Asian J. of Bio Sci. (April, 2008) Vol. 3 No. 1 : (30-32)

Effect of dates of sowing on first symptom appearance and incidence of sterility mosaic in pigeonpea [*Cajanus cajan* (L) Millsp.]

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(Accepted : October, 2007)

The experiment was conducted in pots (30 cm in diameter.) which were filled with field soil. Ten selfed seeds of each of 11 genotypes of pigeonpea were sown in three pots at different dates *viz.*, 15th September 2003, 25th November 2003 and 16th January 2004 to know the effect of different dates of sowing on the first symptom appearance and incidence of disease. Pigeonpea genotypes susceptible to sterility mosaic , exhibited symptoms of disease irrespective of three different dates of sowing. The highly resistant genotypes like ICP 7035 and ICP 8862 were free from sterility mosaic at all different dates of sowing. The incidence of disease in all genotypes sown in September was significantly higher as compared to incidence of disease exhibited by genotypes sown in November and January. The period required for first symptom appearance was significantly shorter in September sowing crop as compared to crop grown in November and January.

Key words: Pigeonpea, Sterility mosaic

INTRODUCTION

Sterility mosaic is considered to be one of the major constraints for low productivity of pigeonpea in India. The disease is known to occur in major pigeonpea growing areas of India (Kannaiyan *et al*.,1984) and yield losses has been observed up to 95 per cent. (Reddy and Nene, 1981). The disease is characterized by proliferation, mosaic symptoms, cessation of reproductive growth and a reduction in the size of the leaflets (Kandaswamy and Ramakrishnan, 1960). Symptom of the disease mainly depends on the time of infection. Infection in susceptible genotype at an early stage of crop growth (<30 to 45-day-old plants) results in the expression of characteristic disease symptoms in 10-15 days and almost complete cessation of flowering, but leaf symptoms become masked as plants grow and later infection in susceptible cultivars (>50 to 60 day-old plants) results in slightly delayed symptom development and then only mild mosaic symptoms on only a few branches or parts of branches and such plants show reduced flowering (20-50 %). However, after ratooning (severe pruning), new growth from such plants show severe mosaic and complete sterility symptom (Reddy and Nene, 1981).The present study was conducted to know the effect of different dates of sowing on the first symptoms appearance and incidence of disease.

MATERIALS AND METHODS

The present study was conducted in the Department & Mycology and Plant Pathology, Institute of Agrilcultural Sciences, B.H.U.,Varanasi during *kharif* season of 2003-2004. The experiment was conducted in pots. Pots (30 cm in diameter.) were filled with field soil. Ten selfed seeds of each of 11 genotypes of pigeonpea were sown in three pots at different dates *viz*., 15th September 2003, 25th November 2003 and 16th January 2004. The pots sown with susceptible genotype, ICP 8863 at different dates served as control. The pots were kept near the infector hedge in the field for natural infection. The plants were regularly monitored to see the first symptom appearance and incidence of disease. The per cent disease incidence (PDI) was calculated adopting the following formula :

$$\text{Per cent disease incidence} = \frac{\text{Number of infected plants}}{\text{Total number of plants}} \times 100$$

Weekly meteorological data regarding the maximum and minimum temperatures, relative humidity, rainfall and wind velocity were recorded from meteorological observatory of the Institute of Agricultural Sciences, Banaras Hindu University, Varanasi.

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RESULTS AND DISCUSSION

The incidence of sterility mosaic on 11 pigeonpea genotypes sown at different dateswas observed and presented in the Table 1. Pigeonpea genotypes susceptible to disease, exhibited symptoms of disease irrespective of three different dates of sowing. The highly resistant genotypes like ICP 7035 and ICP 8862 were free from sterility mosaic at all the different dates of sowing. The incidence of disease on genotypes sown at three different dates was significantly different from each other. Similarly, interaction between dates of sowing and genotypes in development of disease was also statistically significant. The incidence of disease in all genotypes sown in September was significantly higher as compared to incidence of disease exhibited by genotypes sown in November and January. The incidence of disease significantly declined in all the genotypes when sowing was delayed. The ICP 8863(C), a highly susceptible genotype to sterility mosaic exhibited highest incidence (96.49%, 92.19% and 76.89%) at all the dates of sowing.

