

# Evaluation of Mung Bean Genotypes Against Mung Bean Yellow Mosaic Virus (MYMV) in Pre and Post *kharif* Seasons Under Terai Agro-ecological Zone of West Bengal

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## SUMMARY

Twenty four genotypes of mung bean [*Vigna radiata* (L.) Wilczek] were screened for yellow vein mosaic virus (YVMV) disease in pre and post *kharif* seasons under field condition. During pre-*kharif* season, 3 namely Jyoti (154.98), Pusa 95-31(183.63) and PDM 84-139 (200.51) were found to show resistance against MYMV. However, not a single genotype was found to be highly resistant. Hum-12 (782.01) was found to be highly susceptible and 3 genotypes, namely OUM11-5 (581.79), Pusa Vishal (628.89) and Hum-1(733.28) were found to be susceptible. Rests of the genotypes were having intermediary reactions against MYMV. During post *kharif* season among 24 genotypes evaluated only one, Jyoti (132.89) was found to show resistance against MYMV. Seven genotypes, namely RM 3-11(508.95), HUM-1(653.38), BPMR -145(670.98), HUM -12(695.71), PDM84-143(515.34), TARM-1 (587.10) and Pusa Vishal (708.35), were found to be susceptible. Rests of the genotypes were having intermediary reaction against MYMV. The genotype A-86 and Sujata gave highest yield during pre and post-*kharif* seasons, respectively. However, both showed a moderately resistant reaction.

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## Key words :

Mung bean, YVMV incidence, Disease screening.

Some of the lands in North Bengal condition remain fallow during the pre-*kharif* season due to irregular rainfall and unavailability of any alternate crop during the season. Crops like short duration pulses with high value as green gram/ black gram/ cowpea may be utilized in the crop sequence, which apart from giving high returns to the farmers also ameliorate the soil health. Various bottlenecks are observed in mungbean production in the area, one of the major being the diseases. Yellow mosaic disease of mungbean [*Vigna radiata* (L.) Wilczek] is the most serious disease and the main constraint in increasing the production of this crop. The disease was reported from India in 1955 on mungbean (Nariani, 1960). It has potential to inflict 100% damage to this crop (Nene, 1972). It is incited by mungbean yellow mosaic virus (MYMV), which is a whitefly transmitted geminivirus. Development of resistant varieties or to locate the sources of resistance is essential for long term sustainable management of diseases. Jayanna *et al.* (1991) screened 84 *Vigna radiata* genotypes for resistance to MYMV in Karnataka, India. Only Barabanki local was free from yellow mosaic and genotypes ML 537, PDM 84-155 and ML 326 consistently recorded <35% disease incidence. Of the remaining genotypes, 12 and

68 recorded 35-50% and 50% disease incidence, respectively.

So far, meagre information is available regarding biotic stresses of mungbean, their impact in crop loss both in respect to quality and quantity and therefore, in this study efforts have been made to evaluate 22 mung bean genotypes for resistance against the disease.

## MATERIALS AND METHODS

The field experiments were conducted at Pundibari Research Farm and lab experiments were done in Research laboratory, Dept. of Plant Pathology, Uttar Banga Krishi Viswavidyalaya (UBKV), Pundibari, Cooch Behar. Mungbean seeds were sown in the field on 18<sup>th</sup> March, 2006 as pre *kharif* crop. Mungbean was being cultivated in the same field for the last five years. The seeds of different genotypes were sown in randomized block design with 3 replications. Post *kharif* mung bean was sown on 30<sup>th</sup> November, 2006. All the normal agronomic practices were followed except any pest or disease management measures during the course of investigation.

Land situation : Medium to high

Soil type : Loam

No. of genotypes : 24

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Plot size : 3m x 1m  
 Spacing : Row to row –30 cm Plant to plant – 20 cm Plot to plot – 50 cm  
 Fertilizer dose : N:P:K @ 20:40:20 kg/ha

Seeds of 24 genotypes of mungbean were collected from Dept. of Genetics and Plant Breeding, U.B.K.V. and Pulses and Oilseeds Research Station, Berhampore, West Bengal. The seeds were air dried and stored at room temperature. For screening mungbean genotypes against MYMV, the rating scale of Singh *et al.* (1988) was used (Table 1).

genotype was found to be highly resistant. Hum-12 (782.01) was found to be highly susceptible and 3 genotypes, namely OUM11-5 (581.79), Pusa Vishal (628.89) and Hum-1(733.28) were found to be susceptible. Rests of the genotypes were having intermediary reactions against MYMV.

