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Research Note

Screening of some blackgram (*Vigna mungo* (L.) Hepper) genotypes for resistance to yellow mosaic virus during summer season

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Abstract
Seed Yield of mungbean is severely hampered especially in summer season by yellow mosaic virus (YMV) transmitted by white fly (*Bemisia tabaci*). The absence of resistant/tolerant varieties against YMV disease leads to tremendous crop yield losses. An experiment was conducted in the Instructional Farm of RKMVERI, Narendrapur, Kolkata, West Bengal during summer season 2017 and 2018. Twenty genotypes were screened for yellow mosaic virus resistance. Out of these twenty genotypes, four genotypes namely RSU-03, TU-22, Pant-U-31 and RSU-06 were found to be resistant against yellow mosaic virus whereas nine genotypes namely Sarada, RSU-44, RSU-46, Sulata, VBG11-053, Goutam, TJU-24, KUG-725 and Uttara showed moderate resistance for Yellow Mosaic Virus disease. Others were showed either Moderate to high Susceptibility against the disease.

Keywords
Blackgram, Sreening, YMV, Resistance

Blackgram (*Vigna mungo*) a member of family Leguminosae or Fabaceae originated in India (Chatterjee and Bhattacharya, 1986) is popularly known as "urad or uradbean". Requirement of richer protein sources for cattle feed and human consumption has led to great interest in studying the diversity and pathology of blackgram. In summer season, the crop is mostly infested with the yellow mosaic virus (YMV) disease due to high humidity with sudden fluctuation in temperature during the cropping period. The yellow mosaic virus is the most destructive viral disease of blackgram causing yield loss up to 85% (Varma and Malathi, 2003) or sometimes total failure of the crops. This disease is mainly transmitted through whitefly (*Bemisia tabaci* Genn.). The symptom starts from the young leaves with small yellow patches on leaves and ends with complete yellowing of young leaves in susceptible genotypes (Singh and De, 2006). The genes related to YMV resistance is still unknown and needs to be identified which can be done through routine screening of germplasm with natural epiphytic condition. Evaluation or screening of germplasm for disease resistance is an important step in controlling the diseases through host plant resistance.

The genotypes for present experiments were collected from Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal and some were advance elite lines developed through pedigree methods by communicating author. The detail of germplasms has been presented in Table-I.

Yellow Mosaic Virus disease was screened on the basis of 0-9 arbitrary scale according to Alice and Nadarajan (2007), the details have been presented in Table-2

Out of twenty genotypes screened for resistance to yellow mosaic virus (YMV) as per Alice and Nadarajan (2007), not a single genotypes showed Free (F) or Highly Resistant (HR) reaction. Four genotypes namely RSU-06, Pant U-31, TU-22 and RSU-03 showed resistant reaction; whereas nine genotypes namely Sarada, RSU-44, RSU-46, Sulata, VBG11-053, Goutam, TJU-24, KUG-725 and Uttara showed moderate resistance reaction against the yellow mosaic virus. Genotypes namely Shekhar-3, NDUK15-09, VBG12-062, KPU12-1730 and PU-11-25 showed moderately susceptible reaction whereas two genotypes namely NDUK15-222 and KUG-718 showed susceptible reaction against YMV. The details are presented in Table-3**.**

Altogether in the present study, out of twenty genotypes, only four were found to be resistant to YMV. Similar types of genotype screening has also been done by several workers like Asthana *et al*., 1998; Basandrai *et al*., 1999; Ganapathy *et al*., 2003; Peerajade *et al*., 2004, Pathak and Jhamaria, 2004; Obaiah *et al*., 2013. The results obtained in the present study were in accordance with the findings of the workers.

The screening for YMV resulted in identification of four resistant genotypes namely RSU-06, Pant U-31, TU-22 and RSU-03 in the present study whereas genotypes NDUK15-222 and KUG-718 showed susceptible reaction (Table 4). These genotypes can be utilized as parents for further breeding programmes and also to validate the molecular marker which can be facilitated by marker assisted selection (MAS) for the development of YMV resistant breeding lines of blackgram.

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Table 1. List of genotypes used for the study

Sl. No.	Genotypes	Source
1-4	RSU-06, RSU-44, RSU-44, RSU-03	Advance elite lines
5-20	NDUK15-222, Shekhar-3, KUG-78, Sarada, Sulata, VBG11-053, NDUK15-9, VBG12-062, PantU-31, KPU12-1730, Goutam, TJU-24, KUG-725, TU-22, PU-11-25, Uttara	AICRP, MULLaRP, B. C. K. V. Mohanpur, Nadia, West Bengal

Table 2. 0-9 scale for screening of YMV (Alice and Nadarajan, 2007)

Grade	Description	Reaction
1	No visible symptoms on leaves or very minute yellow specks on leaves.	Free (F)
2	Small yellow specks with restricted spread covering 0.1-5 % leaf area.	Highly Resistant (HR)
3	Molting of leaves covering 6-10 % leaf area.	Resistant (R)
4	Yellow mosaic covering 11-15 % leaf area.	Moderately Resistant (MR)
5	Yellow molting and discoloration of 15-20 % leaf area.	Moderately Susceptible (MS)
6	Yellow coloration of 21-30 % leaves and yellowing of pods.	Susceptible (S)
7	Pronounced yellow molting and discolouration of leaves and pods, reduction in leaf size & stunting of plants covering 30-50 % leaf area.	Susceptible (S)
8	Severe yellow colouration of leaves covering 51-75 % of foliage, stunting of plants and reduction in pod size.	Highly Susceptible (HS)
9	Severe yellow leaves covering above of foliage, stunting of plants and no pod formation.	Highly Susceptible (HS)

Table 3. Percentage of leaf area infected by YMV and score given to the genotypes

Sl. No.	Genotypes	Percentage of leaf area infected	Score
1	RSU-06	8.00	3
2	RSU-44	11.50	4
3	RSU-46	12.80	4
4	RSU-03	5.10	3
5	NDUK15-222	22.40	6
6	Shekhar-3	16.10	5
7	KUG-78	24.20	6
8	Sarada	11.10	4
9	Sulata	14.80	4
10	VBG11-053	14.20	4
11	NDUK15-9	15.90	5
12	VBG12-062	19.80	5
13	PantU-31	9.00	3
14	KPU12-1730	18.90	5
15	Goutam	13.50	4
16	TJU-24	13.40	4
17	KUG-725	14.20	4
18	TU-22	9.00	3
19	PU-11-25	18.79	5
20	Uttara	13.50	4

Table 4. Grouping of genotypes on the basis of score and reaction to YMV

Reaction	Genotypes
Resistant (R)	RSU-06, Pant U-31, TU-22 and RSU-03
Moderately Resistant (MR)	Sarada, RSU-44, RSU-46, Sulata, VBG11-053, Goutam, TJU-24, KUG-725 and Uttara
Moderately Susceptible (MS)	Shekhar-3, NDUK15-09, VBG12-062, KPU12-1730 and PU-11-25
Susceptible (S)	NDUK15-222 and KUG-718