The information regarding the first symptom appearance in all the genotypes of pigeonpea sown at different dates has been shown in the Table.2 The appearance of disease was significantly affected by alteration in date of sowing. The period required for first symptom appearance was significantly shorter in September sown crop as compared to crop grown in November and January. The period required for expression of sterility mosaic symptoms on Purple-1 was 38 days when sown in September and November. However, it expressed first symptom after 48 days when sown in January. Genotype ICP 2376 grown on three dates of sowing showed significant variation in duration required for first disease appearance. The first symptom appearance was observed after 55, 70.3 and 85.33 days when grown in September, November and January, respectively. The genotypes ICP-11164, LRG-30 and C-11 took maximum time for first symptom when sown in September as well as November and January. The first symptom appeared significantly earlier and incidence of disease was highest on pigeonpea sown in September as compared to crop sown in November and January. This variation may be attributed to climatic conditions prevailing during the crop season affecting the population of mites and their transmission. During the last week of September to second week of October 2003, mean of maximum-minimum temperature, maximum-minimum relative humidity and wind velocity were 31.36°C and 23.46°C, 90% and 65% and 5.46 km/hr, respectively . The crop sown on 15th Sep. 2003 had most susceptible stage of

Table 1: Effect of different dates of sowing on disease incidence

S. No.	Genotype	Disease incidence (%)*			Type of symptom
		Date of sowing			
		15thSep.2003	25th Nov. 2003	16th Jan.2004	
1	BSMR 846	37.50	31.95	28.60	SM
2	ICP 11164	84.82	78.13	57.27	MM
3	ICP 2376	55.16	41.68	33.25	SM
4	LRG 30	78.70	62.52	50.69	SM
5	ICP 8863 (C)	96.49	92.19	76.89	SM
6	ICP 7035	0.0	0.0	0.0	NS
7	ICP 10976	88.39	80.68	73.86	MM
8	Purple 1	85.92	81.65	71.54	SM
9	C 11	88.51	85.70	67.66	MM
10	ICP 8862	0.0	0.0	0.0	NS
11	BDN 1	87.32	86.90	73.47	MM

* Each value is the mean of three replications

Genotype X date LSD (5%) = 3.52 SM = Severe mosaic Date LSD (5%) = 1.06 NS = No symptom

Genotype LSD (5%) = 2.02 MM = Mild mosaic

Table 2: Effect of different dates of sowing on first symptom appearance

S. No.	Genotype	Time required for first symptom appearance (days)*			Type of symptom
		Date of sowing			
		15th Sep.2003	25th Nov.2003	16th Jan.2004	
1	BSMR 846	39.66	45.33	58.33	SM
2	ICP 11164	58.33	66.33	74.66	MM
3	ICP 2376	55.00	70.33	85.33	SM
4	LRG 30	58.00	66.33	74.66	SM
5	ICP 8863 (C)	38.33	38.00	48.00	SM
6	ICP 7035	0.0	0.0	0.0	NS
7	ICP 10976	39.33	48.33	70.66	MM
8	Purple 1	38.00	38.00	48.33	SM
9	C 11	58.00	67.33	74.66	MM
10	ICP 8862	0.0	0.0	0.0	NS
11	BDN 1	40.33	46.33	57.33	MM

* Each value is the mean of three replications

Genotype X date LSD (5%) = 2.20 SM = Severe mosaic Genotype LSD (5%) = 1.27 MM = Mild mosaic

Date LSD (5%) = 0.66 NS = No symptoms

growth up to the second and third weeks of October, when vector population and its activity enhanced in comparison to the climatic conditions prevailed during November to January sowing. Other workers have also reported that climatic conditions influenced the population of eriophyde mite (Singh and Rathi 1996).

Ghanekar *et al*. (1992) found that the infection of sterility mosaic prevailed throughout the year but incidence was higher in March through October planting whereas it was low in December through February planting. However, during the current study, it was also observed that in some susceptible genotypes per cent disease incidence ranged up to 92.19 in November also, although it is significantly less when compared September sowing. This observation is an agreement with Ghanekar *et al*. (1992), who reported the vulnerability of pigeonpea crop to sterility mosaic infection throughout the year.

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