During the post-*kharif* season the same set of genotypes were evaluated. The data are presented in Table 3.

Among 24 genotypes evaluated only Jyoti (132.89) was found to show resistance against MYMV. Seven genotypes, namely RM 3-11(508.95), HUM-1(653.38), BPMR -145(670.98), HUM -12(695.71), PDM84-

**Table 1: Rating scale for mungbean yellow mosaic virus disease.**

Scale	Plants / foliage affected	Description	Reaction
1.	0.1-5%	Mottling of leaves on less than 1% plants	Resistant
3.	5.1-10%	Mottling of leaves on 1.1-10 % plants	Moderately resistant
5.	10.1-25 %	Mottling and yellow discoloration on 10.1-25 % plants	Moderately susceptible
7.	25.1-50%	Mottling and yellow discoloration of leaves on 25.1-50% plants	Susceptible
9.	50.1-100 %	Severe yellow mottling on over 50% plants, stunting of plants and failure of flowering and fruit setting	Highly susceptible

Scoring was done at 50 days after sowing and based on scoring the per cent disease intensity (PDI) was calculated. The disease scoring was done to get the gradual development of the disease and to calculate the area under disease progress curve (AUDPC).

$$AUDPC = \bar{y} (Y_i + Y_{i+1})/2 (t_2 - t_1)$$

Y= % of severity

$t_2 - t_1$  = Time interval

The mature pods were picked in two stages, one at 70 and another at 80 days after sowing. The pods were threshed and weighed plot wise. The number of plants per plot was recorded and yield was expressed as yield (g) per plant. Data collected during the period of study were processed using INDOSTAT software for statistical analysis according to Gomez and Gomez (1984).

## RESULTS AND DISCUSSION

The genotypes of mungbean were evaluated for resistance against MYMV. Disease incidence was recorded at 45 and 60 DAS. Area under disease progress curve (AUDPC) was calculated between 45 and 60 DAS to estimate the magnitude of disease. The data are presented in Table 2.

During pre-*kharif* season among 24 genotypes evaluated 3 of them namely Jyoti (154.98), Pusa 95-31(183.63) and PDM 84-139 (200.51) were found to show resistance against MYMV. However, not a single

**Table 2: Incidence of MYMV in different mungbean genotypes and their yield during pre-*kharif* season**

Genotypes	45 DAS	60DAS	AUDP	Yield g /plot
	Mean ± SD	Mean ± SD	C	Mean ± SD
Jyoti	8.91±0.97	11.76±0.79	154.98	181.67 ± 14.84
Pusa95-31	10.56±0.67	13.92±0.68	183.63	261.34 ± 10.26
PDM84-139	11.86±1.74	14.87±2.12	200.51	241 ± 12.12
Sujata	11.51±2.15	17.70±3.12	219.13	243.67 ± 10.01
A-86	14.12±1.52	17.17±2.21	234.75	285.34 ± 48.83
MLD95-21	13.85±1.76	18.08±3.13	239.60	248.34 ± 42.52
PDM-11	15.87±0.29	20.53±0.87	273.05	171.67 ± 10.40
A-112	16.93±1.98	19.64±3.64	274.34	250 ± 47.14
SML-226	16.42±0.25	21.57±2.27	285.02	190 ± 26.90
PDM84-143	16.34±0.98	21.68±2.01	285.12	222 ± 22.06
COGG924	17.95±2.46	22.97±2.85	307.03	208.67 ± 24.70
Dhauli	18.36±3.17	24.45±3.06	321.13	229 ± 31.43
Pusa96-32	18.71±0.51	25.41±1.40	330.95	211.67 ± 16.56
RM 3-11	21.60±0.94	26.58±1.49	361.42	186 ± 26.85
OBGG 52	22.53±1.74	27.78±2.14	377.3	213.34 ± 16.07
PDM54	23.38±3.52	29.57±1.30	397.17	211 ± 10.06
TARM-1	25.56±0.29	32.17±1.28	433.04	254 ± 12.16
K-851	26.56±4.93	31.23±5.82	433.49	224.34 ± 25.02
CO-6	25.70±2.92	33.36±1.29	443.01	158 ± 6.24
BPMR-145	30.89±2.76	35.78±3.37	500.02	183.34 ± 20.20
OUM 11-5	36.25±4.09	41.31±5.28	581.79	193 ± 19.67
Pusa Vishal	39.12±1.79	44.73±3.83	628.89	160.34 ± 4.50
Hum 1	44.50±2.03	53.26±2.39	733.28	151 ± 13.52
HUM-12	48.35±10.42	55.91±11.80	782.01	165 ± 12.49

