection (Bacillus thuringiensis sprays) during different growth periods of the crop revealed that the injuriousness of Plutella xylostella was most critical during the period from 4 to 5 weeks after transplanting. Feeding injuries by the insect during earlier and later growth periods were relatively less critical to yield. A similar evaluation on mungbean, using insecticidal protection with acephate, also revealed that insect pest injury, mainly by aphids and leaf rollers, was most critical to yield when inflicted during the vegetative growth stage (3-4 weeks after seedling emergence). Insecticidal protection of the seedling, flowering and pod stages provided decreasing yield benefits, in that order. Towards more judicious pesticide use, it is recommended that insecticidal applications should provide protection during critical periods of crop growth but not necessarily for entire crop growth. [AS]

*0632 Saxana, H.P. ; Phokela, A. ; Singh, Y. 1975. **Effectiveness of carbofuran as seed treatment for controlling pest complex of 'moong' (Phaseolus aureus) and 'urd' (Phaseolus mungo).** ENTOMOLOGISTS' NEWSLETTER, v.5:27-28. [En] (REP.MB-2557)

During the summer of 1974, carbofuran seed treatment in protecting the mungbean and blackgram from their pest insects, viz., galerucid beetle (Madurasia obscurella), jassid (Empoasca kerri) and beanfly (Ophiomyia phaseoli), was tested. In these studies, 2% carbofuran was used for seed treatment whereas disulfoton 5G was applied in the soil at the time of sowing at the rate of 1.5 kg/ha. As a result of these treatments there was a considerable increase in the yield both of mungbean and blackgram. [THH]

*0633 Central Research Institute for Agriculture. 1976. **Mungbean research.** IN: CRIA annual report, 1972 and 1973. Bogor : Central Research Institute for Agriculture. p.176-177 [En] (REP.MB-1933)

Insecticides were screened for controlling beanfly (Agromyza sp.) leaf eaters (Phaedonia sp., Longitasus sp. and Prodenia sp.) and pod borers (Etiella sp.). Monocrotophos, mevinphos, tetrachlorvinphos and chlorpyrifos gave the best control of beanfly and pod borers. Those that were effective against the pests increased the yield over the check. [THH]

*0634 Harnoto 1976. **Insecticide screening against mungbean pest at Harjosari, Tegal, dry season 1975.** LAPORAN KEMAJUAN PENELITIAN SERI HAMA/PENYAKIT (RESEARCH PROGRESS REPORT), no.3:84-87. [In] [En] (REP.MB-2312)

Nine insecticides were tested for their effect on mungbean pests at the Seed Institute in Harjosari, Tegal (Cental Java) during the dry season of 1975. The insecticides were sprayed 3 times, 10, 30 and 50 days after planting at 400 l, 500 l and 600 l per hectare. There was no significant differences among the treatments in controlling beanfly (Ophiomyia sp.), the leaf eating insects and pod sucking insects. However, monocrotophos 60 WSC, dicrotophos 24 WSC, carbaryl 85 SP, Brocide 100 E, Harcros malathion 50 EC, fenetrothion 50 EC, Fenitral 50 EC, fenetrothion 50 EC and phenthoate 60 EC were more effective in

controlling pod borers. [THH]

***0635** Murthy, K.S.R.K. ; Srivastava, B.P. 1977. **Dissipation of malathion residues from green gram, Phaseolus aureus Roxb. seeds.** INDIAN JOURNAL OF ENTOMOLOGY, v.39(2):146-157. [En] [En Abst] (REP.MB-2591)

Detailed investigations were made to determine the extent of malathion residues on mungbean (Vigna radiata) seed at 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 months intervals after treatment with 10, 20, 30, 40, and 50 ppm of malathion. The insecticide residues were determined both by chemical assay (colorimetric method) and microbioassay using Drosophila melanogaster Meig. as the test insect. Half-life value of malathion on mungbean seed was found to be 2.46 months. The malathion residues in case of 10, 20, 30, 40, and 50 ppm application rates were found to reach below the tolerance limit of 2 ppm prescribed by the Govenment of India in 4.68, 5.71, 6.71, 7.33, and 11.37 months, respectively. The grain required to be stored for 6 and 9 months can safely be treated with 20 and 30 ppm, respectively. [AS]

***0636** Pal, S.K. ; Rao, G.G.S.N. ; Kushwaha, K.S. 1977. **A note on the pest fluctuations in relation to weather elements on eight varieties of moong (Vigna radiata) under arid conditions.** INDIAN JOURNAL OF ENTOMOLOGY, v.39(4):375-376. [En] (REP.MB-2838)

An experiment was conducted under arid condition during kharif, 1976 to study the fluctuation in the pest population on 8 varieties of mungbean. Two main pests, viz., aphids (Aphis craccivora Koch.) and leaf weevil (Cyrtozemia cognata Marshall) were observed during the cropping season. The observations indicated that relative humidity above 80% with mean air temperature 27.5 to 28.5 C and low sunshine hours were favorable for the outbreak of A. craccivora. A relative warm period after a severe wet spell, with mean relative humidity 70 to 75% and increase in sunshine hours were conducive for the development of C. cognata. [THH]

***0637** Vyas, H.N. ; Saxena, H.P. 1977. **Observations on the phytotoxicity and plant stand due to disulfoton and phorate seed treatment in Vigna radiata ('moong').** ENTOMOLOGISTS' NEWSLETTER, v.7(9/10):44-45. [En] (REP.MB-2755)

The application of disulfoton and phorate at 1.5 kg a.i./ha in soil at the time of sowing is known to be effective for the control of mungbean pests such as galerucid beetle (Madurasia obscurella Jacoby) and jassid (Empoasca kerri Pruthi) in India. Seed treatments with 1% and 2% by weight of these compounds failed to increase the grain yield. When the seeds treated at 4%, 6% and 8% by weight of these compounds, the germination was delayed by 2-4 days and plant stand was considerably reduced. The symptoms of phytotoxicity in plants were up to 95.16% and 71.59% when the seeds were treated with 8% of disulfoton and phorate, respectively. It is concluded that these compounds applied to mungbean seeds should not exceed 6%. [THH]

***0638** Chiang, H.S. ; Su, C.Y. ; Rose, R.I. 1978. **Major mungbean insect pest management alternatives.** IN: The 1st International Mungbean Symposium. Shanhua, Tainan : AVRDC. p.180-182 [En] (SB205.M8I5)

MEETING: International Symposium on Mungbean, 1st -- Los Banos, Philippines, Aug 16-19, 1977

A total of 100 AVRDC mungbean accessions selected for superior agronomic traits and used as parental lines were screened for beanfly resistance in Taiwan, Thailand and Indonesia. Twelve of them were moderately resistant at two locations and one accession, V 2500, was moderately resistant at all 3 test sites. Accessions were also evaluated at AVRDC for resistance to cowpea aphids, and 14 were from aphid attack. Nine insecticides were evaluated for beanfly control. Oxamyl 24 1 (0.25 kg, a.i./ha) was the most effective in the autumn. Phorate 10 G (2 kg, a.i./ha), DDT 25 EC (0.5 kg, a.i./ha), and carbofuran 40 F (2 kg, a.i./ha) foliar sprays provided the most effective control in the early spring. In late spring, phorate and disulfoton 5 G (2 kg, a.i./ha) granular treatments were the most effective. Phostoxin (1.6 g / A total of 1000 l) afforded the most effective protection against southern cowpea weevil. In addition to the phostoxin treatment, peanut oil at the rate of 2.0 ml/kg of mungbean seeds provided protection from the pest for up to 4 months. [THH]

***0639** Litsinger, J.A. ; Price, E.C. ; Herrera, R.T. ; Bandong, J.P. ; Lumaban, M.D. ; Quirino, C.B. ; Castillo, M.B. 1978. **Introducing pest control technology to a low management crop: the mungbean example in the Philippines.** IN: The 1st International Mungbean Symposium. Shanhua, Tainan : AVRDC. p.183-191 [En] (SB205.M8I5)

MEETING: International Symposium on Mungbean, 1st -- Los Banos, Philippines, Aug 16-19, 1977

Two years' research, 1975-76, revealed that mungbeans are attacked by 26 insects, 6 diseases, and 2 nematodes from the seedling through post harvest in the Philippines. The present paper points out the issues behind the yield gap between farmers fields and research fields and the implications to future research and extension efforts. [THH]

***0640** Rejesus, R.S. ; Banasihan, V.P. 1978. **Critical growth stages for insecticidal application in mungbean.** IN: The 1st International Mungbean Symposium. Shanhua, Tainan : AVRDC. p.192-194 [En] (SB205.M8I5)

MEETING: International Symposium on Mungbean, 1st -- Los Banos, Philippines, Aug 16-19, 1977

An experiment was conducted to define the proper timing of insecticidal treatments in relation to the growth stages of mungbeans. During the dry season, insecticide spraying at 3+17+31+45 days after emergence (DAE) produced the highest yield, and during the wet season two sprayings at 31+45 DAE gave the best yield. [THH]

***0641** Singh, R.N. ; Singh, K.M. 1978. **Influence of intercropping on succession and population build up of insect-pests in early variety of red gram, Cajanus cajan (L.) Millsp.** INDIAN JOURNAL OF ENTOMOLOGY, v.40(4):361-375. [En] (REP.MB-2813)

The change in the crop canopy brought about by intercropping of mungbean,

blackgram, cowpea, sorghum and pearl millet had caused considerable impact on the succession and incidence of insect pests of red gram. This was evidenced by the findings that the appearance of almost all the major pests had been delayed except the flower and pod damaging insects, which although appeared simultaneously in mono- and intercrops of red gram, their initial incidence was much lower in the latter cases. For example, by intercropping of mungbean the appearance of green jassid, leaftier, membracid, bug and Nezara was delayed by two, eight, two and two weeks, respectively. Maximum reduction from 33 to 75% in incidence of jassid took place when red gram was intercropped with pearl millet. Intercropping of pulses brought down the incidence by 8 to 33%. Intercropping with blackgram, cowpea and pearl millet resulted in greater reduction in the incidence of bug in comparison to other intercrops. No consistent picture emerged by intercropping on the incidence of leaftier. Its incidence declined with sorghum and pearl millet intercropping. There was dramatic reduction in the incidence of membracid by intercropping which ranged from 36 to 100%. Considerable reduction in the incidence of green stink bug was observed by the intercropping of red gram with sorghum and pearl millet intercropping. There was considerable reduction in the incidence of flower eating beetle by intercropping except with cowpea. Pulse intercrops showed reduction in the incidence of podborer upto 56%. [AS/PLH]

***0642** Surulivelu, T. ; Chelliah, S. ; Balasubramanian, G. 1978. **Evaluation of granular insecticides and seed treatment formulations for the control of insect pests of blackgram.** MADRAS AGRICULTURAL JOURNAL, v.65(10):693-694. [En] (A:PS)

