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Resistance to Mungbean yellow mosaic virus disease in Greengram

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Abstract

Genotypes were evaluated to identify the sources of Mungbean Yellow Mosaic Virus disease in Green gram. Screening was done under natural field conditions at Regional Agricultural Research Station, Warangal, Telangana State, India. The experimental material consisted fifty seven All India Coordinated Research Project and State nineteen Green gram entries with one check during Kharif-2017 and nineteen All India Coordinated Research Project and twelve state green gram entries with a check screened to yellow mosaic virus disease during Rabi-2017. One hundred eleven Green gram entries, one entry *viz.*, WGG-42 was found immune to mungbean yellow mosaic virus disease in both seasons.

Keywords: Genotypes, Screening, mungbean yellow mosaic virus (MYMV) disease

1. Introduction

Green gram crop is a pulse crop of Telangana State. MYMV disease leads to severe yield reduction not only in India, but also in Pakistan, Bangladesh and areas of South East Asia (Malathi *et al* 2008) [6] in Green gram.

Numerous attempts have been made for the identification of resistant sources against these diseases (Jameel Akhtar *et al.*, 2016) [3] of Green gram. Depending upon the temperature and humidity, the yellow mosaic virus disease spread rapidly in susceptible varieties. Cultivation of resistant genotypes is an effective and cheaper method to combat the disease. Hence, several genotypes need to be screened to identify the source of resistance.

2. Materials and Methods

Trial was conducted in a Randomized Block Design (RBD) with two replications during Kharif-2017 and Rabi 2017 at RARS, Warangal. Germplasms were planted in two rows of 4 meter length with row spacing of 40 cm and 10 cm between plants.

2.1 Mungbean Yellow Mosaic Virus disease incidence

Seventy eight Green gram and thirty three green gram germplasms were evaluated under natural environmental field conditions at Warangal during Kharif-2017 and Rabi-2017.

Mungbean Yellow Mosaic Virus on Green gram (0-9 scale-Mayee and Datar, 1986) [7]

Disease Scale (0-9)	% leaf area coverage	Description	Reaction
0	0	No visible Symptoms on leaves	Immune (I)
1	<1	Small yellow specks covering 0.1 to 1%	Resistant (R)
3	1-10	Yellow mottling of leaves covering 1.1 to 10% leaf area	Moderately Resistant (MR)
5	11-25	Yellow mottling of leaves covering leaf area 11 to 25%	Moderately Susceptible (MS)
7	26-50	Yellow mottling and discoloration of 26 -50% leaf area	Susceptible (S)
9	>50	Above 50% leaf area and pod	Highly Susceptible (HS)

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3. Results and Discussion

3.1 Evaluation of Mungbean yellow mosaic virus disease incidence -Kharif -2017

Yellow mosaic virus disease incidence in seventy eight Green gram germplasm lines was from 0% to 90% during Kharif-2017. Based on the mean disease incidence of both replications during Kharif-2017, one entry WGG-42 was found immune; sixty nine entries (BM 4, NVL 855, AKM 8802, AKM 12-28, AKM 12-24, ML 2479, SML1808, SKNM1504, SKNM1502, VGG16-055, VGG16-036, LGG607, LGG460, LBG450, PantM4, PantM6, PM 14-3, PM 14-11, COGG13-39, COGG 13-19, COGG 912, KM 2355, KM 2241, Type 44, K 851, Pusa 1772, Pusa771, Pusa 0672, RMG 1087, RMG 1092, RMG 1097, NDMK16-324, SVM 6133, NMK 15-08, MDGGV 18, JAUM 0936, MH 2-15, MH 1142, MH 1323, IPM 02-14, IPM 02-3, IPM 512-1, IPM 14-7, IPM 312-19, IPM 312-20, OBG 56, OBG 58, IGKM 2016-1, TMB 126, DGG 7, MGG 387, IPM 410-9, RMB 12-07, Barabanki Local, MGG-295, MGG-388, MGG-429, MGG-434, MGG-444, MGG-399, MGG-351, MGG-359, MGG-360, MGG-385, MGG-387, MGG-417, LGG-460, LGG-450 and WGG-37) were resistant; five entries namely., ML-818, JLM302-46, Kopergoan, MGG-389 and TM-96-2 were moderately resistant and remaining entries were susceptible to mungbean yellow mosaic virus disease (Table 1 and 2).

