Nene, Y.L., and **Sheila, V.K.** 1990. Pigeonpea: Geography and Importance. Pages 1–14 *in* The pigeonpea (Nene, Y.L., Hall, S.D., and Sheila, V.K., eds.). Wallingford, Oxon, UK: CAB International.

Remanandan, P. 1990. Pigeonpea: Genetic Resources. Pages 89–115 *in* The pigeonpea (Nene, Y.L., Hall, S.D., and Sheila, V.K., eds.). Wallingford, Oxon, UK: CAB International.

Sauter, K.J., Gingera, G.R., and **Davis, D.W.** 1995. Adaptation of pigeonpea (*Cajanus cajan* Millsp.) to a loamy sand site in Minnesota. HortScience 30: In press.

Wallis, E.S., Saxena, K.B., Brauns, C., Byth, D.E., and **Whiteman, P.C.** 1983. Short-season pigeonpeas–a cropping system with high yield potential. International Pigeonpea Newsletter 2:5–8.

Pathology

Susceptibility of Pigeonpea Cultivars of Different Maturity Groups to Botrytis Gray Mold

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Pigeonpea suffers from several diseases such as sterility mosaic disease, wilt, and phytophthora blight in the Tarai region of Uttar Pradesh, India. Of the less common diseases, botrytis gray mold (BGM) attacks medium- and late-maturing materials which flower Nov to Jan. It can cause economic losses, though its impact has not been reported so far. Disease symptoms usually appear when plants are flowering, as dark gray fungal growth on the buds and flowers. Infected buds drop, thus reducing pod set. Susceptibility of pigeonpea genotypes in relation to different maturity durations were studied in a field trial at the Crop Research Centre, Pantnagar, during the 1990/91, 1991/92 and 1992/93 crop seasons.

Fifty seven lines/cultivars were grown under natural conditions in the last week of Jun in all the three seasons. BGM appeared on buds as a grayish cottony growth which spread and covered the entire bud, resulting in bud rot and its dropping. Pods, if formed, were reduced in size, and had small, shrivelled seeds. Observations on bud damage were recorded on ten randomly selected plants in 4 cm-row plots at seven-day intervals from 15 Nov to 15 Jan.

In 26 early- to medium-maturing lines which flowered in 83-117 days and matured in 161–196 days, disease development was low (< 10 buds damaged). In constrast, BGM infection in 22 medium- and late-maturing lines was very high in all three seasons. The lines flowering between 161–196 days, and maturing between 265–304 days exhibited the highest bud damage (upto 93.0%) in the first flush. However, seed set was satisfactory in the second flush appearing during Mar.

The results indicate that susceptibility of pigeonpea to BGM depends on maturity and timing of flowering and podding, as also on favorable conditions for BGM.

Pigeonpea Lines Resistant to Old and New Strains of Sterility Mosaic Disease

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Several pigeonpea lines resistant (with no apparent symptoms), and tolerant (mild mosaic and ring spot symptoms) to sterility mosaic disease have been reported (Nene and Reddy 1976; Nene et al. 1981; Nene et al. 1989, and Amin et al. 1993). Recently, Reddy et al. (1993) reported occurrence of five different strains in the sterility mosaic pathogen in India based on the reaction of seven differential genotypes at nine locations in India. Reddy et al. (1991) had earlier reported the occurrence of a new strain in the wilt and sterility mosaic screening nursery at ICRISAT Center, Patancheru based on the altered reaction of ICP 2376. In the screening nurseries, ring spot symptoms were consistently observed on this line between 1975 and 1990. However, in the 1991 rainy season, severe mosaic symptoms were noticed on some plants indicating the appearance of a new strain of sterility mosaic pathogen which was confirmed by further experimentation. This new strain appeared to resemble the variant 3 described by Reddy et al. (1993).

To identify lines resistant to both the old (variant 2) and the new strains, the 153 lines reported resistant/tolerant earlier (ICRISAT 1981) were screened in pots using the infector-hedge technique. These lines were first screened against the old strain during May 1993 (two replications, 15 cm pot per replication with 10 seedlings per entry). They were then evaluated for their reaction to the new strain during May 1994 in a single replication (15 cm pot with 10 seedlings per entry). The lines that

Table 1. Pigeonpea lines resistant/tolerant to the old (variant 2) and new (variant 3) strains of sterility mosaic pathogen, IAC, India, 1993–1994.

