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INFLUENCE OF STERILITY MOSAIC RESISTANT PIGEONPEAS ON MULTIPLICATION OF THE MITE VECTOR

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ABSTRACT : Pigeonpea lines resistant to the causal agent of sterility mosaic did not permit continued multiplication of its eriophyid mite vector, *Aceria cajani*. Resistance to the causal agent and lack of continued multiplication of the mite vector on these lines are expected to provide greater stability of resistance to the disease.

Sterility mosaic of pigeonpea [*Cajanus cajan* (L.) Millsp.] is common in the Indian sub-continent. Capoor (1952) established that the causal agent of the disease was graft transmissible and presumed to be a virus. Seth (1962) reported an eriophyid mite, *Aceria cajani* Channabasavanna to be the vector. Earlier we screened more than 2,800 pigeonpea germplasm accessions and cultivars and identified five resistant lines (Nene and Reddy, 1976b). Later we screened 2,400 additional accessions and cultivars and identified more resistant lines (Reddy and Nene, unpublished). As a first step in studying the factors responsible for resistance, we studied the survival and multiplication of the vector on some of the resistant lines.

MATERIAL AND METHODS : The study was carried out over a period of three years (1975—77). In the first year, survival and multiplication of the vector was studied on two resistant lines ICP-3783 and ICP-7035. In the second year the experiment was repeated and three more resistant lines ICP-6986, —6997, and —7119 were included. In the third year the study was continued using the four resistant lines ; ICP—3782, —7197, —7867, and —7942. T-21 and Sharda, susceptible cultivars which show severe mosaic mottle on leaves and sterility (no flowering), were included each year as the checks.

Plants were grown in 50 cm diameter earthen pots filled with Alfisol and farm yard manure (10 : 1). One plant was grown per pot and the pots were kept at one metre apart. Seedlings 15—25 days old were inoculated with viruliferous mites either by transferring individual mites or by stapling on diseased leaflets carrying mites (Nene and Reddy, 1976a), In the first two years 50 mites per seedling and in the third year approximately 450 mites per seedling were transferred. Each treatment was replicated twice in the first year and thrice in the subsequent 2 years. The studies were carried out from June through December.

Mites per cm^2 of leaf area were counted at various intervals beginning on the fifteenth day after mite transfer in 1975, on the nineteenth day in 1976 and on the

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thirty-second day in the 1977 trial (Table 1). Counts continued until the plants matured. Five to 10 leaflets were randomly collected from each plant and cleared in ethanol-glycerine (9 : 1) for 2 to 24 hours depending upon the time required to clear the leaf (Janarthanan *et al* ; 1971). The resistant lines required the longest treatment. Mites on each leaflet were counted using a Bausch & Lomb Stereozoom 7 (magnification ×40) microscope. The area of the leaflets was measured with an automatic area meter (Model AAM-7, Hayashi Denkoh Co. Ltd., Tokyo, Japan) and the number of mites per cm^2 of leaf area were calculated.

TABLE 1 : Counts of eriophyid mites, *Aceria cajani*, on some sterility mosaic resistant and susceptible pigeonpea cultivars during 1975 to 1977.

Cultivar/line		Average number of mites per cm^2 of leaf area estimated on days after mite transfer on 7-21 July						
		15-19	30-33	49-52	63-70	93-98	124-128	140-142
Tested for 3 *years*								
T-21	(S)	0.11	0.11	0.03	0.38	1.34	4.63	10.63
Sharda	(S)	0.20	0.24	0.31	3.09	1.30	2.84	12.77
Tested for 2 *years*								
ICP-3783	(R)	0 12	0.03	0.00	0.00	0.00	0.00	0.00
ICP-7035	(R)	0.04	0.03	0.00	0.00	0.00	0.00	0.00
Tested for 1 *year*								
ICP-3782	(R)	—	0.01	0:00	0.00	0.00	0.00	0.00
ICP-6986	(R)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ICP-6997	(R)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ICP-7119	(R)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ICP-7197	(R)	—	0.03	0.00	0.03	0.00	0.01	0.00
ICP-7867	(R)	—	0.00	0.00	0.00	0.00	0.00	0.00
ICP-7942	(R)	—	0.00	0.00	0.00	0.04	0.01	0.00

S —Susceptible, R—Resistant

— =Observations not recorded

RESULTS : In all these years the susceptible cultivars developed 100% infection within 15 days after inoculation. All the resistant cultivars remained completely symptom-free.

Results of the tests carried out during the three years period (1975-1977) are presented in Table 1. On both the susceptible lines ; T-21 and Sharda, mites were detected from the beginning of the observations and they multiplied continuously until the plants matured. Of the 9 resistant lines, mites were detected on 4 lines ; ICP-3782, —3783, —7035, and —7197, up to about one month and that too in very low numbers. No mites were detected on 4 lines ; ICP-6986, —6997, —7119 , and —7867 at any time of observation. There was no continuous multiplication on seven of the resistant lines. In two lines ; ICP-7197 and —7942, few mites were detected when observed after 63-70 and 124-128 days, and 93-98 and 124-128 days, respectively.

DISCUSSION : Results clearly indicate that the disease resistant pigeonpea lines seldom supported multiplication of the vector (Table 1). The causes for the lack of mite multiplication on these genotypes are yet to be investigated. Inereased multiplication of the mite vector on the virus infected plants than on healthy ones of the susceptible genotype was observed earlier by Thresh (1964). Detection of mites in low numbers up to one month after inoculation on some of the resistant lines ICP-3782, —3783, —7035 and —7197, indicates that these lines are not immune to mites, but they do not favour their multiplication. We do not expect mites to survive for one month without feeding, because we have found that the mites cannot survive for more than 9 hr on leaves of non-hosts, such as sorghum or cowpea (Reddy and Nene, unpublished). The presence of mites on some resistant lines at certain periods may be the result of subsequent contamination rather than actual multiplication of the mites originally transferred.

We believe that the resistance to sterility mosaic agent coupled with factors preventing multiplication of the vector should lead to a greater stability of sterility mosaic resistance in these lines.

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