

Screening of some blackgram(*Vignamungo*(L.)Hepper) genotypes for resistance to yellow mosaic virus

S.Obaiah^{1*}, *B.V. Bhaskara Reddy*², *N.P. Eswara Reddy*³ and *Y. Siva Prasad*²

¹S.V. Agricultural College, ANGRAU, Tirupati-517502, Andhra Pradesh, India

²Institute of Frontier Technologies, Regional Agricultural Research Station, Tirupati-517502, Andhra Pradesh, India

³College of Food Science and Technology, ANGRAU, Pulivendula, Andhra Pradesh, India

*E-mail:vikky503@gmail.com

Yellow mosaic disease affects many legumes in India and other south Asian countries and is caused by whitefly (*Bemisia tabaci* Genn.) transmitted by Gemini viruses. Yellow mosaic virus (YMV) in blackgram (*Vignamungo*(L.)Hepper) is the most destructive viral disease affecting yield potential of blackgram both qualitatively and quantitatively and ability to cause yield loss up to 85% (Nene, 1972; Varma and Malathi, 2003). Mungbean yellow mosaic virus (MYMV) belong to the genus *begomovirus* and occurs in a number of leguminous plants such as mungbean, urdbean, cowpea (Nariani, 1960, Nene, 1973), soybean (Suteri, 1974), horsegram (Muniyappa *et al.*, 1975), lab-lab bean (Capoor and Varma, 1948) and French bean (Singh, 1979). In blackgram, MYMV causes irregular yellow green patches on older leaves and complete yellowing of young leaves of susceptible varieties (Singh and De, 2006).

Initially the disease appears as a small yellow patches or spots on green lamina. The young leaves are the first to show the symptoms. The yellow discoloration slowly increases and newly formed leaves may completely turn yellow. The infected plants normally mature later and bear very few flowers and pods. Evaluation of germplasm entries for disease resistance is a crucial step in controlling plant diseases through host plant resistance. Genes conferring resistance can be to a certain extent

identified through routine screening procedures such as germplasm evaluation. Hence, present study has been taken up to evaluate germplasm of blackgram to Yellow Mosaic Virus.

In the case of YMV in blackgram, in the present study, we have screened 56 genotypes/entries and identified 22 entries that have shown promising reaction to YMV resistance under natural field conditions.

The study was carried out at disease screening field established at Regional Agricultural Research Station, Lam, Guntur district of A. P., India during Rabi, 2011. Resistance screening was conducted in the natural epidemic conditions using alternative rows of highly susceptible varieties. About 56 varieties and AICRP entries were evaluated at RARS, Lam, Guntur. The disease was scored on a 1-9 arbitrary scale according to Alice and Nadarajan (2007).

Rating scale for scoring yellow mosaic virus disease (1-9 scale):

1. No visible symptoms on leaves or very minute yellow specks on leaves.
2. Small yellow specks with restricted spread covering 0.1 to 5 % leaf area.
3. Yellow mottling of leaves covering 5.1 to 10 % leaf area.

4. Yellow mottling of leaves covering 10.1 to 15 % leaf area.
5. Yellow mottling and discoloration of 15.1 to 30 % leaf area.
6. Yellow discoloration of 30.1 to 50 % leaf area.
7. Pronounced yellow mottling and discoloration of leaves and pods, reduction in leaf size and stunting of plants covering 50.1 to 75 % foliage.
8. Severe yellow discoloration of leaves covering 75.1 to 90 % of

foliage, stunting of plants and reduction in pod size.

9. Severe yellow discoloration of entire leaves covering above 90.1 % of foliage, stunting of plants and no pod formation.

Observations on the disease incidence were taken on randomly selected five plants of each entry and took a mean of each entry to assign the category. The following categories are used in assessing the resistant reaction for yellow mosaic virus disease.

Rating

- 1.0 to 2.0
- 2.1 to 4
- 4.1 to 5
- 5.1 to 7
- 7.1 to 9

Reaction

- Resistant (R)
- Moderately resistant (MR)
- Moderately susceptible (MS)
- Susceptible (S)
- Highly susceptible (HS)

A total of 56 genotypes screened against YMV to identify the sources of resistance revealed that 22 entries exhibited resistance (R) reaction with a rating of 1.0 to 2.0. Eleven genotypes fell in the category of moderately resistant (MR) with a rating scale of 2.1 to 4.0. The remaining 23 genotypes have shown susceptibility reaction to different degrees. Of them, two were moderately susceptible (MS) with a rating of 4.1 to 5.0; eight genotypes were susceptible (S) with a rating of 5.1 to 7; and 13 genotypes were highly susceptible (HS) with a rating of 7.1 to 9. The data in Table 1 presents the actual disease resistance/susceptibility reaction of different blackgram genotypes/entries towards YMV disease. Different blackgram genotypes/entries that fall into each category were grouped in Table 2.