Resistant		Tolerant			
		Ring Spot		Mild Mosaic	
variant 2	variant 3	variant 2	variant 3	variant 2	variant 3
ICP 2630	ICP 2630	ICP 2376	ICP 7188	ICP 410	ICP 999
ICP 3782	ICP 3782	ICP 4344	ICP 8118	ICP 999	ICP 7119
ICP 3783	ICP 3783	ICP 4777	ICP 11245	ICP 1923	ICP 7201
ICP 4725	ICP 4725	ICP 4782	ICP 11257	ICP 2014	ICP 7354
ICP 7035	ICP 7035	ICP 6630		ICP 3678	ICP 7873
ICP 7119	ICP 7239	ICP 7367		ICP 5125	ICP 7904
ICP 7188	ICP 7281	ICP 7906		ICP 5551	ICP 7906
ICP 7239	ICP 7403	ICP 7994		ICP 7201	ICP 7997
ICP 7281	ICP 7867	ICP 8105		ICP 7583	ICP 8006
ICP 7349	ICP 8116	ICP 8129		ICP 7636	ICP 8040
ICP 7353	ICP 8117	ICP 8135		ICP 7683	ICP 8051
ICP 7403	ICP 8850	ICP 8317		ICP 7823	ICP 8077
ICP 7867	ICP 8852	ICP 9140		ICP 7871	ICP 8109
ICP 7942	ICP 8853	ICP 9150		ICP 7873	ICP 8120
ICP 7997	ICP 8861	ICP 9166		ICP 7882	ICP 8124
ICP 8006	ICP 11276	ICP 9187		ICP 7898	ICP 8125
ICP 8040	ICP 11278	ICP 11245		ICP 8109	ICP 8131
ICP 8051		ICP 11250		ICP 8110	ICP 8135
ICP 8077		ICP 11251		ICP 8113	ICP 8266
ICP 8166		ICP 11254		ICP 8125	ICP 8856
ICP 8117		ICP 11255		ICP 8216	ICP 8857
ICP 8118		ICP 11260		ICP 8266	ICP 11249
ICP 8120		ICP 11263		ICP 8852	ICP 11275
ICP 8123		ICP 11265		ICP 8857	ICP 11283
ICP 8124		ICP 11270		ICP 9134	
ICP 8131		ICP 11272		ICP 9144	
ICP 8136		ICP 11273		ICP 9155	
ICP 8145		ICP 11280		ICP 9182	
ICP 8501		ICP 11284		ICP 9183	
ICP 8850				ICP 9752	
ICP 8853				ICP 10222	
ICP 8856				ICP 10231	
ICP 8861				ICP 11243	
ICP 9689				ICP 11244	
ICP 11256				ICP 11247	
ICP 11258				ICP 11248	
ICP 11278				ICP 11249	
				ICP 11252	
				ICP 11257	
				ICP 11259	
				ICP 11261	
				ICP 11262	
				ICP 11264	
				ICP 11266	
				ICP 11267	
				ICP 11268	
				ICP 11269	
				ICP 11271	
				ICP 11274	
				ICP 11276	
				ICP 11281	
				ICP 11282	
				ICP 11283	
				ICP 11285	

Resistant :< 10% disease with severe mosaic symptoms.
Tolerant :< 10% severe mosaic with either ring spot/mild mosaic symptoms.
Susceptible : 10% disease with severe mosaic symptoms.

showed less than 20% disease incidence were re-evaluated in a replicated trial (three replications, 15 cm pot per replication with 10 seedlings per pot). In all the tests, three known susceptible checks were included (BDN1, LRG30, ICP 8863). Observations on disease reaction were recorded at 75 days after sowing (DAS).

The incidence of sterility mosaic disease varied from 0-100% in different lines. The susceptible checks (BDN1, LRG30 and ICP 8863) showed 90-100% disease incidence indicating good spread of disease in all the tests. Among the 153 lines evaluated against the old strain, 37 lines showed resistance (less than 10% disease incidence) and 83 lines showed tolerance (29 ring spot and 54 mild mosaic). However, against the new strain, only 17 lines showed resistance, and 28 lines showed tolerance (4 ring spot and 24 mild mosaic). Only two (ICP 8852 and ICP 11276) of the 17 lines that showed less than 10% disease against the new strain showed more disease against the old strain (Table 1).

