
Screening of hybrid cultivars/lines of mung bean [*Vigna radiata* (L.) Wilczek] against Yellow Mosaic Virus disease in the plains of West Bengal

PRITHA DAS, POLY SAHA, P. S. NATH, B. K. DE AND SRIKANTA DAS

Department of Plant Pathology, Faculty of Agriculture, Bidhan Chandra Krishi Viswavidyalaya,
Mohanpur 741 252, Nadia,

Received : 12.08.2009

Accepted : 30.10.2010

Published : 25.04.2011

A field screening had been made against the yellow mosaic virus disease in mung bean to identify the source of resistance for future multiplication, genetic improvement and cultivation in the plains of West Bengal. Twelve cultivars/lines namely Pasu-94531 B-105, Pusa-105, PDM-54, PDM-84-139, PS-7, HUM-12, PDM-84-143, K-851, PDM-50, PS-16 and Pusa Baisakhi were selected and screened under natural field condition for consecutive two years (2005 & 2006) during pre-kharif seasons. None of the lines cultivars were free from the disease. The lowest disease incidence (6.10%) and disease severity (23.04%) and maximum yield were recorded in PDM-84-143 followed by PDM-84-139. Pusa-9534 and B-105. The average population of white fly was also less in PDM-84-143; followed by PDM -84-139. Pusa-9531 and B-105.

Key words : Mung bean, yellow mosaic virus disease, cultivars. incidence severity whitefly population, yield

INTRODUCTION

Mungbean (*Vigna radiata* L. Wilezek) is an important pulse as well as cash crop which is well known among farmers in many localities. In West Bengal, mungbean is the principle pulse crop and mainly grown in pre-kharif and kharif season. Among the diseases affecting this crop, yellow mosaic is the most destructive virus disease, which causes heavy losses in yield. The disease has been reported to cause up to 83.9% loss in yield when symptoms appeared 20 days alter sowing in Bihar (Quaiser and Ahmed. 1991). Nene (1972), Furgo and Mishra (1986) have reported that loss of yield due to yellow mosaic of mungbean varies from 10-100% depending on the time of infection, susceptibility of the cultivars, season of cultivation and vector population during the growing season. Substantial informations are available in indirect control of the disease by controlling vector of the disease through application of insecticides. These control practices

for the most part check or limit the spread of disease. In view of the raising cost of insecticides and their inability to control the disease completely and posing great threat to environment and creating health hazards, rational approach would be to evolve varieties/lines resistant to infection by the virus. In the present study attempts are made to determine the resistant varieties/lines of mungbean to yellow mosaic virus disease in the field.

MATERIALS AND METHODS

Twelve varieties/lines namely Pusa-94531. B-105, Pusa-105, PDM-54, PDM-84-139, PS-7, HUM-12, PDM-84-143. K-851, PDM-50, PS-16 and Pusa Baisakhi were selected and screened under natural conditions for consecutively two years (2005 & 2006) during pre-kharif season in the Instructional farm, BCKV located at Jaguli. Nadia. Tests of each variety/line were replicated three times in randomized block design. The plot size was 2 m x 2

m. The seeds were sown with a spacing of 30 cm row to row and 15 cm plant to plant in the third week of February. A recommended dose of fertilizers were applied. The crop was grown at irrigated condition following normal cultural practices of this region except application of pesticides. Natural incidence of yellow mosaic virus disease was recorded on the basis of symptom on individual plant starting from 15 days after sowing (DAS) and thereafter 10 days interval and continued up to 45 DAS.

The incidence and severity of disease were calculated by using the following, formula and scale :
Disease incidence = No. of plant infected in a plot/ Total No. of plants in that plot \times 100; and Disease severity = Σ Numerical rating/No. of leaves observed \times Highest rating scale \times 100

The scale used as follows : 0 = No. of plants showing any symptoms; 1 = Less than 1% plants showing symptoms; 3 = 1-10% plants showing mottling of leaves; 11-20% plants showing mottling and yellow discolouration of leaves; 7 = 21-50% plants showing mottling, yellow discolouration of leaves, stunting of plants; and 9 = 51% or more plants affected. Stunting of plants pronounced.

Flower and fruits reduced. Yellow mottling severe.

Whitefly population was recorded simultaneously and the procedure followed as same as described by Sastry and Singh (1971). Five plants in each replicated plot and three leaves (upper, middle and lower) from each plant were selected at random for whitefly population count. Whitefly population count was taken in the morning when whiteflies are less active. Harvesting was completed by five pickings, Disease incidence and severity data were statistically analysed after angular transformation.