A field experiment was conducted to evaluate the efficacy of certain granular insecticides and seed treatment formulations for the control of beanfly (Ophiomyia phaseoli Tryon), leafhoppers (Empoasca kerri Pruthi) and whitefly (Bemisia tabaci). The treatments were soil application of disulfoton, aldicarb and phorate granules at 1 kg a.i./ha along with seed treatments of carbofuran 2 g and 4 g a.i./100 g seed and untreated check. The results indicated that all the insecticidal treatments were effective to control the pest insects and increased the grain yield. However, aldicarb and carbofuran 4 g treated plots recorded the lowest populations of beanfly, leafhopper and whitefly. Carbofuran 2 g and aldicarb treatments recorded 433 and 425 kg/ha seed yield, respectively, while the untreated check yielded only 131 kg/ha. [THH]

***0643** Jamornmarn, S. ; Sinchaisri, N. 1979. **The role of pest management on mungbean in multiple cropping system.** IN: Mungbean in cropping system in Central Thailand. Bangkok : Kasetsart University. p.52-63 (Kasetsart University, Faculty of Agriculture, Technical Bull. no.1) (SB205.M8K3)

Three pest insects were found on mungbean at Bangpae, Thailand. They are bean thrips (Taeniothrips longistylus Karny), flea beetle (Longitasus manilensis Weise) and an unidentified red spider mite. A program of insect pest management system was set up and would be extended to the farmers. [THH]

***0644** Pawar, V.M. ; Chavan, K.M. 1979. **Effect of systemic insecticides on germination and seedling development in green gram (Vigna aureus Hepper).** INDIAN JOURNAL OF ENTOMOLOGY, v.41:405-408. [En] (REP.MB-2861)

Seeds of mungbean were treated with carbofuran 40 F, in 40 EC, dimethoate 30 EC, phosphamidon 100 EC and formothion 25 EC at 1, 3, 5% a.i. on 100 g of seed. The germination percentage was considerably reduced in all treatments of dimethoate and in 5% a.i. of monocrotophos. The rest of the treatment were at par with the control. The radicle length was reduced in all concentrations of insecticides tested except carbofuran 1% and in 5%. None of the insecticides tested accelerated the plumular growth. [THH]

*0645 Litsinger, J.A. ; Price, E.C. ; Herrera, R.T. 1980. **Small farmer pest control practices for rainfed rice, corn, and grain legumes in three Philippine provinces.** PHILIPPINE ENTOMOLOGIST, v.4(1/2):65-86. [En] [En Abst] (A:PS)

Small farmers employ a wide array of traditional and modern insect, disease, and vertebrate pest control practices. Traditional methods include religious and magical practices, and the use of plant parts as repellants or attractants. Hand removal of insects from crops and alarm mechanisms to repel vertebrate pests are the common mechanical/physical control practices. Farmer awareness of cultural control practices such as planting time, crop rotation, increased seeding rate, synchronous planting, and intercropping was high. Farmers are knowledgeable of the concept of plant resistance to pests and employ resistant varieties when available; however, they are ignorant of the role of parasites and predators as biological control agents. Most farmers do not use fungicides because they do not recognize plant diseases as living organisms. All farmers have access to knapsack sprayers and use insecticides, although infrequently and often badly timed. Insecticide applications are often ineffective because farmers under dose by a factor of 3 to 10. Farmers follow directions as written on container labels in terms of tablespoons per sprayer load. However recommended dosages are based on spray volumes of 1,000 L/ha, whereas farmers average 135 L/ha. [AS]

*0646 Litsinger, J.A. ; Bandong, J.P. ; Paragna, F. 1980. **Field evaluation of foliar insecticides for preflowering mung bean insects, Pangasinan, Philippines, 1977-78.** INSECTICIDE AND ACARICIDE TESTS, v.5:138-139. [En] (REP.MB-2664)

Several insecticides were screened for the control insect pest of mungbean on a farmer's field in the Philippines. Monocrotophos, triazophos, phosalone, deltamethrin, cyanofenphos, fenthion, carbophenothion, and dimethoate performed well against the beanfly. Although the flea beetle infestation was low, good control was achieved by all insecticides except tetrachlorvinphos, phosphamidon, MTMC, fenthion, cartap and bufencarb. All but two insecticides - cartap and MTMC - controlled aphids. Highest yields were obtained with monocrotophos, carbaryl, Metasystox, parathion, deltamethrin, and phosalone indicating that perhaps other insects were limiting yield. Insignificant yield responses occurred with malathion, methomyl, ethylan, bufencarb, and EPN. [AS/NST]

*0647 Litsinger, J.A. ; dela Cruz, C.G. ; Paragna, F. 1980. **Field evaluation of foliar insecticides for preflowering mung bean insects, Pangasinan, Philippines, 1978-79.** INSECTICIDE AND ACARICIDE TESTS, v.5:140-141. [En] (REP.MB-2663)

The foliar applications of commericially available insecticides comparable

in performance to monocrotophos were evaluated on 2 and 12 days old mungbean plants against preflowering insects. Each insecticide was applied to 4 replicated plots (50 sq.m) in a randomized complete block design. Spray volume averaged 400 l/ha. All plots, including the check, received postflowering insecticide (0.05 kg a.i. deltamethrin/ha). Plastic sheeting (1 m wide) was held between plots to prevent spray drift. The trials were conducted during the dry season in the village of Poo, Manooag municipality, Pangasinan province. Mungbean (300,000 plants/ha) was broadcast sowed and harrowed into tilled soil on fields previously planted to puddled rice during the monsoon season. Fields were irrigated once to ensure even germination. Rainfall was 0 mm, RH averaged 79%, and the mean daily maximum and minimum temperatures were 31 C ad 19 C, respectively, for the crop period. Beanflies were counted by dissecting 25 plants/plot. Flea beetle damage was estimated visually as % defoliation on a per-plot basis. Aphids were scored (1-9 scale) on a per-plant basis expressed as an average/plot: 1=no aphids, 3=winged aphids, 5=several colonies, 7=many distinct colonies, 9=many coalesced and indistinct colonies. Yield was based on 15 sq.m. Of the nonpyrethroids - triazophos, omethoate, dimethoate, fenthion, and carbophenothion were equal to monocrotophos for beanfly control at 0.25 kg a.i./ha. All four synthetic pyrethroids tested were effective against beanfly, particularly permethrin (0.02 kg a.i./ha) and deltamethrin (0.01 kg a.i./ha). Deltamethrin at 0.005 kg a.i./ha was promising. All of the insecticides tested performed well against flea beetle and aphids. Phosalone, phosmet, ethion, and Metasystox were not particularly effective against beanfly, but they did produce high yields, indicating that perhaps other insects were causing yield losses. [AS/THH]

***0648** Venkataramaiah, C. ; Reddy, A.J. ; Chandrasekharam, V. 1980. **On DDT-induced 'radicular proliferation' in Phaseolus mungo Linn.** CURRENT SCIENCE, v.49(6):242-243. [En] (A:PS)

The blackgram seedlings treated with DDT showed retarded growth of the seedlings. [THH]

***0649** Lin, C.S. 1981. **Resistance of beans to insects.** CHINESE JOURNAL OF ENTOMOLOGY, v.1(2):1-6. [En] [En Ch Abst] (A:PS)

Mungbean varieties (V 2535 and V 2533) were moderately resistant to the beanfly and leaf miners. The mechanism of resistance was antixenosis. Cowpea was highly resistant to the feeding adult of the Chinese rose beetle. There is a significant negative correlation between leaf toughness and the percent area damage by the Chinese rose beetle. Among the test varieties, increase in the toughness of the leaves decreased the percent area of damage by this beetle. [AS]

***0650** Vyas, H.N. ; Saxena, H.P. 1981. **Toxicological and persistence studies of some insecticides in relation to pest complex and plant growth of green gram, Vigna radiata (L.) Wilczek and field pea, Pisum sativum L.** PULSE CROPS NEWSLETTER, v.1(1):98. [En] (A:PS)

Various insecticidal treatments were evaluated against important pests of mungbean and pea during 1976-78. The results showed that disulfoton 5 G, 1.5 kg a.i./ha applied in soil and 4% seed treatment with carbofuran proved to be very effective in controlling galerucid beetle (Madurasia obscurella Jacoby),

beanfly (Ophiomyia phaseoli Tryon) and leaf miner (Acrocercops phaseospora Meyr) on mungbean. Monocrotophos (0.04%) and endosulfan (0.07%) sprays were useful in reducing the jassid population at later stage of mungbean growth and in minimizing the pod borer damage. A similar trend was also observed in pea. The correlation coefficient between plant height, leaf and grain yield was positive in both mungbean and pea. Insecticide residues in the dry seeds were not detectable, and there was also no danger of soil contamination with the insecticide residues. [THH]

***0651** Yein, B.R. ; Singh, Harcharan 1981. **Effects of some agricultural chemicals on the control of chewing insect pests of greengram.** JOURNAL OF RESEARCH (PUNJAB AGRICULTURAL UNIVERSITY), v.18(1):30-36. [En] [En Abst] (REP.MB-2311)

The treatment, involving the application of endosulfan at 0.12 kg of a.i./ha as two sprays applied 4 and 8 weeks after sowing mungbean, was the most effective in controlling the galerucid beetle (Luperodes sp.) and semi-looper (Anomis flava Fab.). The treatment gave 65 to 80 and 24 to 25% reduction in the number of holes and in the infestation of leaves, respectively, by the beetle and 76 to 78% mortality of the semi-looper as compared with control. Soil application of aldicarb (1.5 kg of a.i./ha), gave 30 to 31 and 3 to 6% reduction in the number of holes and in the infestation of the leaves, respectively, by the beetles and 43 to 46% mortality of the semi-loopers, was however, appreciably less effective in controlling the pests. In the case of the pod-borer (Etiella zinckenella Treit.) of lima bean both pesticides were ineffective. Application of nitrogenous (12.5 kg of N/ha), and phosphatic (40 kg of P/ha) fertilizers in the absence of pesticides, on the other hand, increased the build-up of the populations and infestation of plants by all the pests under study. Thus the use of the fertilizers, without the pesticides, gave non-significant marginal increase in yield over that from the control. For getting higher yields of mungbean it was found necessary to use pesticides as well as fertilizers. [AS]

***0652** Gajbhiye, V.T. ; Agnihotri, N.P. ; Jain, H.K. ; Sinha, S.N. ; Srivastava, K.P. 1982. **Residues of important synthetic pyrethroids in pulse crops (chick-pea, green gram and black gram).** JOURNAL OF ENTOMOLOGICAL RESEARCH, v.6(2):137-139. [En] [En Abst] (REP.MB-2646)

Residue of synthetic pyrethroids, viz., permethrin, cypermethrin, fenvalerate and decamethrin on chickpea (Cicer arietinum Linn.), mungbean [Vigna radiata (L.) Wilczek.] and blackgram [Vigna mungo (L.) Hepper] were determined at harvest. In the case of pea crop (Pisum sativum Linn.), residues were determined in pods and green seeds at different time intervals. The crops were sprayed at pod formation stage with 0.015% permethrin, 0.0075% cypermethrin, 0.02% fenvalerate and 0.005% decamethrin. The residues were determined by gas-liquid chromatography. The straw samples of all the crops were found to contain excessive residues. Except pea, there was translocation of insecticide residues in the grains of all the crops, but the level remained below the prescribed maximum residue limit. There was no translocation of any insecticide into green peas. [AS]