3.1.1 Evaluation of Mungbean yellow mosaic virus disease incidence -Rabi-2017

Yellow mosaic virus disease incidence in thirty three Green gram germplasm lines was from 0% to 25% during Rabi-2017. Based on the mean disease incidence of both replications during rabi-2017, three entries viz., WGG-42, MUM-2 and SML-32 were found immune, eight entries viz., MGG-385, Kopergoan, ML 818, MGG-388, LGG 607, MLGG-17-6, MLGG-17-5 and WGG-37 were resistant; eighteen entries (Pusa-9072, TARM 1, CO 6, VGG- 15-030, COGG -13-39, VGG- 16-027, VGG- 16-036, VGG -16-

055, MGG-387, NVL-722, OBG-56, OBG-57, OBG-58, LGG- 450, LGG- 460, Kopergoan and LGG-460) were moderately resistant and remaining entries were susceptible to mungbean yellow mosaic virus disease (Table 3 and 4).

Out of sixty four Mungbean lines, only six entries viz., AZRI-1, NCM-15-11, NCM-21, NCM-11-8, 14063 and AZRI-06 were found resistant to yellow mosaic virus disease in Green gram (Muhammad Hanif Munawar *et al.*, 2014). Pathak and Jhamaria (2004) evaluated fourteen Mungbean varieties for resistance against YMV and found ML-5 and MUM-2 with resistance of 2.22% and 3.12% infection as against 100% infection in K-851 a Check cultivar. Out of twelve genotypes of green gram, only two genotypes, Meha and ML 1477 were recorded as resistant to YMV (Jameel Akhtar *et al.*, 2016) [3].

Total twenty five genotypes of mungbean, seven entries viz., IPM 02-03, KM 2241, PDM 139, Pusa 0672, HUM 16, ML 1464 and TARM-1 of the genotypes exhibited resistance to Yellow mosaic virus disease (Nishant Bhanu *et al.*, 2017) [5].

Twenty genotypes of mungbean germplasm were evaluated, ten lines were found resistant namely, IPM-99-125, IPM-02-14, IPM-02-03, Sweta, SML-832, PUSA-5931, MH-125, Pant Mung 4, Pant Mung5 and MH 421 to Yellow Mosaic Virus disease (Kirti Pawar *et al.*, 2019) [4].

The interspecific recombinant genotypes i.e. MMH 15521, MMH 1125, MMH 3132, MMH 3563, MMH 3615, MMH 4615, MMH 53105 and MMH 5615 were found to be highly resistant (Abbas Ghulam *et al.* 2018) [1].

Among the forty eight individuals, ten progenies namely, Resplant5, Resplant 22, Resplant28, Resplant35, Resplant88, Resplant92, Resplant123, Resplant156, Resplant157 and Resplant5168 are confirmed for resistance to YMV in green gram (Pandiyani *et al.* 2020) [9].

Out of the forty-two mungbean genotypes, thirteen genotypes viz., Pusa 0672, IPM 205-7, HUM 8, KM 2245, IPM-2-03, ML 1464, KM 2241, PDM-139, TARM-1, HUM 26, Meha, HUM 16 and IPM 409-4 were found to be resistant (Yugandhar Gokidi *et al.*, 2021) [11].

Table 1: Screening of Green gram entries against yellow mosaic virus disease – Kharif-2017 (AICRP entries)

Sl.no.	Entries	Yellow Mosaic Virus disease		
		% Leaf area overage	0-9 scale	Reaction
1	BM 4	0.6	1	R
2	NVL 855	0.5	1	R
3	AKM 8802	0.4	1	R
4	AKM 12-28	0.6	1	R
5	AKM 12-24	0.7	1	R
6	ML 2479	0.4	1	R
7	ML 818	8.5	3	MR
8	SML 1808	0.6	1	R
9	SKNM 1504	0.4	1	R
10	SKNM 1502	0.3	1	R
11	VGG 16-055	0.5	1	R
12	VGG 16-036	0.6	1	R
13	LGG 607	0.2	1	R
14	LGG 460	0.3	1	R
15	LBG 450	1.0	1	R
16	Pant M 4	0.8	1	R
17	Pant M 6	1	1	R
18	PM 14-3	1	1	R
19	PM 14-11	1	1	R
20	COGG 13-39	0.6	1	R
21	COGG 13-19	1	1	R
22	COGG 912	0.7	1	R
23	KM 2355	1	1	R