It is apparent from this screening that the resistance/tolerance observed against the old strain (variant 2) is not effective against the new strain (variant 3). However, the lines, ICP 2630, ICP 3782, ICP 3783, ICP 4725, ICP 7035, ICP 7239, ICP 7281, ICP 7403, ICP 7867, ICP 8116, ICP 8117, ICP 8850, ICP 8853, ICP 8861, and ICP 11278 maintained resistance to both the strains. Similarly, the line ICP 11245 maintained the ring spot form of tolerance to both strains, while the lines ICP 999, ICP 7201, ICP 7873, ICP 8125, ICP 8266, ICP 8857, ICP 11249, and ICP 11283, maintained mild mosaic form of tolerance to both strains. This study indicated the possibility of isolating lines resistant to or tolerant of both strains. Further, the study also indicated the possibility of obtaining resistant sources for the new strain from lines hitherto tolerant of the old strain. Hence, a thorough screening of all the available lines for their reaction to the new strain of sterility mosaic pathogen is essential for identification of resistant and tolerant sources.

These resistance sources may be used in the various pigeonpea breeding programs to develop strain-specific resistant cultivars, and to broaden the genetic base of the existing resistant cultivars for effective management of sterility mosaic disease.

References

Amin, K.S., Reddy, M.V., Nene, Y.L., Raju, T.N.,Shukla, P., Zote, K.K., Arjunan, G., Bendre, N.J., Rathi, Y.P.S., Sinha, B.K., Gupta, R.P., Anilkumar, T.B., Chauhan, V.B., Bidari, V.B., Singh, G., Jha, D.K., and **Gangadharan, K.** 1993. Multi-location evaluation of pigeonpea (*Cajanus cajan*) for broad based resistance to sterility-mosaic disease in India. Indian Journal of Agricultural Science. 63(9):542-546.

Nene, Y.L, Kannaiyan, J., Reddy, M.V., and **Remanandan, P.** 1981. Sources of Resistance to selected Pigeonpea diseases. Pages 6-22 *in* Pulse Pathology Progress Report No. 16. Patancheru 502 324, A P, India: International Crops Research Institute for the Semi-Arid Tropics. (Limited distribution.)

Nene, Y.L., and **Reddy, M.V.** 1976. Screening for resistance to Sterility mosaic of pigeonpea. Plant Disease Reporter 60(2):1034–1036.

Nene, Y.L., Reddy, M.V., Benival, S.P.S., Mahmood, M., Zote, K.K., Singh, R.N., and **Sivaprakasam, K.** 1989. Multilocational testing of pigeonpea for broad-based resistance to sterility mosaic in India. Indian phytopathology. 42:444–448.

Reddy, M.V., Raju, T.N. and **Nene, Y.L.** 1991. Appearance of a new strain of pigeonpea sterility mosaic pathogen. International Pigeonpea Newsletter. 14:22-23.

Reddy, M.V., Raju, T.N., Nene, Y.L., Ghanekar, A.M., Amin, K.S., Arjunan, G., Astaputre, J.V., Sinha, B.K., Muniyappa, V., Reddy, S.V., Gupta, R.P and **Gangadharan, K.** 1993. Variability in sterility mosaic pathogen of pigeonpea in India. Indian Phytopathology 46(3):206-212.

Evaluation of Pigeonpea Germplasm for Resistance to Sterility Mosaic

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Pigeonpea is one of the important pulse crops of India. In eastern Uttar Pradesh (U P), where long-duration pigeonpea is grown, sterility mosaic (SM) is one of the factors limiting its cultivation. During 1986/87, it occurred in an epidemic form in eastern U P and northern Bihar, reducing the yield by 95% in some of the districts of U P (DPR 1987). In recent years, increased incidence of the disease has been observed in the states of Gujarat, Maharashtra, Andhra Pradesh, Tamil Nadu, and Karnataka also (Reddy and Raju 1993).