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Evaluation of Pigeonpea [*Cajanus cajan* (L.) Millspaugh] Genotypes against Sterility Mosaic Disease

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ABSTRACT

Pigeonpea [Cajanus cajan (L.) Millspaugh] is a short lived legume belonging to Cajaninae sub tribe of the economically most important leguminous tribe Phaseoleae. It plays an important role in food and nutritional security because it is a rich source of proteins, minerals and vitamins. During kharif 2015-16, 38 genotypes of pigeonpea were screened against sterility mosaic disease at the Agriculture research station, Bidar under natural epiphytotic condition and also by leaf stapling technique at UAS, Raichur (Karnataka), India. Among the 38 genotypes screened only Bahar genotype showed resistant, 18 genotypes were moderately resistant and 19 genotypes showed susceptible reaction.

Key words: *Pigeonpea, Sterility Mosaic Disease (SMD), Screening.*

INTRODUCTION

Pigeonpea [*Cajanus cajan* (L.) Millspaugh] is a short lived legume belonging to Cajaninae sub tribe of the economically most important leguminous tribe Phaseoleae. It plays an important role in food and nutritional security because it is a rich source of proteins, minerals and vitamins. In India, pigeonpea is cultivated in an area of about 36.3 lakh ha with an annual production of 27.6 lakh tonnes averaging a productivity of 760.33 kg ha^{-1} [1]. The biotic stresses are considered as one of the main reasons for limiting the yields in pigeonpea. Among them the major biotic stresses causing economic concerns in yield are the *Fusarium* wilt, Sterility Mosaic Disease (SMD) and *Phytopthora* blight[6].

SMD is one among the most destructive disease of pigeonpea causing yield losses up to 95 per cent[2,6]. Presently disease is very severe in major pigeonpea growing regions of Northern Karnataka.

The task of developing resistant varieties is complicated in view of the genetic plasticity of the pathogen. Despite several attempts especially during the past 20 years, the agents of SMD remain uncharacterized and posed a big challenge to the scientific community.

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Effective method of managing virus diseases of crop plants is by using resistant varieties which is most economical, inexpensive and eco-friendly for resource poor farmers in comparison to chemicals. The cost of cultivation with disease/pest resistant varieties was found to be less in comparison to other methods.

MATERIALS AND METHODS

A field experiment was conducted during *kharif* 2015-16 at ARS, farm Bidar. Initially susceptible variety of pigeonpea was sown as a hedge crop for the source of inoculum before two months according to the wind direction and one side crop was surrounded by sugarcane as it cause humidity and congenial condition for the multiplication of vector population and also leaf stapling method was followed for screening to identify the resistant source for pigeonpea sterility mosaic disease. The infected leaf sample was stapeled to the healthy pigeonpea seedlings at 10-15 days after sowing in such a way that the undersurface of the infected leaf should come in contact with the healthy pigeonpea leaf surface of test genotype.

The pigeonpea genotypes were collected from AICRP on pigeonpea from Kalaburgi. Each genotype was sown in single row of 3 m length with a spacing of 60 x 30 cm. The initial disease plant count was recorded in all genotypes starting from 60, 90 and 120 DAS till harvest. The infected plants were marked with different colour tags for different recordings, to avoid missing of early infected plants. The disease incidence (%) pigeonpea sterility mosaic disease was calculated by using the formula given below.

$$\text{Disease incidence (\%)} = \frac{\text{Number of SMD infected plants}}{\text{Total number of plants}} \times 100$$

The genotypes were categorised into different categories in the following manner[4]

Sl. No	Reaction	Disease incidence (%)
1	Resistant	0 -10 %
2	Moderately resistant	11 -30 %
3	Susceptible	> 30 %

RESULTS AND DISCUSSION

Totally 38 genotypes were screened for their reaction to SMD disease during the season *kharif*, 2015 at ARS, Bidar with ICP-8863 as susceptible check. Based on the performance of genotypes over the season, they were categorised into following manner. Resistant (0-10%), moderately resistant (11-30%) and susceptible (>30%) incidence of SMD. The results are presented in Table 1 and 2.

Out of 38 genotypes screened, one of the genotype Bahar showed resistant, while GRG-177, GRG-152, NTL-900, ICP-16264, GRG-2013, GRG-140, GRG -811, GRPH-1, GRPH-2, GRPH-3, GRG-444, GRG-820, AGL-1666, AGL-1919, AGL-2013, PRK-B 136, AGL-1603, AGL-2249 genotypes were moderately resistant and rest of the genotypes GRG-151, ICPL-14001, AKT-9913, GRG-222, BDN-2008-1, GRG-111, TS-3R, Maruti, ICP-722, ICP-13673, ICP-13101, ICP-88039, ICP-14832, BDN-2008-8, TDRG-33, ICP-11320, ICP-8793, ICPL-99050 and GRG-829 were susceptible. The maximum incidence of 100 per cent was recorded in susceptible check ICP-8863 (Maruti). Considering the overall performance of pigeonpea genotypes over the season, most of the genotypes exhibited moderately resistant and susceptible reaction.

The results are in agreement with the earlier research findings, Saifulla *et al.*[7] they screened the four pigeonpea genotypes *viz*., BRG 3, ICP 7035, Hy-3C and ICP 8863 against SMD for three consecutive years from 2002-03 to 2005-06. BRG 3 and ICP 7035 recorded resistant reaction, while the genotype

HY-3C recorded moderate resistant reaction to SMD. The susceptible check ICP 8863 recorded 100 per cent disease incidence and also concordant with the observations made by Muniyappa *et al*[5].

