

Prevalence of sterility mosaic disease in major pigeon pea growing areas of northeastern Karnataka

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ABSTRACT

Roving survey was conducted to know the extent of severity of sterility mosaic disease (SMD) of pigeon pea in three districts of northeastern Karnataka viz Bidar, Kalaburgi and Yadgir. The results revealed that the incidence varied from 9.50 to 34.50 per cent during Kharif 2015. Bidar district recorded highest incidence of the disease (26.38%) followed by Kalaburgi (24.08%) and the least incidence was at Yadgir (10.81%). The highest incidence of 34.50 per cent was recorded at the Rajgira village of Bidar Taluk.

Keywords: Pigeon pea; sterility mosaic disease; incidence; district; Taluk; village

INTRODUCTION

Pigeon pea, *Cajanus cajan* (L) Millspaugh is a short-lived legume belonging to Cajaninae sub-tribe of the economically most important leguminous tribe Phaseoleae. It is a multipurpose grain legume crop grown extensively for food in Asian and African countries. India is considered as the primary centre of origin for pigeon pea due to the presence of ample variability in local germplasm and wild relatives (Saxena 2008). In India it 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 (Anon 2014). The biotic stresses are considered as one of the main reasons for limiting the yields in pigeon pea. More than 210 pathogens have been reported to infect pigeon pea which include fungi, bacteria, viruses, nematodes and phytoplasma. Among them the major biotic stresses causing economic concern in yield are the *Fusarium* wilt, sterility mosaic disease (SMD) and *Phytophthora* blight (Reddy et al 1998).

SMD is one among the most destructive diseases of pigeon pea (Kannaian et al 1984) causing yield losses up to 95 per cent (Reddy and Nene 1981, Ganapathy et al 2011). The disease was first reported

from Pusa, Bihar (Mitra 1931) and subsequently from several states of India. Hence the present investigations were carried out to know the more severely affected places in northeastern Karnataka.

METHODOLOGY

A roving survey was conducted in major pigeon pea growing areas of northeastern Karnataka viz Bidar, Kalaburgi and Yadgir districts during Kharif 2015-16. In each district three Taluks and in each Taluk three villages were selected. Further in each village three fields were surveyed to record the incidence of pigeon pea sterility mosaic.

The per cent incidence of sterility mosaic disease was calculated by counting hundred plants at four to five spots in each field and number of plants showing sterility mosaic disease symptoms were recorded. Similar observations were taken at three to four transects in each field. The disease incidence was calculated by using the formula given below:

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

Table 1. Incidence of sterility mosaic disease (SMD) of pigeon pea in three districts of northeastern Karnataka during Kharif 2015

District	Taluk	Location	Number of fields visited	SMD incidence (%)	Mean	
					Taluk	District
Bidar	Bidar	Rajgira	3	34.50	32.50	26.38
		Markal	3	29.50		
		Haladkeri	3	33.50		
	Humnabad	Humnabad	3	25.50	24.43	
		Hallikhed(B)	3	23.20		
		Chitguppa	3	24.60		
	Bhalki	Navadgi	3	20.50	22.23	
		Melkunda	3	23.50		
		Bhalki	3	22.70		
Kalaburgi	Chittapur	Chittapur	3	24.50	26.25	24.08
		Dandorti	3	30.75		
		Madbula	3	23.50		
	Sedam	Hudda.K	3	19.60	23.53	
		Nilahalli	3	22.50		
		Kokanalli	3	28.50		
	Kalaburgi	Farhatabad	3	19.50	22.46	
		Nandikur	3	24.70		
		Kotnoor	3	23.20		
Yadgir	Yadgir	Ramasamudra	3	10.90	11.05	10.81
		Gurmitkal	3	12.75		
		Yergol	3	9.50		
	Shahapur	Bheemarayanagudi	3	12.50	12.85	
		Dornahalli	3	13.75		
		Alishnagar	3	12.30		
	Shorapur	Rangampet	3	9.50	8.53	
		Tinthni	3	8.59		
		Hastanapur	3	7.51		

RESULTS and DISCUSSION

From the data presented in Table 1 it is revealed that prevalence of SMD in all nine villages of three Taluks of Bidar district there was a disease incidence from 20.50 to 34.50 per cent with a mean incidence of 26.38 per cent. The highest incidence of 32.50 per cent was recorded in Bidar followed by Humnabad Taluk (24.43%). Among the villages maximum disease incidence was recorded in Rajgira (34.50%) followed by Haladkeri village (33.50%) in Bidar Taluk whereas the lowest disease incidence was recorded in Navadgi village (20.50%) of Bhalki Taluk.