RESULTS AND DISCUSSION

The two years pooled data presented in Table 1, indicated that the disease incidence varied from 6.40 to 10.62% at 45 days after sowing. Disease severity varied from 24.49 to 51.32% at 45 days after sowing. Lowest disease incidence and severity was recorded in variety PDM-84-143 (6.40% and 23.04%) followed by PDM-84-139 (7.30% & 24.49%), Pusa-9531 (7.77 % & 26.44%), B-105 (7.8% & 26.48%), Pusa-105 (8.09% & 26.54%), PDM-54 (8.21% & 26.2%), HUM-12 (9.25% & 28.85%), Pusa Baisakhi (9.26% & 29.45%), PS-16

Table 1 : Field screening of different variety, or lines of mungbean against yellow mosaic virus disease (two years pooled data, 2005 and 2006).

Varieties/ lines	Incidence (%) Days after sowing				Severity (%) at 45 DAS	Whitefly population at 45 DAS (average)	Yield kg/plt	Yield q/ha
	15	25	35	45				
Pusa-9531	2.5 (9.09)	6.48 (14.5)	7.30 (15.68)	7.77(16.18)	26.44 (30.94)	6.0	0.14	3.58
B-105 (Control)	2.5 (9.09)	4.58 (12.36)	7.8 (16.21)	7.80(16.21)	26.48 (30.96)	6.0	0.13	3.25
Pusa-105	0.83 (5.23)	4.16 (11.77)	7.13 (15.49)	8.09(16.52)	26.54 (31.00)	7.0	0.11	2.83
PDM-54	3.33 (10.51)	5.06 (13.00)	8.21 (16.65)	8.21(16.65)	26.82 (31.19)	7.0	0.10	2.58
PDM-84-139	1.66 (7.41)	3.75 (11.16)	6.48 (14.75)	7.30(15.68)	24.49 (29.66)	5.0	0.15	3.75
PS-7	1.25 (6.41)	7.14 (15.50)	7.76 (16.17)	9.78(18.22)	30.12 (33.29)	8.0	0.90	2.25
HUM-12	0.91 (5.49)	3.16 (10.25)	7.75 (16.17)	9.25(17.0)	28.85 (32.23)	7.0	0.10	2.50
PDM-84-143	2.16 (8.46)	4.39 (12.10)	5.72 (13.84)	6.40(14.66)	23.04 (28.68)	5.0	0.17	4.25
K-851	2.83 (9.69)	5.84 (13.98)	9.42 (17.87)	10.29(18.71)	34.23 (35.80)	8.0	0.80	2.00
PDM-50	1.25 (6.41)	3.27 (10.42)	7.94 (16.37)	10.62(19.02)	51.32 (45.75)	10.0	0.63	1.58
PS-16	1.66 (7.41)	6.09 (14.29)	9.37 (17.82)	9.75(18.19)	29.83 (33.10)	8.0	0.93	2.33
Pusa Baisakhi	1.00 (5.73)	5.88 (14.03)	7.51 (15.91)	9.26(17.72)	29.45 (32.86)	7.0	0.10	2.50
S.Em(\pm)	2.26	1.98	1.32	1.41	2.09		0.17	
C.D. at 0.05	5.99	4.83	3.23	3.43	5.10		0.42	

Figures in parenthesis indicate angular transformed values

*Average of 5 plants; DAS = Days after sowing.

(9.75% & 29.83%), PS-7 (9.78% & 30.12%), K-851 (10.29% & 34.23%) and PDM-50 (10.62% & 51.32%). Population of whiteflies differed with respect to varieties/lines. Minimum average population of whiteflies differed with respect to varieties/lines. Minimum average population (5 insects) was recorded on variety/line PDM-84-143 & PDM-84-139 followed by Pusa 9531, B-105, (6 insects), Pusa-105, PDM-54 and HUM-12 (7 insects), PS-16, K-851, S-7 (8 insects). Maximum average population (10) was recorded on variety PDM-50. Yield ranged from 1,575 to 4.25 q/ha were recorded in different varieties/lines. Highest yield was recorded in variety PDM-84-143 followed by PDM-84-139, Pusa-9531 and B-105.

Summing up the performance of the test varieties/lines against yellow mosaic virus, whiteflies and yield, varieties/lines PDM-84-143 was the best

followed by PDM-84-139, Pusa-9531 and B-105. Some biochemical component might have served as defensive mechanism against the virus and vector resolving high yield. The variety/line DM-84-143 can be recommended for cultivation in the plains of West Bengal.

REFERENCES

- Furgo, P.A. and Mishra, M.D. 1986. Effect of seed treatment of mung bean (*Vigna radiata*) with *Rhizobium* - yellow mosaic virus and its effect on growth and nitrogen fixation (Abs.). In National Seminar on Whitefly transmitted Plant virus diseases. A.R.I., New Delhi, India.
- Nene, Y.L. 1972 A survey of viral diseases of pulse crop in Uttar Pradesh. Technical Report. G.B.Pant University of Agriculture and Technology, Pantnagar, U.P., India.
- Quaiser Ahmed and Ahmed, Q. 1991. Growth attributes and grain yield of mungbean plants affected by mungbean yellow mosaic virus in field. *Indian Phytopathology*. **43** (4): 559-560.