24	KM 2241	0.8	1	R
25	Type 44	0.9	1	R
26	K 851	0.6	1	R
27	Pusa 1772	0.5	1	R
28	Pusa 1771	1	1	R
29	Pusa 0672	1	1	R
30	RMG 1087	0.9	1	R
31	RMG 1092	1	1	R
32	RMG 1097	0.8	1	R
33	NDMK16-324	0.9	1	R
34	SVM 6133	1	1	R
35	NMK 15-08	0.6	1	R
36	MDGGV 18	1.0	1	R
37	JLM302-46	10	3	MR
38	JAUM 0936	0.8	1	R
39	MH 2-15	1	1	R
40	MH 1142	0.6	1	R
41	MH 1323	1	1	R
42	IPM 02-14	0.9	1	R
43	IPM 02-3	1	1	R
44	IPM 512-1	0.9	1	R
45	IPM 14-7	0.8	1	R
46	IPM 312-19	1	1	R
47	IPM 312-20	1	1	R
48	OBGG 56	0.7	1	R
49	OBGG 58	1	1	R
50	IGKM 2016-1	1.0	1	R
51	Kopergoan	9.0	3	MR
52	TMB 126	0.8	1	R
53	DGG 7	0.6	1	R
54	MGG 387	0.4	1	R
55	IPM 410-9	0.5	1	R
56	RMB 12-07	0.6	1	R
57	Barabanki Local	0.8	1	R
58	WGG-42 (Check)	0	0	I

[Immune (I), Highly Resistant (HR), Resistant(R), Moderately Resistant (MR), Moderately Susceptible (MS), Susceptible(S), Highly Susceptible (HS)]

Table 2: Screening of Green gram entries against yellow mosaic virus disease -Kharif-2017 (Station entries)

Sl.no.	Entries	Yellow Mosaic Virus disease		
		% Leaf area coverage	0-9 scale	Reaction
1	MGG-295	0.8	1	R
2	MGG-388	0.9	9	R
3	MGG-429	1.0	1	R
4	MGG-434	0.9	1	R
5	MGG-389	10	3	MR
6	MGG-444	1	1	R
7	MGG-399	85	9	R
8	MGG-351	1	1	R
9	MGG-359	0.9	1	R
10	MGG-360	1	1	R
11	MGG-385	0.8	1	R
12	MGG-395	75	9	HS
13	MGG-402	90	9	HS
14	TM-96-2	10	3	MR
15	MGG-387	0.9	1	R
16	MGG-417	1	1	R
17	LGG-460	0.7	1	R
18	LGG-450	1.0	1	R
19	WGG-37	1.0	3	R
20	WGG-42 (Check)	0	0	I

Table 3: Screening of Green gram entries against yellow mosaic virus disease* Rabi -2017(AICRP entries)

Sl.no.	Entries	Yellow Mosaic Virus disease		
		% Leaf area coverage	0-9 scale	Reaction
1	Pusa-9072	10	3	MR
2	TARM 1	9	3	MR

3	CO 6	10	3	MR
4	VBN (Gg)2	25	5	MS
5	MGG -385	24	5	MS
6	VGG- 15-030	9	3	MR
7	COGG -13-39	8	3	MR
8	VGG- 16-027	10	3	MR
9	VGG- 16-036	10	3	MR
10	VGG -16-055	9	3	MR
11	AGG- 35	8	3	MR
12	MGG-387	10	3	MR
13	NVL-722	10	3	MR
14	OBGG-56	9	3	MR
15	OBGG-57	8	3	MR
16	OBGG-58	10	3	MR
17	LGG- 450	10	3	MR
18	LGG- 460	9	3	MR
19	Kopergaon	8	3	MR
20	WGG-42 (Check)	0	0	I

Table 4: Screening of Green gram entries against yellow mosaic virus disease - Rabi- 2017 (Station entries)

Sl.no.	Entries	Yellow Mosaic Virus disease		
		% Leaf area coverage	0-9 scale	Reaction
1	LGG-460	10	3	MR
2	MGG-385	0.8	1	R
3	Kopergaon	0.6	1	R
4	ML- 818	0.9	1	R
5	MGG-388	1.0	1	R
6	LGG 607	0.8	1	R
7	MUM-2	0	0	I
8	SML-32	0	0	I
9	MLGG-17-6	0.9	1	R
10	MLGG-17-5	1.0	1	R
11	WGG-2	25	5	MS
12	WGG-37	1.0	3	R
13	WGG-42 (Check)	0	0	I

4. Conclusion

One hundred eleven entries, one entry WGG-42 was found immune and WGG-37 was found resistant to mungbean yellow mosaic virus disease in Kharif and Rabi seasons. Two entries *viz*; MGG-389 and TM-96-2 were found moderately resistant and remain entries were susceptible to mungbean yellow mosaic virus disease in Green gram. These genotypes, may be used as resistant source in further breeding programs.

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