***0653** Venugopal, M.S. ; Litsinger, J.A. ; Apostol, R.F. 1982. **Field evaluation of insecticide seed treatments for preflowering mungbean insect**

pests, 1981. INSECTICIDE AND ACARICIDE TESTS, v.7:94. [En] (REP.MB-2761)

Insecticides as seed treatments at 10 g a.i./100 kg seed were tested at IRRI for control of preflowering mungbean insect pests. Mungbean seeds (100 kg/ha) were shaken in a plastic bag with each insecticide and 25% gum arabic before sowing to 5 sq.m plots on Feb. 26 in a randomized complete block design with 3 replications. Plant stand was thinned to 300,000 plants/ha after emergence. The Santa Rita series soil (clayey amorphos isohyperthermic, Typic Hapludolls) -- pH = 6.5, 52% pore space, 2.7% organic matter, 34% clay, 36% silt, 30% sand -- averaged 39 and 28 C for daily maximum and minimum temperatures at 5 cm depth, respectively, the first 14 days after sowing. There was no rainfall during this dry season trial, but the plots were irrigated with overhead sprinklers. In each plot at 21 days after crop emergence (DE), 25 random plants were dissected for evidence of beanfly stem tunneling and 25 leaf bud terminals were removed randomly, placed in 70% ethyl alcohol for counting thrips under a microscope. All plots including the untreated control received postflowering insect pest protection with 0.03 kg a.i. decamethrin EC/ha 25, 35, 45 DE. Yield cuts were 5 m row per plot. Carbofuran 30ST, promecarb 38SP, chlorthiophos 25SP, and chlorthiophos 25ST provided the best control of both beanfly and thrips under heavy pest pressure. For an unexplained reason, formetanate hydrochloride 50SP gave a superior yield without significant insect control. Dioxacarb 50WP was phytotoxic to explain the low thrips count. [AS]

***0654** Singh, A.K. ; Gupta, D.S. ; Hameed, S.F. 1983. **Translocation and dissipation of disulfoton in mung bean, Vigna radiata var. aureus Hubn.** JOURNAL OF ENTOMOLOGICAL RESEARCH, v.7(2):127-132. [En] [En Abst] (REP.MB-2601)

Translocation and dissipation of disulfoton residues following application of four doses, viz., 1.0, 1.5, 2.0 and 2.5 kg a.i./ha at the time of sowing of mungbean, Vigna radiata var. aureus Hubn., were evaluated by microbioassay and colorimetric methods. Residues of disulfoton in the soil immediately following its application were 9.75, 13.15, 16.84 and 19.05 ppm due to respective four doses. Dissipation rates increased with the increase in dosage rates of disulfoton. On the 20th day after application, the dissipation was 67.65, 71.05, 73.70 and 75.65% corresponding to these four doses. Its half-life in the soil ranged from 12.54 to 13.11 days. The amount of disulfoton translocated into mungbean plant reached its maximum on the 20th day, being 2.45, 4.44, 5.36 and 7.08 ppm for the four dosages, respectively. At harvest, 66 days after application, the residue was below the detectable level both in the soil and plant. [AS]

***0655** Singh, K.N. ; Srivastava, B.P. ; Nath, G. 1983. **Phosphine residues and its effect on the germination of stored pulses.** INDIAN JOURNAL OF ENTOMOLOGY, v.45(1):71-80. [En] [En Abst] (REP.MB-2537)

The residues of phosphine in mungbean resulting from treatment of 2, 4 and 8 tablets/ton were found to reach the tolerance level of 0.01 ppm in 0.07, 0.50, and 1.63 days, respectively. The corresponding time taken for residues to reach the lowest level of detectability (0.001 ppm), was 1.68, 2.51 and 4.34 days. In cowpea phosphine residues were found to reach the tolerance level of 0.01 ppm in 0.10, 1.19 and 2.19 days and the corresponding time for the residues to reach the lowest level of detectability was found to be 2.49, 3.85 and 5.38 days for 2, 4 and 8 tablets/ton, respectively. In the case of pea the residues of phosphine resulting from treatment of 2, 4 and 8 tablets/ton were

found to reach the tolerance level of 0.01 ppm in 0.17, 1.26 and 2.51 days respectively, while the residues reached the lowest level of detectability in 1.78, 2.88 and 4.78 days, respectively. Only half a minute washing of samples of fumigated pulses collected zero day after aeration resulted in reduction of residues to 0.002-0.005 ppm indicating thereby that if washing of grains can be assured, the commodities can be released to consumers immediately after exposure period is over. Normal cooking/boiling (15-20 min) also readily removed phosphine residues below the detectable level. Since none of these pulses are eaten raw and are often subjected to prior cooking/boiling before consumption, they may be consumed even immediately after exposure period is over. Phosphine fumigation did not impair the germination of mungbean, cowpea and pea seeds, even in case of fumigation with excess dosages of 4 and 8 tablets/ton. [AS/NST]

***0656** Talekar, N.S. ; Chen, B.S. 1983. **Seasonality of insect pests of soybean and mungbean in Taiwan.** JOURNAL OF ECONOMIC ENTOMOLOGY, v.76(1):34-37. [En] [En Abst] (AVRDC/JP/76) (REP.MB-2359)

Seasonality of various insect pests of soybean and mungbean was studied by planting the host plants once every 2 weeks over 6 years. The beanfly, Ophiomyia phaseoli (Tryon), and two other agromyzids, Melangromyza sojae (Zehntner) and O. centrosematis de Meijere, although they occur throughout the year, only cause severe damage during the autumn season. The southern green stink bug, Nezara viridula (L), infests soybean and mungbean between May and October; Anomala cupripes Hope and A. expansa Bates occur from mid-April through October; and limabean podborer, Etiella zinckenella (Treitschke), remains active between September and May. Aphis glycines Matsumura infests soybeans mainly during October through March, the cooler time of the year. [AS]

***0657** Verma, A.N. ; Bhanot, J.P. ; Khurana, A.D. 1983. **Effect of pre-sowing soil application of BHC and aldrin on plant stand in wheat and moong.** HARYANA AGRICULTURAL UNIVERSITY JOURNAL OF RESEARCH, v.13(1):150-152. [En] [En Abst] (REP.MB-2633)

Repeated applications of insecticides to the same field may result in their accumulation to rather undesirable high levels, which may interfere with the germination and plant stand of the crops sown therein. A study on the effect of pre-sowing soil application of BHC and aldrin on plant stand in wheat and mungbean was conducted. The results revealed that pre-sowing soil application of aldrin dust at doses as high as 125 kg a.i./ha did not adversely effect the plant stand in wheat but at 50 kg a.i./ha considerable reduction in the stand of mungbean plants was observed. The high doses of soil applied BHC dust, 50 kg a.i./ha for mungbean and 100 kg a.i./ha for wheat, resulted in considerable reduction in the stand of both wheat and mungbean. [THH]

***0658** Dhuri, A.V. ; Singh, K.M. ; Singh, R.N. 1984. **Incidence of insect pests in black gram Vigna mungo (L.) Hepper.** INDIAN JOURNAL OF ENTOMOLOGY, v.46(3):270-276. [En] [En Abst] (REP.MB-2871)

Fairly high mean ambient temperature around 30-32 C seems to be most conducive in the population build up of various insect pests of blackgram. High temperature that prevails during summer season contributes to decline in the pest incidence, whereas scattered rains followed by fairly high relative

humidity favour the population build up of pests resulting in higher levels of incidence in the kharif crop. Incidence of major insect pests of blackgram as well as their natural enemies during kharif and summer crops is discussed. [AS]

*0659 Gurha, S.N. ; Misra, D.P. ; Singh, R.A. ; Gangal, L.K. 1984. **Yield stimulatory potential of temik and disyston in urid.** PESTICIDES, v.18(8):34-35. [En] (REP.MB-2532)

A field trial of blackgram variety PS 1 was conducted to evaluate the yield response due to aldicarb and disulfoton treatments, during kharif season of 1979. Dry weather condition considerably warded off the insect population and the prevalence of diseases. The average yields over control were higher by 60 and 27%, respectively, for plots treated with aldicarb and disulfoton. [THH]

*0660 Patel, K.G. ; Vyas, H.N. 1984. **Seasonal abundance of green lacewing, Chrysopa (=Chrysoperla) scelestes Banks on cotton, green gram and groundnut at Junagadh (Gujarat).** AGRICULTURAL SCIENCE DIGEST, v.4(1):7-8. [En] [En Abst] (REP.MB-2655)

Studies on the seasonal abundance of green lacewing, Chrysopa (=Chrysoperla) scelestes Banks on cotton, mungbean and groundnut crops at Junagadh during 1981-82, revealed that the Chrysopa population, comprising of average number of egg, larva and pupa per 20 plants was the highest in mungbean (22.25) during September, followed by cotton (18.25) and groundnut (5.00). The second peak of Chrysopa population was observed in the cotton crop during January. It coincided with aphid infestation. [AS]

*0661 Saxena, A.K. ; Rathore, V.S. ; Khatri, A.K. ; Choudhary, B.S. 1984. **Economics of insecticidal spray schedule on different blackgram varieties.** INDIAN JOURNAL OF PLANT PROTECTION, v.12(1):25-29. [En] [En Abst] (REP.MB-2830)

The blackgram is infested by six major pests, viz., green jassid, green semilooper, bean aphid, eumolpid flea beetle, pea thrips and pod borer. The eumolpid flea beetle, Colposcelis kanaraensis (Jacoby), appears to be the first record. The early varieties Pant U-30 and JU-78-4 were less infested by the pest complex and also higher yielding than others. The crop treated with insecticides gave an increased yield of 300 to 600 kg/ha (30 to 58% more) over the untreated (benefit/cost ratio 3.9 to 4.9), saving an avoidable loss of 23 to 37% due to the pest complex of blackgram. [AS]

*0662 Young, G.R. 1984. **A checklist of mite and insect pests of vegetable, grain and forage legumes in Papua New Guinea.** PAPUA NEW GUINEA JOURNAL OF AGRICULTURE, FORESTRY AND FISHERIES, v.33(1-2):13-38. [En] [En Abst] (A:PS)

Over 100 species of both mites and insects have been recorded as feeding on vegetables, grain and forage legumes in Papua New Guinea. A checklist of these pests is presented, giving host plants and localities, and some assessment of the type of damage. [AS]

*0663 Lal, S.S. 1985. **A review of insect pests of mungbean and their control in India.** TROPICAL PEST MANAGEMENT, v.31(2):105-114. [En] [En Abst] (A:PS)

This paper reviews the studies of various insect pests infesting mungbean, Vigna radiata (L.) Wilczek, in India. A total of 64 species of insects reported to attack mungbean in the field have been tabulated. Information on distribution, biology, ecology, natural enemies, cultural, varietal and chemical methods of control, etc. of whitefly, Bemisia tabaci Genn, leaf hopper, Empoasca kerri Pruthi, black aphid, Aphis craccivora Koch, Bihar hairy caterpillar, Diacrisia obliqua (WIK), galerucid beetle, Madurasia obscurella Jacoby, stem fly, Ophiomyia (Melanagromyza) phaseoli (Tryon), lycaenid borer, Euchrysops cnezus Fabr, and spotted caterpillar, Maruca testulalis Geyer, is included. [AS]