**Table 3: Incidence of MYMV in different mungbean genotypes and their yield during Post-kharif season**

Genotypes	45 DAS	60 DAS	AUDPC	Yield gm./plot
	Mean $\pm$ SD	Mean $\pm$ SD		Mean $\pm$ SD
Jyoti	7.80 $\pm$ 0.39	9.91 $\pm$ 0.25	132.89	170 $\pm$ 12.53
Sujata	15.06 $\pm$ 0.27	19.45 $\pm$ 0.67	258.91	247.67 $\pm$ 9.29
Pusa95-31	16.08 $\pm$ 0.39	19.27 $\pm$ 0.56	265.14	232.67 $\pm$ 16.16
PDM-11	16.27 $\pm$ 1.34	20.38 $\pm$ 1.82	274.91	180.34 $\pm$ 4.93
Dhauli	18.45 $\pm$ 1.58	21.23 $\pm$ 1.12	297.70	211.67 $\pm$ 24.98
PDM84-139	18.75 $\pm$ 0.84	22.34 $\pm$ 0.75	308.17	210.34 $\pm$ 8.08
SML-226	18.57 $\pm$ 1.82	22.56 $\pm$ 1.96	308.42	194 $\pm$ 9.84
A-112	18.96 $\pm$ 1.37	22.58 $\pm$ 1.63	311.62	184 $\pm$ 22.51
COGG924	21.49 $\pm$ 1.73	24.36 $\pm$ 1.78	343.92	190.34 $\pm$ 19.56
K-851	21.56 $\pm$ 1.46	24.83 $\pm$ 0.53	348.02	197.34 $\pm$ 4.04
Pusa96-32	22.29 $\pm$ 1.70	25.72 $\pm$ 1.81	360.11	192 $\pm$ 16.37
PDM54	24.43 $\pm$ 0.31	28.42 $\pm$ 1.24	396.42	191.67 $\pm$ 13.01
A-86	24.49 $\pm$ 2.02	29.05 $\pm$ 2.40	401.63	172.34 $\pm$ 15.94
OUM 11-5	25.30 $\pm$ 1.47	28.75 $\pm$ 1.49	405.424	185 $\pm$ 12.49
CO-6	26.13 $\pm$ 0.75	30.60 $\pm$ 1.78	425.49	157.67 $\pm$ 11.50
OBGG 52	27.07 $\pm$ 1.48	30.53 $\pm$ 2.14	432.08	187.67 $\pm$ 19.13
MLD95-21	28.06 $\pm$ 2.63	32.10 $\pm$ 2.16	451.21	169.67 $\pm$ 11.06
RM 3-11	31.84 $\pm$ 1.61	36.01 $\pm$ 1.04	508.954	174.67 $\pm$ 12.01
PDM84-43	31.97 $\pm$ 1.89	36.74 $\pm$ 2.05	515.34	161.34 $\pm$ 2.51
TARM-1	36.93 $\pm$ 0.82	41.34 $\pm$ 11.36	587.10	160.34 $\pm$ 4.72
Hum 1	40.30 $\pm$ 1.01	46.81 $\pm$ 1.09	653.38	156.34 $\pm$ 9.71
BPMR-145	41.76 $\pm$ 2.31	47.69 $\pm$ 3.53	670.98	133 $\pm$ 8
HUM-12	43.69 $\pm$ 2.59	49.06 $\pm$ 2.43	695.71	163.34 $\pm$ 10.26
Pusa Vishal	43.57 $\pm$ 1.64	50.86 $\pm$ 1.11	708.35	159 $\pm$ 8

143(515.34), TARM-1 (587.10) and Pusa Vishal (708.35) were found to be susceptible. Rests of the genotypes were having intermediary reactions against MYMV. During post-*kharif* the genotypes in general showed more susceptibility towards the disease. Considering both the seasons, Jyoti was the only genotype that exhibited resistance. As far as the disease reaction and yield are concerned Pusa 95-31 seemed to be a good option for

this part of the country as it performed a high yielder and also showing moderate to high resistance against MYMV. The result corroborated with the findings of Garain *et al.* (2003). The genotype A-86 and Sujata gave highest yield during pre and post-*kharif* seasons, respectively. However, both showed a moderately resistant reaction.

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