Table 1: Reaction of pigeonpea genotypes against SMD during *kharif* 2015 at ARS farm, Bidar

Sl. No.	Pigeonpea genotypes	Disease incidence (%)			
		At 60 DAS	At 90 DAS	At 120 DAS	Reaction
1.	AGL-1603	22.50	25.75	28.50	MR
2.	AGL-1666	18.60	24.50	24.50	MR
3.	AGL-1919	16.60	22.70	25.60	MR
4.	AGL-2249	20.50	28.00	28.00	MR
5.	AGL-2013	21.50	26.75	26.75	MR
6.	AKT-9913	51.00	53.50	54.50	S
7.	Bahar	4.70	4.80	4.70	R
8.	BDN-2008 - 1	15.50	42.50	50.00	S
9.	BDN-2008- 8	35.20	52.90	64.70	S
10.	GRG-111	33.30	33.30	40.00	S
11.	GRG-140	15.42	18.50	20.75	MR
12.	GRG-151	26.60	26.60	33.5	S
13.	GRG-152	10.50	12.40	15.50	MR
14.	GRG-177	12.50	15.00	15.00	MR
15.	GRG-222	33.33	44.40	44.40	S
16.	GRG-444	14.50	25.00	28.50	MR
17.	GRG-811	12.50	15.40	18.75	MR
18.	GRG-820	12.50	25.50	35.50	MR
19.	GRG-829	37.50	55.50	60.50	S
20.	GRG-2013	13.33	20.00	25.60	MR
21.	GRPH-1	9.00	18.50	18.50	MR
22.	GRPH-2	10.50	21.5	21.5	MR
23.	GRPH-3	9.50	20.50	20.50	MR
24.	ICP-7223	62.50	82.5	89.5	S
25.	ICP-8793	70.00	89.50	100	S
26.	ICP-11320	65.50	88.50	96.50	S
27.	ICP-13101	23.00	30.70	46.50	S
28.	ICP-13673	29.50	35.50	42.50	S
29.	ICP-14832	28.50	35.70	42.80	S
30.	ICP-16264	13.50	16.50	16.50	MR
31.	ICP-88039	39.00	72.00	72.00	S
32.	ICPL-14001	28.50	35.70	42.80	S
33.	ICPL-99050	40.50	63.50	63.50	S
34.	Maruti (ICP 8863)	88.20	100	100	S
35.	PRK-B-136	18.50	26.50	27.00	MR
36.	NTL- 900	16.00	22.50	24.50	MR
37.	TDRG-33	26.60	46.60	62.60	S
38.	TS-3R	29.50	36.50	45.86	S

(R) - Resistant, (MR) - Moderately resistant, (S) – Susceptible, DAS – Days after sowing

Table 2: Reaction of pigeonpea genotypes to SMD disease during *kharif* 2015 at ARS farm, Bidar

Sl. No.	Disease scale/host reaction	List of entries
1.	Resistant (0-10%)	Bahar
2.	Moderate resistant (11-20%)	GRG-177, GRG-152, NTL-900, ICP-16264, GRG-2013, GRG-140, GRG-811, GRPH-1, GRPH-2, GRPH-3, GRG-444, GRG-820, AGL-1666, AGL-1919, AGL-2013, PRK-B-136, AGL-1603, AGL-2249 **(18 genotypes)**.
3.	Susceptible (>30%)	GRG-151, ICPL-14001, AKT-9913, GRG-222, BDN-2008- 1, TS-3R, Maruti, ICP-722, ICP-13673, GRG-111, ICP-13101, ICP-88039, ICP-14832, BDN-2008- 8, TDRG-33, ICP-11320, ICP-8793, ICPL-99050, GRG-829 **(19genotypes)**.

REFERENCES

1. Anonymous, 2014, *Annu. Rep.* Department of Agriculture and Cooperation, Ministry of Agriculture, Govt. of India.
2. Ganapathy, K. N., Gnanesh, B. N., Byregowda, M., Venkatesha, S. C., Sunil, S., Gomashe and Channamallikarjuna, V., AFLP analysis in pigeonpea (*Cajanus cajan* (L.) Millsp.) revealed close relationship of cultivated genotypes with some of its wild relatives. *Genet. Res. Crop Evol*., **58:** 837–847 (2011).
3. Kannaiyan, J., Nene, Y. L., Reddy, M. V., Ryan, J. G. and Raju, T. N., Prevalence of pigeonpea diseases and associated crop losses in Asia, Africa and America. *Trop. Pest Manage.*, **30:** 62-71 (1984).
4. Lava Kumar, P., Studies on pigeonpea sterility mosaic disease isolation and characterisation of the causal agent and assessment of genetic variation within and between populations of the mite vector, *Aceria cajani ICRISAT, India*, **12:** 13-45 (2002).
5. Muniyappa, V., Lavakumar, P., Rangaswamy, K. T., A sterility mosaic resistant vegetable and grain purpose pigeonpea variety. *ICRISAT Org.*, **1:** 23-24 (2005).
6. Reddy, M. V., Raju, T. N. and Lenne, J. M., Diseases of pigeonpea. In: *The Pathology of Food and Pasture Legumes.* CAB *Int.* ICRISAT, pp. 517-558 (1998).
7. Saifulla, M., Mahesh, M. and Byre Gowda, M., Reaction of pigeonpea genotypes for sterility mosaic disease. *In National seminar on new frontiers in Plant Pathology.* Shimoga, India, pp. 43-45 (2006).