*0664 Misra, S.G. ; Gupta, A.K. 1985. **Effect of organophosphorus insecticides on nitrogen metabolism during germination of mung and cowpea.** PESTICIDES, v.19(10):31-33. [En] (REP.MB-2804)

The present study was undertaken to clarify the effect of four organophosphorus insecticides on soluble and insoluble nitrogen content of the germinating seeds of mungbean and cowpeas. Seeds of both mungbean and cowpea were sown in petri dishes containing 50 gms of silica sand and 25 ml aqueous solution (25, 50 and 100 ppm) of phorate, disulfoton, monocrotohpos and fensulfothion. Samples were analysed 2, 4, and 6 days after germination. Synthesis of proteolytic enzymes and their activity is not affected by organophosphate insecticides used at normal dose. [THH]

*0665 Sinha, S.N. 1985. **Field screening of insecticides for seed treatment of pulses. 1. Green gram (Vigna radiata (L.) Wilczek).** SEED RESEARCH, v.13(1):120-128. [En] [En Abst] (REP.MB-2784)

Several insecticides and their dosages were evaluated for safe and effective treatment of seeds of mungbean, Vigna radiata (L) Wilczek during 1980, 1981 and 1982. Carbofuran at a concentration of 0.5% a.i. was found non-phytotoxic to the seedlings and did not impair germinability of treated seed under field conditions. It also protected the crop from the incidence of galerucid beetle, Madurasia obscurella Jacoby for about a fortnight. [AS]

*0666 Vongbuddhapitak, A. ; Thoophom, G. ; Atisook, K. ; Lertruengdej, Y. 1987. **Organochlorine residues in mungbean grown in Thailand in 1984.** THAI JOURNAL OF AGRICULTURAL SCIENCE, v.20(1):1-10. [En] [En Abst] (A:PS)

Mungbean samples collected from the major growing areas, northern and northeastern Thailand, were analyzed to study the current situation of organochlorine insecticide contamination. Acetonitrile/water extraction, alumina clean up and gas chromatographic quantitation were the main analysis procedures. DDT, endrin, dieldrin, toxaphene, heptachlor and chlordane were found in 27, 13, 11, 11, 5 and 1% of the total 101 analyzed samples, respectively. Almost all of the residues found were at or below the limit of quantitation which was very low. The level of the residues in mungbean was within the limit for human consumption based on the US administrative guidelines or action level. [AS]

***0667** Saxena, H.P. ; Kumar, S. ; Prasad, S.K. 1969. **Screening of germ plasm of pulse crops for insect resistance.** IN: Proceedings [of the] third annual workshop conference on pulse crops. New Delhi : Indian Council of Agricultural Research. p.138-142. [En] (REP.MB-1010)

MEETING: Annual Workshop Conference on Pulse Crops, 3rd -- New Delhi, India, Feb 3-5, 1969

A total of 132 lines of cowpea, 104 lines of mungbean and 100 lines of blackgram were screened for resistance against galerucid beetle, jassid (Empoasca kerri Pruthi), aphid (Aphis craccivora K.), semi-loopers (Plusia spp.) and leaf miner (Acrocercops spp.) during the kharif season of 1968. All lines of each crop exhibiting resistance should be further screened in larger plots and the most promising ones should be further tested by artificial infestation in a screen house. [THH]

***0668** Balboa, F.C. 1972. **Comparative resistance of five varieties of mungo, Phaseolus aureus Roxb., to the attacks of the bean fly, Agronomyza phaseoli Coq.** ARANETA RESEARCH JOURNAL, v.19(1):66-79. [En] (Thesis - B.S.A. (Entomology)) (REP.MB-0649)

Five mungbean varieties were used to study the relative resistance to the attack of beanfly, Ophiomyia phaseoli, in Rizal, the Philippines. The beanfly attacked the mungbean plants in all stages of growth but severe damage was made during seedling stage. The most resistant variety as indicated by the damaged and dead plants was Mungong Tagalog with only 14.81% plant mortality. The thickness of the pubescence and toughness of the stem of Mungong Tagalog seemed to be the main contributing factors in rendering the plants unsuitable for beanfly oviposition. [THH]

***0669** Vyas, H.K. ; Baser, S. ; Betala, S.R. ; Sharma, S.K. 1972. **susceptiability%susceptibility.** IN: Proceedings [of the] seventh workshop (kharif pulses). New Delhi : ICAR. p.124-126 [En] (REP.MB-1437)

MEETING: Workshop [on] kharif Pulses, 7th -- Bangalore, India, Jun 5-9, 1972

Varietal susceptibility of mungbean to gram pod borer, Heliothis armigera Hbn., was observed in two experiments. Varieties were classified as least susceptible, moderately susceptible and highly susceptible having 0 to 15%, 16 to 40%, and above 40% damaged pods, respectively. Among ten varieties of experiment 1, the least susceptible variety was NP 23 and highly susceptible L-24-2 with 4.1% and 46% pod damage, respectively. Experiment 2 comprised 16 varieties. The least damaged variety was Kheda 10 with 11.36% pod damage and the worst infested was GC 207 with 40.44%. [THH]

***0670** Kooner, B.S. ; Singh, Harcharan ; Singh, Kuldip ; Singh, K.B. 1973. **Screening of mung germ plasm against the incidence of whitefly, yellow mosaic virus and jassids.** IN: Proceedings [of the] ninth workshop (kharif pulses). New Delhi : Indian Council of Agricultural Research. p.148-152. (REP.MB-1476)

MEETING: Workshop [on] Kharif Pulses, 9th -- New Delhi, India, Jun 7-9, 1973

A total of 673 mungbean lines were screened for resistance to whitefly, mungbean yellow mosaic virus and jassids. four varieties, viz., 10866, LM 47, LM 141, and LM 364, were found to be resistant to whitefly as well as mungbean yellow mosaic virus. They were also relatively less infected by jassids. [THH]

*0671 Srivastava, A.S. ; Srivastava, K.M. ; Singh, L.N. ; Singh, R.P. ; Srivastava, R.L. 1975. **Relative susceptibility of some green gram (Phaseolus aureus Roxb.) varieties to galerucid beetle, Madurasia obscurella Jocob and pod borer, Euchrysops cnejus Fabricius.** LABDEV JOURNAL OF SCIENCE AND TECHNOLOGY, PART B: LIFE SCIENCE, v. 13(3/4):221-222. [En] [En Abst] (REP.MB-2681)

Eleven mungbean varieties were tested against galerucid beetle (Madurasia obscurella Jacob) and pod borer (Euchrysops cnejus Fabricius) to establish their relative susceptibility. None of them was resistant but considerable differences were evident in the level of susceptibility. [THH]

*0672 Tengkano, W. ; Soekarna, D. 1976. **Screening of mungbean (Phaseolus radiatus) varieties for resistance to the bean fly, Agromyza phaseoli Coq.** LAPORAN KEMAJUAN PENELITIAN SERI HAMA/PENYAKIT (RESEARCH PROGRESS REPORT), no.4:39-47. [En] (REP.MB-2060)

In all, 100 mungbean varieties were screened for resistance to beanfly (Ophiomyia phaseoli Tryon) at Bogor in September 1977 when the beanfly population was high. The adults on the seedling were counted each day from 5 to 12 days after sowing. The high number of adults was observed from 5 to 7 days after sowing. Plants of the most susceptible variety were killed by O. phaseoli. All varieties were susceptible. [THH]

*0673 Gunasekaran, G.R. ; Kumaresan, D. ; Balasubramanian, G. ; Jayaraj, S. ; Marappan, P.V. 1977. **Relative susceptibility of blackgram varieties to stem fly and pod borer.** MADRAS AGRICULTURAL JOURNAL, v.64(1):56-57. [En] (REP.MB-1992)

Blackgram is damaged severely by beanfly (Ophiomyia phaseoli Tryon) in the early stage and by pod borer (Catochrysops cnejus F.) at the pod formation. All 160 blackgram varieties were screened against beanfly during November 1973 and 33 varieties against pod borer during 1974. The beanfly incidence was 4 to 10% in the varieties Coconada, No 55, Karaikal, Killikulam, Khargoan 3, Vilakudi, US 131, Tenkasi, P 58, P 47, Udgir, L 32-5, Chicknabroad, B-1, Dhone, T 65 and 338-8 indicating high resistance in them. Among the 33 varieties, only one variety No 55 recorded a high resistance to pod borer with 8% damage. The variety No 55 was resistant to both beanfly and pod borer, recording 4 and 8% incidence, respectively. [THH]

*0674 Kooner, B.S. ; Singh, Kuldip ; Singh, Harcharan ; Singh, K.B. 1977. **Field-screening of mungbean germplasm against whitefly (Bemisia tabaci Genn.) and yellow mosaic.** JOURNAL OF RESEARCH (PUNJAB AGRICULTURAL UNIVERSITY), v.14(1):75-76. [En] [En Abst] (REP.MB-2538)

A preliminary field-screening of 504 germplasm lines of mungbean for resistance to whitefly (Bemisia tabaci Genn.) and yellow mosaic was conducted for two years. Eleven lines, namely 11148, ML-7, P 290, P 292, P 242, ML-1, ML-6, P 131, P 293, P 325 and P 364, were found to be the least susceptible both to the virus and the whitefly, whereas P-56, RS-9 and 11152 showed the maximum susceptibility. [AS]

***0675** Tengkano, W. ; Sutarno, T. ; Ganda, M. 1978. **[Varietal testing on the resistance of mungbean to the infestation of Ophiomyia phaseoli Tryon].** LAPORAN KEMAJUAN PENELITIAN SERI HAMA/PENYAKIT (RESEARCH PROGRESS REPORT), v.14:51-71. [In] [In Abst] (REP.MB-2313)
(NOTE: English translation is available)

In a cooperative project with the Asian Vegetable Research and Development Center (AVRDC), Taiwan, a total of 100 varieties were tested for their resistance to the infestation of O. phaseoli in September 1975. Varieties which had a slight attack in this testing, were retested in June 1976 in Cikeumeuh, Bogor Experimental Station. Aside of the cooperative project with AVRDC, the varietal testing was requested by the breeding section of Bogor Research Institute for Food Crops. Varieties showing low mortality were retested in November 1976 at the same locations. 3 varieties from AVRDC showed a mortality of 15% and 4 varieties from legume breeding section showed a mortality of 10% from the first and the second testing. One of those varieties, Green Gram MI (I) Yala (Bhakti), originated from Sri Lanka. It has 8.9% plant mortality. Based on the recommendation of the Department of Agronomy, the variety has a high potential yeild of 1,608 kg/ha. Aside of the Green Gram MI (I) Yala, Dau Mo Phouc-Try variety also had low infection; 8.8% plant mortality. The highest yield was 1.204 kg/ha. The Q (No.1360) variety received from AVRDC had 3% plant mortality in the first and 8% in the second testing. [AS]

***0676** Chhabra, K.S. ; Kooner, B.S. ; Singh, G. 1979. **Field resistance of certain cultivars of mungbean to whitefly, Bemisia tabaci G., and yellow-mosaic virus.** JOURNAL OF RESEARCH (PUNJAB AGRICULTURAL UNIVERSITY), v.16(4):385-388. [En] [En Abst] (REP.MB-2323)