Among nine villages of three Taluks in Kalaburgi district the disease incidence ranged from 19.50 to 30.75 per cent with a mean incidence of 24.08 per cent. The data on mean SMD per cent over Taluks showed highest incidence in Chittapur (26.25%) followed by Sedam Taluk (23.53%). Among the villages maximum disease incidence was found in Dandorti (30.75%) of Chittapur Taluk followed by Kokanalli

village (28.50%) in Sedam Taluk. Lowest disease incidence (19.50%) was recorded in Farahatabad village of Kalaburgi district.

The results of Kharif 2015 indicated the prevalence of SMD in all nine villages of three Taluks of Yadgir district and the disease incidence ranged from 9.50 to 13.75 per cent with mean incidence of 10.81 per cent. The highest incidence of 12.85 per cent was recorded in Shahapur followed by Yadgir Taluk (11.05%). Among the villages maximum per cent incidence was recorded in Doranhalli (13.75%) of Shahapur Taluk followed by Gurmitkal village (12.75%) of Yadgir Taluk. The lowest disease incidence was seen at Hastanapur village (7.51%) followed by Tinthini (8.59%) village of Shorapur Taluk.

One of the probable reasons contributing to SMD incidence in Bidar and Kalaburgi districts may be attributed to the continuous monocropping by the farmers and also off-season survival of sterility mosaic pathogen in ratooned and perennial crop grown along

the borders and bunds of sugarcane field in irrigated tracts and also pigeon pea flushes of the previous season crop which was commonly observed in SMD infested fields. The higher SMD incidence noticed in Bidar district might have influenced the disease outbreak in adjoining Taluks of Kalaburgi district. The present research findings are concordant with the observations made by Narayana et al (2000).

Variation in the incidence of SMD from location to location within a district may be attributed to climatic factors affecting the survival and multiplication of mite vectors in Kharif pigeon pea which were prevalent during off-season in the irrigated and protected fields in the form of ratooned/perennial/summer pigeon pea. Minimum temperature range of 10-25°C and maximum of 25-35°C was found congenial for built up of mite population and temperature below 10°C and above 35°C was not congenial for vector and disease built up respectively as reported by Dhar et al (1998). Moreover Bidar district falls under northeastern transitional zone with an annual rainfall of 1020 mm per annum and has got cool and humid climatic conditions with lower temperatures which probably help in increased population of mite vectors in turn receiving more SMD epidemics in the district over years.

REFERENCES

- Anonymous 2014. Annual report. Department of Agriculture and Cooperation, Ministry of Agriculture, Govt of India.
- Dhar V, Chaudhary RG, and Nairnuddin 1998. Population studies on sterility mosaic vector (*Aceria cajani*). Annual Report, Indian Institute of Pulse Research, Kanpur, Uttar Pradesh, India.
- Ganapathy KN, Gnanesh BN, Byregowda M, Venkatesha SC, Gomashe SS and Channamallikarjuna V 2011. AFLP analysis in pigeon pea, *Cajanus cajan* (L) Millsp revealed close relationship of cultivated genotypes with some of its wild relatives. Genetic Resources and Crop Evolution **58**: 837-847.
- Kannaiyan J, Nene YL, Reddy MV, Ryan JG, and Raju TN 1984. Prevalence of pigeon pea diseases and associated crop losses in Asia, Africa and America. Tropical Pest Management **30**(1): 62-71.
- Mitra M 1931. Report of imperial mycologist. Scientific Report, Agricultural Research Institute, Pusa, Bihar, India.
- Narayana YD, Mahalinga DM, Jayalakshmi SK, and Benagi VI 2000. Prevalence of sterility mosaic disease of pigeon pea in northern Karnataka. Karnataka Journal of Agricultural Sciences **13**(2): 470-472.
- Reddy MV and Nene YL 1981. Estimation of yield loss in pigeonpea due to sterility mosaic. Proceedings, International Workshop on Pigeon pea, 15-19 Dec 1980, ICRISAT Centre, Patancheru, Andhra Pradesh, India **2**: 405-312.
- Reddy MV, Raju TN and Lenne JM 1998. Diseases of pigeon pea. In: The pathology of food and pasture legumes (DJ Allen and JM Lenne eds), CAB International, ICRISAT, pp 517-558.
- Saxena KB 2008. Genetic improvement of pigeon pea- a review. Tropical Plant Biology **1**(2): 159-178.