Evaluation of germplasm entries for disease resistance is a crucial step in controlling plant diseases through host plant resistance. Genes conferring resistance can be to a certain extent identified through routine screening procedures such as germplasm evaluation. In the case of YMV in blackgram, of 56 genotypes screened, 22 entries have been identified exhibiting promising reaction to YMV resistance. Identification of resistant lines is essential in the ambit of integrated disease management which is an upcoming concept in the field of agriculture. Earlier studies indicated that identification of resistant sources to YMV is a reliable option for controlling this viral disease. Similar type of genotype evaluations were previously documented by several workers (Asthana *et al.*, 1998; Basandrai *et al.*, 1999; Ganapathy *et al.*, 2003; Peerajadeet

al., 2004 and Pathak and Jhamaria *et al.*, 2004). However, critical investigations are necessary to ascertain the resistance level

in these germplasm lines and to further confirm them to finally include in breeding programmes.

Table 1: Screening of blackgram genotypes against yellow mosaic virus during Rabi, 2011

S. No	Entry/ Variety	Diseasescoring scale* (1-9 scale)	S. No	Entry/ Variety	Diseasescoring scale* (1-9 scale)
1	LBG-623	9	29	P-726	5
2	PU-202	1	30	RU 10-1	8
3	PU-204	3	31	RU 10-2	8
4	PU-205	2	32	RU 10-3	4
5	PU-210	2	33	RU 10-4	9
6	P-205	3	34	RU 10-5	9
7	P-204	4	35	RU 10-6	6
8	P-206	1	36	LBG-645	9
9	P-207	2	37	LBG-685	9
10	P-208	2	38	LBG-709	6
11	P-209	2	39	LBG-17	7
12	P-210	2	40	LBG-20	4
13	P-1051	2	41	LBG-752	3
14	P-1052	2	42	LBG-22	7
15	P-1053	2	43	T-9	3
16	P-1058	2	44	PU-31	2
17	P-1059	2	45	LBG-648	7
18	P-1060	2	46	LBG-748	5
19	P-1061	2	47	LBG-749	6
20	P-1062	2	48	LBG-750	9
21	P-1064	1	49	LBG-751	7
22	P-1065	1	50	LBG-752	9
23	P-1070	2	51	LBG-754	7
24	P-1075	2	52	LBG-756	9
25	P-710	3	53	LBG-759	9
26	P-712	3	54	LBG-764	9
27	P-715	1	55	LBG-20	9
28	P-718	4	56	PU-31	3

*indicates disease resistance/susceptibility reaction wherein 1.0 to 2.0= Resistant (R); 2.1 to 4= Moderately Resistance (MR); 4.1 to 5=Moderately Susceptible (MS); 5.1 to 7= Susceptible (S); 7.1 to 9= Highly Susceptible (HS)

Table 2: Grouping of genotypes screened against YMV in blackgram during Rabi, 2011

Rating	Reaction	Genotypes
1.0 to 2.0	Resistant (R)	PU-202, PU-205, PU-210, P-206, P-207, P-208, P-209, P-210, P-1051, P-1052, P-1053, P-1058, P-1059, P-1060, P-1061, P-1062, P-1064, P-1065, P-1070, P-1075, P-715, PU-31.
2.1 to 4	Moderately Resistant (MR)	PU-204, P-205, P-204, P-710, P-712, P-718, RU10-3, LBG-20, LBG-752, T-9, PU-31.
4.1 to 5	Moderately Susceptible (MS)	P-726, LBG-748
5.1 to 7	Susceptible (S)	RU10-6, LBG-709, LBG-17, LBG-22, LBG-648, LBG-749, LBG-751, LBG-754
7.1 to 9	Highly Susceptible (HS)	LBG-623, RU 10-1, RU 10-2, RU 10-4, RU10-5, LBG-645, LBG-685, LBG-750, LBG-752, LBG-756, LBG-764, LBG-759, LBG-20.

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