Four cultivars, viz., ML 1, ML 3, ML 5 and LM 170, of mungbean (Vigna radiata W.) were tested against whitefly, Bemisia tabaci, and yellow mosaic virus (YMV) along with the 'infestor' for three crop seasons. All the cultivars were more resistant to whitefly and the virus than the 'infestor'. In overall performance, ML 1 and ML 3 were better than the other test cultivars. [AS]

***0677** Chhabra, K.S. ; Kooner, B.S. 1980. **Sources of whitefly, Bemisia tabaci G. and yellow mosaic virus resistance in Vigna radiata Wilczek.** TROPICAL GRAIN LEGUME BULLETIN, v.19:26-29. [En] (A:PS)

Seven cultivars were tested to confirm their resistance against whitefly and yellow mosaic virus (YMV). ML 1, ML 3, ML 5 and IM 170 had the lowest populations of whitefly and the lowest incidence of YMV. [PBA 52-6150]

***0678** Chhabra, K.S. ; Kooner, B.S. ; Brar, J.S. 1980. **Resistance behaviour**

of mungbean, Vigna radiata (L.) Wilczek cultivars against insect-pest complex and yellow mosaic virus. INDIAN JOURNAL OF ECOLOGY, v.7(2):276-280. [En] [En Abst] (REP.MB-2251)

Ninety one cultivars of mungbean, Vigna radiata (L.) Wilczek were screened for resistance to whitefly, Bemisia tabaci G.; jassid, Empoasca moti P.; pod borers, Lampides boeticus L., Maruca testulalis G. and Heliothis armigera H.; and yellow mosaic virus in the field for two seasons, 1977 and 1978. Four cultivars viz. ML 194, ML 195, ML 235 and 15127 were found to be resistant to these pests as well as the virus. [AS]

*0679 Chiang, H.S. ; Talekar, N.S. 1980. **Identification of sources of resistance to the beanfly and two other Agromyzid flies in soybean and mungbean.** JOURNAL OF ECONOMIC ENTOMOLOGY, v.73(2):197-199. [En] [En Abst] (AVRDC/JP/59) (REP.SB-608)

A total of 6775 soybean and 3713 mungbean accessions was screened for resistance to the beanfly, Ophiomyia phaseoli (Tryon), and 2 other agromyzids, O. centrosematis (de Meijere), and Melanagromyza sojae (Zehntner), in mass screening trials during 2 yr. Since no immune accessions were found in the preliminary screeding, we did a directional selection and screened the least affected entries a 2nd and 3rd time. We selected 16 soybean and 28 mungbean accessions that were least affected. When tested at 6 locations around Taiwan, 4 soybean and 3 mungbean accessions were least affected at all locations. These soybean accessions were highly resistant and mungbean accessions were moderately resistant to all 3 species. These accessions are now being used to breed resistance into high yield potential commercial varieties of these crops. [AS]

*0680 Talekar, N.S. 1980. **Search for beanfly resistance in soybean, mungbean, and snapbean.** IN: Proceedings of legume in the tropics. Serdang, Selangor : Universiti Pertanian Malaysia. p.293-299 (REP.SB-541)

MEETING: Symposium on Legumes in the Tropics -- Serdang, Selangor, Malaysia, 1979

A total of 6775 soybean and 3713 mungbean accessions from AVRDC and 369 snapbean accessions from CIAT were screened at AVRDC for beanfly resistance. Four soybean accessions, G 3089, G 3091, G 3104, and G 3122 are highly resistant. Three mungbean accessions, V 2396, V 3495, and V 4281 are considered to be moderately resistant. One snapbean accession, G 35023, fell in high resistance and seven accessions, G 35075, G 35122, G 08047, G 08408, G 05478, G 02472, and P 492 fell in the moderate resistance category. These material appear to be promising for use in a resistance breeding program. [THH]

*0681 Rajendran, R. ; Ramakrishnan, C. 1981. **Evaluation of black gram genotypes resistant to pod borers.** PULSE CROPS NEWSLETTER, v.1(2):66. [En] (A:PS)

All 112 lines of blackgram were screened for resistance to pod borers under the conditions of natural infection for four consecutive seasons of 1976-1980. All lines were sown in double rows of 5 m length with a spacing of 30 x 10 cm. Test lines were sown between the rows of local check CO 4. All normal cultural

practices were followed except pesticide application. The intensity of infestation was estimated by counting the total and damaged pods at the time of harvest. The results showed that three lines, viz., Thirunelveli, T. 168 and Sivapuri, were resistant, recording less than 4% pod borer infestation in all seasons as against the maximum of 18.0, 26.7, 15.5 and 17.5% infestation in the four seasons. [THH]

*0682 Singh, Ram ; Chauhan, R. 1984. **Screening greengram genotypes against Tarsonemus mite.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.54(8):669-670. [En] [En Abst] (A:PS)

Visual symptoms on leaves as a result of feeding by Tarsonemus sp. were found suitable for classifying the genotypes of mungbean [Vigna radiata (L.) Wilczek] into different categories. None of the 80 genotypes was immune and only TR 1-1093 showed a high degree of resistance. Three genotypes showed more than 80% leaf infestation and were considered highly susceptible. The rest were intermediate. [AS]

BEANFLIES

*0683 Rutherford, A. 1914. **The beanfly (Agromyza phaseoli, Coq.).** TROPICAL AGRICULTURIST: AGRICULTURAL JOURNAL OF CEYLON, v.42:411-413. [En] (REP.MB-2381)

In Sri Lanka, when Ophiomyia phaseoli Tryon (= Agromyza phaseoli Coq.) is present, the bean crop is often a complete failure. O. phaseoli was reared from mungbean and blackgram, and although growing in neighboring plots, the former was severely damaged. Several Chalcids were bred from infested material. The control methods of uprooting and burning of plants had the disadvantage of destroying any parasites that may be present. A cage covered with fine muslin would permit the parasites to escape, while retaining the flies. [THH]

*0684 Malloch, J.R.M. 1916. **A new species of Agromyza destructive to beans in the Philippines.** ENTOMOLOGICAL SOCIETY OF WASHINGTON, PROCEEDINGS, v.18:93. (REP.MB-1957)

A new agromyzid species, Agromyza (=Ophiomyia phaseoli), is described. This species often causes serious injury to cowpeas, mungbean and beans. [THH]

*0685 Otanes y Quesales, F. 1918. **The bean fly.** PHILIPPINE AGRICULTURIST, v.7(1):2-31. [En] [En Abst] (REP.MB-1373)

Agromyza destructor (=Ophiomyia phaseoli) is the worst pest to young beans in the Philippines. The pest is most destructive to kidney beans and cowpeas, especially from January to April. The Limas and the patani, both belonging to the same species, Phaseolus lunatus, are the most resistant to the attack of this pest. Batao (Dolichos lablab) and mungbean (Vigna radiata) are also resistant. As far as observed, seven species of beans are immune from the attack. This pest has two known hymenopterous parasites - Eurytoma poloni

Girault and Paratrigonogastra stella Girault - both belonging to the family Chalcididae. The control of this pest by spraying is a difficult matter and probably would not be a paying proposition. This pest can be more easily and cheaply controlled by cultural methods. Crop rotation and planting immune or resistant beans during the season of greatest destructiveness will undoubtedly operate to check the ravages of this pest. [AS/THH]

***0686** van der Goot, P. 1930. **The Agromyzid flies of some native pulses in Java.** MEDEDEELINGEN VAN HET INSTITUUT VOOR PLANTENZIEKTEN, v.78:1-97. [Nl] [En Abst] (REP.MB-2306)

Ophiomyia phaseoli Tryon (=Melanagromyza phaseoli Coqa) causes serious damage to kidney bean, soybean, mungbean, rice bean and other pulses in Java. Although Melanagromyza sojae Zehnt and M. dolichostigma de meijere are of no economic importance, they are still injurious to soybean and other plants. All of three these species are described with detailed notes on their life history, food plants, and parasites. The life cycle is completed within 21 days. Four pupal parasites, viz., Cynipoid sp., Trigonogastra agromyzae Dodd, Eurytoma poloni Gir., and Eurytoma sp. are recorded. The average parasitism is only 5%; the first 2 species are the most abundant. A list of different food plants is given with notes on the nature of damage. A few native varieties of soybeans seems to be more resistant to injury, but no immune varieties were found. For controlling this pest, a number of cultural control methods - ridging of young plants, fertilization, paddy straw cover and time of planting - were tried and reduced the mortality of young plants. [THH]

***0687** Sepswasdi, P. ; Meksongsee, B. 1971. **A study on the control of the beanfly (Melanagromyza phaseoli Coq.) on mungbean.** KASIKORN, v.44(4):289-293. [En] (REP.MB-0595)

Six insecticides were tested for controlling mungbean beanfly (Ophiomyia phaseoli) in Thailand. Application of carbofuran 10G, aldicarb 10G, and phorate 10G at sowing, or carbofuran 75WP at 3g a.i./100g seeds as seed treatments were effective in controlling O. phaseoli. These treatments significantly increased the growth and height of mungbean plants in comparison with untreated control plants. [THH]

***0688** Roongsook, D. ; Sitchawat, T. ; Knapp, F.W. ; Tiemtaisong, A. 1973. **The effect of phorate and malathion on beanfly control and on yield of mungbean.** THAI JOURNAL OF AGRICULTURAL SCIENCE, v.6(4):283-286. [En] [En Abst] (REP.MB-1693)

Soil application of 1 kg a.i./ha of phorate at planting time was effective in controlling the beanfly larva (Ophiomyia phaseoli Tryon) in mungbean (Vigna radiata). Both phorate and malathion treatments significantly increased mungbean yields. [AS]

***0689** Lin, C.S. ; Rose, R.I. 1976. **[Screening of mungbean varieties for resistance to beanfly and study for resistance mechanism (abst)].** PLANT PROTECTION BULLETIN (R.O.C.), v.17(4):14. [Ch] (REP.MB-0741)

More than 3000 mungbean accessions were screened for insect resistance in the field. Fifty seeds of each variety were sown as a single row in a 5m x 0.75m plot. Selected resistant accessions were then sent to Thailand, Philippines and Indonesia where the screening was done to find varieties resistant to local strains. Selected beanfly resistant and susceptible varieties were examined for resistant mechanism in the field and in the greenhouse. The results showed that the mechanism of resistance to insect was non-preference. A positive correlation was found between the thickness of mungbean leaf and beanfly infection rate (r=0.8165). This implied that beanflies prefer to eat or lay eggs in thick leaf varieties. Other mechanism will need further study. [PLH/NST]

***0690** Su, C.Y. ; Ross, A. 1976. **Field testing of insecticides for the control of insects on legumes.** PLANT PROTECTION BULLETIN (R.O.C.), v.18(4):414. [Ch] (REP.MB-1067)

(NOTE: Abstract translated by Prof. Yau I Chu)

Nine insecticides were tested for controlling beanfly on soybean and mungbean at AVRDC. The insecticides of EC, SCW, SP, WP formulation were applied 3 times after germination. The granular insecticides were applied once at sowing. Carbofuran 3% G (2.0 kg a.i./ha), Oxamyl 24% LC (0.25 kg a.i./ha), phorate 10% G (2.0 kg a.i./ha), carbofuran 40.64% F (1.0 kg a.i./ha), triazophos 40% EC (0.25 kg a.i./ha), and omethoate 50% LC (0.25 kg a.i./ha) were effective in controlling the pest. [THH]

***0691** Su, C.Y. ; Kung, S.P. ; Rose, R.I. 1976. **Control of beanflies in mungbeans and asparagus beans, 1975.** INSECTICIDE AND ACARICIDE TESTS, v.1:53. [En] (REP.MB-1066)

Beanflies are pests of various important food legumes including mungbean, soybean, adzuki bean, lima bean, snap bean, cowpea and asparagus bean. Field plot evaluations of insecticides for their control were carried out in ten square meter plots. Each insecticide tested was applied to four replicated plots in a RCB experimental field design. For each crop planting, nine insecticides and one control were evaluated. Granular formulated insecticides were applied by hand with the amount for each row or the plot being previously weighed. Emulsifiable and wettable powder formulations were applied with 10 lb. air pressure sprayers calibrated with a stopwatch. For the emulsifiable or wettable powder formulated insecticides, 500 ml spray were applied per plot. Methods of control evaluation were based on the dissection and count of the number of larvae and pupae as well as the number of damaged plants in a thirty plant sample. Under the conditions of three field tests in which 27 insecticides were evaluated, the most effective were carbofuran, triazophos, mephosfolan, diazinon, DDT and disulfoton and aldicarb. [AS]

***0692** Ibrahim, A.G.B. 1977. **Increased production of leguminous crops through control of bean-fly.** Serdang : University Pertanian Malaysia. 12p. [En] [En Abst] (REP.MB-1762)

MEETING: Conference on Food and Agriculture Malaysia 2000 — Serdang, Malaysia, Jul 25-29, 1977

(NOTE: Paper presented at the Conference)

Field trials were conducted to assess the effect of beanfly, Ophiomyia phaseoli (Tryon) (Diptera: Agromyzidae) on crop losses in four legumes; Phaseolus vulgaris, Vigna radiata, V. sesquipedalis and Glycine max. In the absence of chemical control 65% of P. vulgaris seedlings were killed one month after seeding. Among the five insecticides tested to control the beanfly, dimethoate was most effective giving significant yield (P less than 0.05) increase. The nature of damage by the pest is discussed. [AS]

***0693** Burikam, I. 1978. **Ecological investigation on the bean fly, Ophiomyia phaseoli (Tryon) (Diptera: Agromyzidae), and its natural enemies in Thailand.** Bangkok : Kasetsart University. 71p. [En] [En Abst] (Thesis - M.Sc.) (SB945.L55B8)

In Thailand the most important natural enemies of the bean fly, Ophiomyia phaseoli, were Plutarchia sp. and Biosteres sp. Other less important natural enemies included a eulophid, a pteromalid, a cynipid and a species each of nematode and ant. Under laboratory condition, O. phaseoli was capable of laying 77.12 [plus or minus] 21.56 eggs during an oviposition period of 13.36 [plus or minus] 3.17 days. Larvae moulted 3 times and the total larval stage was 7.37 [plus or minus] 0.49 days. The growth increment of larvae based on the length of cephalopharyngeal apparatus followed Dyar's Law with the mean geometric ratio of 1.882. The pupal stage averaged 7.76 [plus or minus] 0.73 days. The longevity of male and female adults were 7.13 [plus or minus] 2.39 and 15.42 [plus or minus] 3.78 days, respectively. Life cycle from egg to adult stage was 18.45 [plus or minus] 0.76 days. The analysis of the life tables of O. phaseoli revealed the followed population statistics: the net reproductive rate of increase (Ro) = 16.92, the capacity for increase (rc) = 0.101, the cohort generation time (Tc) = 28.001 days, and the finite rate of increase [lambda] = 1.106. The population study of O. phaseoli indicated that O. phaseoli attacked mungbean, during seedling stage and began to move out at the end of the vegetative stage prior to flowering. The analysis of the population density found that there was a density-dependent factor regulating the population. The biological study of the larval-pupal parasite, Plutarchia sp., revealed that life cycle from egg to adult emergence was 17.47 [plus or minus] 0.92 days. The femal adult developed 9.32 [plus or minus] 2.15 eggs per day. The life history of Biosteres sp., a eulophid and a pteromalid was studied to a less extent. The assessment and evaluation of Plutarchia sp. as a biological control agent required additional investigation. This investigation could be employed for the implementation of a pest management program for O. phaseoli. [AS]

***0694** Lin, C.S. 1979. **Varietal resistance of mung bean to the bean fly and the other agromyzids.** University of Hawaii. xi, 107p. (SB945.L55L5)

The beanfly (Ophiomyia phaseoli Tryon) was the most common species, followed in abundance by Melanagromyza sojae Zehntner at the Asian Vegetable Research and Development Center (AVRDC). Evaluating legumes in the genus Vigna for resistance to the beanfly, the adzuki bean was the most susceptible and the rice bean was the most resistant to attack. Scatter diagram of the resistance and susceptibility of the test varieties to the beanfly damage on the basis of standard deviation of the percent plant mortality, the number of larvae and puparia per plant, and the number of leaf punctures was an effective method used to categorize and evaluate the resistance and susceptibility of the test varieties. Mungbean varieties were screened for resistance to the beanfly and agromyzid leaf miner (Liriomyza spp.) at AVRDC, Taiwan and Waimanalo, Hawaii. Three varieties (V 2533, V 2535, V 2545) were in the resistant category. The

mechanism of resistance was antixenosis. Resistant varieties had relatively higher degrees of pubescence. Higher amounts of antifeedant, and lower amounts of attractant compared to the susceptible varieties. These factors prevented or deterred the feeding and/or oviposition of the beanfly and the leaf miner adults. The antifeedant chemical showed positive phenolic color reaction and an infrared absorption band at 2240/cm, suggesting a cyanide ion functional group. [AS]

***0695** Manohar, S. ; Balasubramanian, M. 1980. **Note on the oviposition behaviour of agromyzid stem fly, Ophiomyia phaseoli Tryon (Diptera: Agromyzidae), in blackgram.** MADRAS AGRICULTURAL JOURNAL, v.67(7):470-471. [En] (A:PS)

The oviposition behaviour of beanfly, Ophiomyia phaseoli, in blackgram was studied. The male and female flies were kept in gauze cages containing blackgram plants in small pots. The adults started mating soon after emergence. The female fly wandered over the surface of leaves to locate a suitable spot, and then inserted her ovipositor vertically into the leaf and laid the eggs. After each insertion, the female fly moved backwards and sucked the sap oozing from the site of ovipositor insertion. The eggs were laid singly. More eggs were laid on the lower surface than on the upper surface. The mean number of eggs laid on the lower surface of leaves was 1.8 as compared to 0.4 on the upper surface. [THH]

***0696** Manohar, S. ; Balasubramanian, M. 1980. **Study on the seasonal incidence of agromyzid stem fly Ophiomyia phaseoli Tryon (Diptera: Agromyzidea) in blackgram.** MADRAS AGRICULTURAL JOURNAL, v.67(8):534-537. [En] [En Abst] (A:PS)

A trial was conducted with 12 monthly sowings from December 1976 to November 1977 with blackgram (Co 2) at Coimbatore to study the seasonal incidence of stem fly Ophiomyia phaseoli Tryon. The study revealed that the stem fly incidence was minimum in September, October and November sown crops and was maximum in March, July and August sown crops. The stem fly incidence on the 45th day after sowing was positively correlated with total rainfall during the corresponding period and was not correlated with other weather factors. [AS]

***0697** Goh, H.G. 1983. **Studies on mungbean beanfly.** Shanhua, Tainan : AVRDC. 59 leaves [En] (AVRDC Research Interns' Report) (REP.MB-2307)

Five AVRDC mungbean accessions: V 2396, V 3495, V 4281, V 3428 and V 2184 were planted to assess the mechanism of resistance in mungbean to beanfly. The mechanism of resistance was found to be antibiosis. The resistance to beanfly was due to the thickness of the trifoliate leaf, trichomes on unifoliate leaf and stem, dry weight of unifoliate leaf, white and green color of upper leaf surface, TC value of upper and lower leaf surface, lower moisture content of unifoliate leaf, diameter of stem, height of plant, length of petiole and length of root. These factors prevented or deterred the feeding and oviposition by the beanfly. In the survey of insects associated with mungbean grown during summer, the population ratio of Ophiomyia phaseoli was the highest, followed by Melanagromyza soja. Beanfly parasite population was low during late July to August. [THH]

*0698 Distabanjong, K. 1984. **Inheritance of beanfly resistance in mungbean (Vigna radiata (L.) Wilczek).** Bangkok : The Graduate School of Kasetsart University. xi, 80p. [En] [En Th Abst] (Thesis - M.Sc., Agriculture) (SB205.M8D5)

Three beanfly resistant mungbean cultivars namely, LM.031, Jhain Mung 1-4, and PLM.322 were crossed with three susceptible but high yielding cultivars namely, U-Thong 1, MG 50-10A (G), and CES 1D-21 to generate F1, B1, B2, and F2. Reciprocal crosses of the latter four generations were also made. In 1983, altogether eighteen trials were grown under natural beanfly infestation to study the mode of inheritance of the resistance. It was found that resistance was controlled by quantitatively inherited nuclear genes. Additive gene effect was responsible for resistance in all trials. Non-additive gene effects, although large in magnitude as compared to mean and additive gene action, had large standard errors of estimate that hindered their significance in many crosses. Thus a plant breeder would be safer using selection methods being employed in self-pollinated crops, since these schemes utilize additive and interaction of additive gene actions very effectively. Since resistance level of mungbean to the beanflies was not high and yet the resistant cultivars gave very low yield, a plant breeder should plan to combine resistance from all known sources through 'chain crosses' before performing selections. [AS]

*0699 van der Goot, P. 1984. **Agromyzid flies of some native legume crops in Java.** Shanhua, Tainan : AVRDC. 98p. [En] (AVRDC Publication 84-216) (SB945.L55G8)

Ophiomyia phaseoli Tryon (=Melanagromyza phaseoli Coqa) causes serious damage to kidney bean, soybean, mungbean, rice bean and other pulses in Java. Although Melanagromyza sojae Zehnt and M. dolichostigma de Meijere are of no economic importance, they are still injurious to soybean and other plants. All of these three species are described with detailed notes on their life history, food plants, and parasites. The life cycle is completed within 21 days. Four pupal parasites, viz., Cynipoid sp., Trigonogastra agromyzae Todd, Eurytoma poloni Gir., and Eurytoma sp. are recorded. The average of parasitism is only 5%; the first 2 species are the most abundant. A list of different food plants is given with notes on the nature of damage. Of soybeans a few native varieties seem to be more resistant to injury, but no immune varieties were found. For controlling this pest, a number of cultural control methods - ridging of young plants, fertilization, paddy straw cover and time of planting - were tried and reduced the mortality of young plants. [THH]

*0700 Gupta, P.K. ; Singh, J. 1984. **Control of Ophiomyia phaseoli Tyron in greengram with granular insecticides.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.54(4):321-324. [En] [En Abst] (A:PS)

Field studies revealed that aldicarb 10G, disulfoton 5G (Solvirex 5G), disulfoton 5G (Disyston 5G), carbofuran 3G, phorate 10G and mephosfolan 5G granules were effective in controlling the bean stem-fly, Ophiomyia phaseoli Tryon, an important pest of mungbean [Vigna radiata (L.) Wilczek]. Aldicarb, disulfoton (Disyston) and disulfoton (Solvirex) 2.0 kg a.i./ha gave best results in controlling this pest as well as in increasing the grain yield. [AS]

*0701 Pipithsangchan, S. ; Sittisak, N. 1985. **Fluctuation of beanfly**

population in mungbean. PRINCE OF SONGKLA UNIVERSITY, FACULTY OF NATURAL RESOURCES, RESEARCH REPORT, 1985-1:23-24. [En] (SB187.T4L3 1985)

Among many species of beanfly, Ophiomyia phaseoli (Tryon) is one of the most important seedling infesting insects of mungbean. The objective of this study was to examine the pattern of fluctuation of O. phaseoli at Hat Yai, Songkhla, Thailand. The number of maggots and pupae recorded on three varieties of mungbean, viz., U-thong 1, VC 1560 D and CES ID-21, followed the same pattern. For all varieties, the peak of the infestation period occurred around late August and mid-September. However, the number of maggots and pupae in all varieties decreased quite rapidly in late September. A significant difference was found between the number of maggots and pupae recorded in all varieties in the low and high rainfall periods. The infestation levels decreased remarkably during rainy months. [PLH]

WHITEFLIES

*0702 Mathur, R.S. ; Banerjee, A.K. ; Bajpai, G.K. 1965. **The effect of vector control on yellow mosaic incidence on moong (mung bean) in India.** PLANT DISEASE REPORTER, v.49(2):166-167. [En] [En Abst] (REP.MB-0514)

The incidence of the yellow mosaic of mungbean (Vigna radiata), a monsoon pulse crop in Uttar Pradesh, was reduced by altering the dates of sowing or by weekly spraying of insecticides for destroying the population of Bemisia tabaci (Genn.) a vector of this disease. Late sown crops showed the least infection by yellow mosaic disease. Control of Bemisia tabaci by Metasystox, parathion E 605 and diazinon 20E in early sown crops also reduced the disease appreciably. The effect of Metasystox was statistically most significant. [AS]

*0703 Nene, Y.L. 1973. **Control of Bemisia tabaci Genn.: a vector of several plant viruses.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.43(5):433-436. [En] [En Abst] (REP.MB-1965)

An experiment was conducted to find out the insecticides that could kill in the shortest possible time the whitefly, Bemisia tabaci Genn., a vector of several plant viruses. Ambithion, phoxim, malathion and parathion among non-systemic insecticides and monocrotophos among systemic insecticides gave a quicker kill of whitefly adults, but none of the insecticides could kill whitefly adults in less than 20 min. Non-phytotoxic mineral oil at 2% quickly killed the adults by immobilizing them in less than 3 min after they settled on the oil-sprayed leaf surface. The yellow mosaic virus of mungbean (Vigna radiata) could be acquired as well as inoculated in blackgram (V. mungo) by whitefly adults in a feeding period of 15 min. Mineral-oil sprays, by quick immobilization of the adults, could completely prevent the transmission of the virus in glass-house tests. The mineral oil was also ovicidal. The results suggest the mineral oil in combination with a systemic insecticide should give promising results in the control of whitefly transmitted viral diseases under field conditions. [AS]

*0704 Nene, Y.L. 1973. **Note on a fungus parasite of Bemisia tabaci Genn., a vector of several plant viruses.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES,

v.43(5):514-516. [En] (REP.MB-1962)

The fungus Paecilomyces farinosus was found infecting adults of Bemisia tabaci on cotton field and caused 90% mortality in the laboratory. Yellow mosaic disease on soybean, mungbean and blackgram was spread by B. tabaci. [THH]

*0705 Rathi, Y.P.S. ; Nene, Y.L. 1974. **Sex of Bemisia tabaci Genn. in relation to the transmission of mung bean yellow mosaic virus.** ACTA BOTANICA INDICA, v.2(1):74-76. [En] [En Abst] (REP.MB-2043)

The efficiency of whitefly (Bemisia tabaci) in transmitting mungbean yellow mosaic virus to blackgram depends on the sex of the adults. The female was more efficient than the male. [THH]

*0706 Bhattacherjee, N.S. 1976. **Control of the spread of the yellow mosaic virus of 'moong' in soybean.** ENTOMOLOGISTS' NEWSLETTER, v.6(11/12):64-65. [En] (REP.MB-2758)

The mungbean yellow mosaic virus is transmitted to soybean by the whitefly, Bemisia tabaci Gennadius, which thrives in high temperatures after the premonsoon showers and infests the plants from primary leaf stage throughout the growing period. The disease is most severe when the plants are still tender. At Indian Agricultural Research Institute, it was found that good protection of the crop against the pest and vector was provided by soil insecticide treatment at the time of sowing with aldicarb, phorate, disulfoton and carbofuran at 1.5 kg a.i./ha followed by foliar sprays with 0.07% endosulfan or a mixture of 0.025% methyl demeton and 0.035% endosulfan at 15-20 days interval from one month after sowing. [THH]

*0707 Kooner, B.S. ; Singh, Harcharan 1980. **Control of whitefly and the yellow-mosaic virus in green gram with granular insecticides.** JOURNAL OF RESEARCH (PUNJAB AGRICULTURAL UNIVERSITY), v.17(3):268-271. [En] [En Abst] (REP.MB-2580)

Field trials were conducted for two years for the control of whitefly and the yellow mosaic virus in mungbean with the soil application of granular formulations of aldicarb, carbofuran, disulfoton, mephosfolan and phorate. A dose of 2 kg a.i./ha of each formulation was applied in two equal splits: half at the time of sowing the crop and the remaining half, four weeks after that. The insecticidal treatments reduced the incidence of whitefly and the yellow mosaic virus. They also increased the grain yield. In these respects, on the whole, the most effective treatment was that with aldicarb. It decreased the population of whitefly by 100, 58, and 63% in contrast with that in the control in observations recorded 5, 7 and 11 weeks after sowing, respectively. Initially, up to 5-7 weeks after sowing the crop, the differences in the incidence of the yellow mosaic virus were nonsignificant, but subsequently they became significant and the aldicarb treatment decreased the virus infected plants by 28.2 to 65.9% in contrast with those in the case of the control. The increase in grain yield over that in the control with this treatment was 48.6 to 137.3%. The next promising treatment was that of disulfoton which increased the grain yield by 52.6 to 76.3% over the control. [AS]

***0708** Rangaraju, R. ; Chenulu, V.V. 1980. **A new method for counting whitefly (Bemisia tabaci Genn.) population in mung bean (Vigna radiata (L.) Wilczek).** CURRENT SCIENCE, v.49(21):825-826. [En] (A:PS)

According to the habit of whiteflies to disperse sideways or upwards on being disturbed, a new method for counting whiteflies in mungbean was devised. The method comprises using a bell jar of suitable size (height x diameter: 15 x 21 cm or 50 x 29 cm) to cover the plant and slightly disturbing the pests. All the whiteflies on the plant immediately left the plant and rested on the inner wall of the bell jar and started moving upwards towards light. Whitefly counts were then taken. This method proved much convenient as the data could be collected with ease and considerable economy of time and labor. [THH]

***0709** Murugesan, S. ; Chelliah, S. 1981. **Efficacy of insecticides in the control of Bemisia tabaci (Genn.), a vector of the yellow-mosaic virus disease on greengram.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.51(8):583-584. [En] [En Abst] (A:PS)

A 2-year field experiment was conducted to assess the efficacy of insecticides and emulsifiable oil in controlling the whitefly, Bemisia tabaci (Genn.), and checking the incidence of the yellow mosaic disease on greengram, [Vigna radiata (Linn.) Wilczek]. Monocrotophos and disulfoton significantly reduced the whitefly population, but Metasystox and monocrotophos were effective in reducing the mosaic incidence. Monocrotophos at 0.25 kg a.i./ha applied 3 times at 10-day intervals starting from the 15th day of sowing was more effective than other chemicals in bringing down the whitefly population, disease incidence and intensity of symptoms, and in increasing the grain yield. [AS]

***0710** Yein, B.R. ; Singh, Harcharan 1982. **Effect of pesticides and fertilizers on the pollution of whitefly and incidence of yellow-mosaic virus in greengram.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.52(12):852-855. [En] [En Abst] (A:PS)

Soil application of aldicarb (1.5 kg a.i./ha) proved the most promising treatment in reducing the whitefly (Bemisia tabaci Gennadius) population on mungbean [Vigna radiata (Linn.) Wilczek]. This treatment gave maximum reduction (66-67%) of the pest in the early stage (5 weeks after sowing the crop). Application of aldicarb alone or in combination with endosulfan and captan reduced the virus-infected plants by 31-39% and 25-46% when compared with the control in 1975 and 1976, respectively. The use of aldicarb in combination with fertilizers also reduced the incidence of yellow-mosaic virus. Application of nitrogenous and phosphatic fertilizers without the use of insecticides encouraged the build-up of the whitefly population as well as the incidence of yellow-mosaic virus. For getting higher yields of mungbean, it was necessary to use both the pesticides and the fertilizers. [AS]

***0711** Gupta, P.K. ; Singh, J. 1983. **Effect of systemic granular insecticides on whitefly population and yellow-mosaic infection in greengram.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.53(8):737-742. [En] [En Abst] (A:PS)

When applied at 2.0 kg a.i./ha in summer as well as in the rainy season,

phorate 10G, mephosfolan 5G, disulfoton 5G (Disyston 5G), disulfoton 5G (Solvirex 5G), carbofuran 3G and aldicarb 10G reduced whitefly population and yellow-mosaic infection in mungbean [Vigna radiata (Linn.) Wilczek]. The maximum benefit : cost ratio was obtained with 1 application of any of the 6 granular insecticides. [AS]

POD BORERS

*0712 Banerjee, S.N. ; Pramanik, L.M. 1964. **An outbreak of Euchrysops cnejus (Fabr.) on golden gram, Phaseolus aureus in West Bengal.** SCIENCE AND CULTURE, v.30(10):507. [En] (REP.MB-1139)

The larvae of Euchrysops cnejus Fabr. attack mungbean pods of all stages by boring at the basal part of the pod and feed on the seeds. [THH]

*0713 Central Research Institute for Agriculture. 1971. **Mung bean research: insecticidal research.** IN: Annual Report for 1971. Bogor : CRIA. p.77-79 [En] (REP.MB-0824)

A field insecticide screening was conducted at Bontobili, Indonesia in 1971. The pest of importance at the time was limabean pod borer (Etiella zinckenella). The insecticides were applied four times at 4, 15, 35, and 60 days after emergence. All of the insecticides gave significantly higher yields than the nontreated check. Chlorpyrifos and cyanofenphos were superior in reducing pest infestation. Chlordimeform produced some phytotoxic affects on plants. [THH]

*0714 Sidhu, A.S. ; Sandhu, A.S. 1971. **Studies on the control of moong jassid through the use of soil systemic insecticides.** IN: Proceedings [of the] fifth workshop on pulse crops. New Delhi : ICAR. p.123-126. [En] [En Abst] (REP.MB-1033)

MEETING: Workshop on Pulse Crops, 5th -- Hissar, India, Mar 18-20, 1971

Aldicarb (Temik 10 G), carbofuran (Furadan 10 G), disulfoton (Solvirex 5 G) and Phorate (Thimet 10 G) were tested for the control of jassids infesting mungbean (Vigna radiata) crop. Application of granules of these insecticides (in the sandy soil) at 1.5 to 2 kg a.i./ha in the seed-furrows at the time of sowing during July proved quite effective for 5 to 6 weeks in controlling Amrasca devastans (Distant) infesting the monsoon crop. Yield of grains was significantly increased in the treated plots. Aldicarb and carbofuran enhanced the germination of the seeds. Disulfoton and phorate did not depress the germination either but they caused scorching of leaves in many young plants which, however, seldom died. Application of these granular insecticides in the premonsoon crop (sown in April) was not found necessary because of the very low population of Empoasca tabaci (Distant) infesting the mungbean crop sown during this season. None of the four insecticides proved effective in checking the incidence of the yellow mosaic disease transmitted by Bemisia tabaci Genn. [AS/THH]

***0715** Sidhu, A.S. ; Sandhu, A.S. 1971. **Control of jassid infesting moong crop with new insecticides.** IN: Proceedings [of the] fifth workshop on pulse crops. New Delhi : Indian Council of Agricultural Research. p.138-142. [En] [En Abst] (REP.MB-1032)

MEETING: Workshop on Pulse Crops, 5th -- Hissar, India, Mar 18-20, 1971

Mungbean crop sown during the monsoon period in the Punjab was found to be heavily infested by Amrasca devastans (Distant). Field trials were conducted for its control using chlorfenvinphos, fenitorthion, tetrachlorvinphos, malathion as 0.075% sprays; carbofuran, mephosfolan, dioxacarb, endosulfan, monocrotophos, phosalone, vamidothion as 0.05%; dimethoate 0.03% and endrin 0.02% high volume sprays at 1000 L/ha. All these insecticides were quite effective and caused significant reduction in the jassid population. Excepting monocrotophos, two sprayings of these insecticides done in the first and last week of September, 1969 resulted in significant increase in the yield of grains. [AS]

***0716** Batala, S.R. ; Vyas, H.K. ; Baser, S.L. ; Sharma, S.K. 1972. **Chemical control of gram pod borer, Heliothis armigera Hbn, in Rajasthan.** IN: Proceedings [of the] seventh workshop (kharif pulses). New Delhi : Indian Council of Agricultural Research. p.121-123 [En] (REP.MB-1436)

MEETING: Workshop [on] Kharif Pulses, 7th -- Bangalore, India, Jun 5-9, 1972

Heliothis armigera Hb. is one of the most injurious pests of mungbean pods. The damage caused to the pods ranged between 40 and 60%. A chemical control trial with Metasystox 0.1%, methyl parathion + DDT 0.1%, dimethoate 0.1% and formothion 0.1% was conducted at Government Agriculture Research Farm, Durgapura (Jaipur) in 1971. The insecticides were applied at the time of pod formation. The incidence of pod borer was recorded before and 24, 48 and 72 hours after spray and yield was recorded at harvest time. Results showed that methyl parathion + DDT 0.1% was effective against pod borer. Yields of all treatments were significantly better than non-treated check. [THH]

***0717** Pramanik, L.M. ; Basu, A.C. 1973. **Biology of the moong pod border, Euchrysops cnejus (Fabricius) (Lycaenidae:Lepidoptera).** INDIAN JOURNAL OF AGRICULTURAL RESEARCH, v.7(2):118-120. [En] (REP.MB-1678)

Pod borer, Euchrysops cnejus Fabr., is the most destructive on kharif mungbean in West Bengal, India. The peak period of the pest activity is July to August. The larva bores into the pods of all stages. This paper describes the life history, host plants and distribution of the pest. [THH]

***0718** Srivastava, K.M. ; Singh, L.N. ; Singh, R.P. 1976. **Blue butterfly, Euchrysops sp. as pea pest in Uttar Pradesh.** ENTOMOLOGISTS' NEWSLETTER, v.6(3):27-28. [En] (REP.MB-2750)

Euchrysops, a pest of kharif legumes such as pigeonpea, blackgram, mungbean, cowpea and beans, was recorded on pea during February - March 1975 at Kanpur, Uttar Pradesh. The infested pods were characterized by a small circular hole on one side at the middle portion of the pod. The larvae remained inside the pod and fed on the developing seeds causing considerable damage to the

crop. [THH]

***0719** Chelliah, S. ; Balasubramanian, G. ; Surulivelu, T. ; Menon, P.P.V. 1977. **Chemical control of blackgram pod borers.** MADRAS AGRICULTURAL JOURNAL, v.64(9):628-629. [En] (REP.MB-1985)

A field experiment was conducted to test certain insecticides in controlling pod borers of blackgram. A common spray with monocrotophos 0.04% was given at the flowering stage except for the check. Pod borer infestation between treatments was significantly different and damage on a pod basis ranged from 9.6 to 15.1% in insecticide treated plots while it was 32.9% in the untreated. Among the insecticides tested, aldicarb was outstanding, followed by disulfoton and phorate. The seed treatment with carbofuran was next best to the three granular insecticides applied in soil. There were 65.2, 64.0 and 60.1% increases in grain yield in aldicarb, phorate and disulfoton treatments respectively over the check. Application of either aldicarb, phorate or disulfoton at 1 kg a.i./ha at seeding followed by spraying with monocrotophos 0.04% at flowering stage will be an effective schedule for pod borer control on blackgram. [THH]

***0720** Litsinger, J.A. ; Bandong, J.P. ; Paragna, F. 1980. **Field evaluation of foliar insecticides for postflowering mung bean insects, Pangasinan, Philippines 1977-78.** INSECTICIDE AND ACARICIDE TESTS, v.5:137-138. [En] (REP.MB-2662)

Two trials on farmers' fields in Poo, Manaoag, Pangasinan evaluated 15 foliar insecticides against postflowering insects, predominantly Heliothis on mungbean. The impact of Heliothis on mungbean infestation was measured as % defoliation (visual estimate/plot), no. larvae (50 plants), % damaged green and dry pods (100 pods), and no. pods/plant (25 plants). Yield was based on 15 sq.m. Decis (0.05 kg a.i./ha) was outstanding for the control of Heliothis on mungbean applied either twice (30 and 42 DE) or three times (30, 40, and 55 DE). Also effective were fenvalerate, methomyl, acephate, monocrotophos, and carbaryl, but endosulfan, cartap, malathion, and diazinon did not control Heliothis on mungbean at 0.75 kg a.i./ha. [AS/NST]

***0721** Yein, B.R. ; Singh, Harcharan 1980. **Effects of pesticides and fertilizers on the population of jassids on greengram.** JOURNAL OF RESEARCH (PUNJAB AGRICULTURAL UNIVERSITY), v.17(4):383-387. [En] [En Abst] (REP.MB-2901)

The sprays of endosulfan (0.12 kg a.i./ha) and seed treatment with captan (0.04 kg a.i./ha) were ineffective in controlling jassids (Amrasca biguttula Ishida and Batrachomorphus sp.) on mungbean. The soil application of aldicarb @ 1.5 kg a.i./ha, on the other hand, proved to be most promising in reducing the population of the pests as compared with that in the control. This treatment gave the maximum reduction (64 to 83% of the pests in the early stages, i.e., 5 to 6 weeks after sowing the crop. The efficacy of the insecticide decreased with the lapse of time. The application of nitrogenous (12.5 kg of N/ha) and phosphatic (40 kg of P/ha) fertilizers in the absence of insecticides encouraged the build-up of the population of the pests. Thus the application of nitrogenous and phosphatic fertilizers without the use of pesticides gave nonsignificant marginal increases or even decreases in the yield as compared

with the yield from the control. For getting higher yields of mungbean, it is necessary to use both the pesticides and fertilizers. [AS]

***0722** Chhabra, K.S. ; Brar, J.S. ; Kooner, B.S. 1981. **Jassid species recorded on green gram, black gram and red gram in the Punjab.** PULSE CROPS NEWSLETTER, v.1(2):65. [En] (A:PS)

In the Punjab, India, mungbean, blackgram and pigeonpea are attacked by a number of sucking pests like whitefly, jassid and aphids when the crops are in the vegetative phase of growth. Specimens of jassid were collected from the experimental area during the 1979 crop season. The specimens collected were identified to be Empoasca moti Pruthi and E. terminalis Distant. [THH]

***0723** Singh, O.P. ; Jakhmola, S.S. 1983. **Losses caused by Pachytychius mungonis Marshall to greengram in Madhya Pradesh.** INDIAN JOURNAL OF AGRICULTURAL SCIENCES, v.53(11):973-974. [En] (A:PS)

Mungbean, Jawahar 45, was sown on 16 July 1982. At the pod forming stage, 100 randomly selected plants were tagged for observations. Mature pods were plucked from the tagged plants on 30 September to 15 October at 5-day intervals to record the percentage of pods and seeds infested by pod borer, Pachytychius mungonis Marshall. The weight of 100 healthy and 100 infested seeds were recorded to assess the losses. The pest infested 9.53 to 28.60% of pods and 2.37 to 10.24% of seeds. The weevil was 5.59% of seeds and the larva devoured 98.2% of seeds by weight. [THH]

***0724** Gatoria, G.S. ; Singh, Harcharan 1984. **Effect of insecticidal and fertilizer applications on the jassid complex in green gram, Vigna radiata (L.) Wilczek.** JOURNAL OF ENTOMOLOGICAL RESEARCH, v.8(2):154-158. [En] [En Abst] (REP.MB-2777)

The treatment combinations involving 1 to 2 sprays of monocrotophos each at 0.4 kg a.i./ha gave significant reduction in the population of the jassids [Empoasca terminalis Distant, Empoasca moti Pruthi and Amrasca biguttula biguttula (Ishida)] up to 24 days after the application of each spray. The maximum reduction from 52 to 96 % was recorded within 10 days after the application of each spray. The seed-furrow application of carbofuran and phorate (each at 1.5 kg a.i./ha) singly or in combination with fertilizers (N 12.5 kg + P 40 kg/ha) was inffective in controlling the jassids. The use of fertilizers alone did not affect the population of jassids. However, there was a tendency to increase jassid population due to application of fertilizers. [AS]

***0725** Manohar, S. ; Balasubramanian, M. 1984. **Efficacy of carbofuran seed treatment for the control of pod borers of blackgram Vigna mungo (L.) Hepper.** PESTICIDES, v.18(10):57-58. [En] (REP.MB-2531)

A field trial was conducted to test the efficacy of insecticidal seed treatment in controlling the pod borers of blackgram with Co 2 variety. All treatments were given at flowering stage. There was significant difference among the treatments in reducing the pest damage. Among the insecticides tested, carbofuran seed treatment was effective; this treatment gave superior