

Original Research Article

Field Screening of Mungbean Genotypes against Leaf Blight Intensity of Pathogen *Macrophomina phaseolina*

P. B. Khaire^{1*}, D. G. Hingole², A. M. Gayakwad² and P. L. Sontake³

¹College of Agriculture Naigaon (Bz.), Nanded, (M.S), India

²Department of Plant Pathology, College of Agriculture, Badnapur, India

³Agricultural Research Station, Badnapur (M.S), India

*Corresponding author

ABSTRACT

Keywords

Mungbean,
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screening

Mungbean is an important *Kharif* pulse crop widely grown in Marathwada region. Among various biotic constraints *Macrophomina phaseolina* (Tassi.) Goid is one of the major limiting factor in mungbean cultivation. A total of 35 germplasm lines of mungbean were screened against *Macrophomina* blight, along with JL-781 as susceptible check in sick plot of these test lines, 29 cultivar found resistant, 2 cultivar found moderately resistant, 1 cultivar found moderately susceptible, 1 cultivar found susceptible and JL-781 were found highly susceptible.

Introduction

Mungbean (*Vigna radiate* L. Wilczek), is one of the most important leguminous crops belonging to the family *Leguminaceae* is originated from India and South Asia. India alone accounts for about 2/3rd of total global production of mungbean. The area, production and productivity of mungbean in the country during the year 2015-16 is 2.45 m.ha., 1.59 m.tonnes, and 632 kg/ha, respectively (Anonymous, 2016a). In the state of Maharashtra, area, production and productivity of mungbean during the year 2015-16 is 3.85 lakh ha., 0.72 lakh tones and 187 kg/ha, respectively (Anonymous, 2016b). In Marathwada region of Maharashtra, area, production and productivity of mungbean during year 2015-16 were 1.69 lakh ha. 0.18 lakh ton, and 121

kg/ha, respectively. Generally, the production and productivity of pulses including mungbean are very low, because the crop is grown on marginal lands with poor management practices, low rainfall, high rate of flower and fruit drop, non-uniform maturity, pods shattering and susceptibility to pests and diseases. The diseases caused by fungal, bacterial, and viral pathogen are one of the major constraints in the cultivation of mungbean. Among the diseases the leaf blight of mungbean caused by *Macrophomina phaseolina* have been reported as most potential and devastating diseases putting farmers into economic loss (Zote *et al.*, 1983). Eradication of this soil-borne pathogen is difficult because of its

polyphagous nature and its survival in the soil through its resting structures. As fungicides are costly and unfriendly to our ecosystem, it is imperative to identify the source(s) of its resistance and exploit it to develop resistant varieties of mungbean through breeding approaches. Field screening are used to screen mungbean genotypes for leaf blight resistance.

Materials and Methods

Preparation of *M. phaseolina* inoculum

The pathogenic strain of *M. phaseolina* isolated from diseased roots of mungbean was multiplied on sorghum grains. The grains were at first soaked in water overnight, washed and half-boiled in water and filled in 250 ml Erlenmeyer conical flasks to 1/4th of their capacity and sterilized at 15 lbs pressure for 15 minutes. Thereafter, *M. phaseolina* was inoculated in the flasks and incubated at 28° C for 15 days. The flasks were shaken every day. After multiplication, sorghum grain inoculums were placed in each row at 200 gm/m row length before 15 days of sowing (Pareek 1992).

Material details

To examine the sources of resistance against *M. phaseolina* thirty five mungbean

germplasm lines, genotypes, cultivars/ varieties were screened under field condition at research farm of ARS, Badnapur during *Kharif* 2016-17. Each test entry was planted into two rows of 30 cm row to row and 10 cm plant to plant spacing. The experiment was non-replicated.

Observations on blight disease intensity were recorded 15 days before harvesting of the crop and applying 0-9 grade disease rating scale (Mayee and Datar, 1986) accordingly, the genotypes were grouped as immune, resistant, moderately resistant, moderately susceptible, susceptible and highly susceptible the following scale was used for screening the genotypes (Nene *et al.*, 1981).

Results and Discussion

A total of thirty five varieties/ cultivars/genotypes/germplasm lines of mungbean were screened during *Kharif*, 2015-16 against *Macrophomina* blight under field condition. The observations on per cent blight intensity were recorded at 15 days before harvesting of the crop and test entries of mungbean were graded and categorized as Resistant (0 to 10 %), moderately resistant (10.1 to 20 %), moderately susceptible (20.1 to 30 %), susceptible (30.1 to 50 %) and highly susceptible (> 50 % PDI).

Genotypes categorization

Grade	Disease intensity	Disease reaction
1	0-10	Resistant (R)
2	10.1-20	Moderately Resistant (MR)
3	20.1-30	Moderately susceptible (MS)
4	30.1-50	susceptible (S)
5	Above 50	Highly susceptible (HS)

Table.1 Reaction of mungbean varieties against *M. phaseolina* under field condition during Kharif 2016

Sr. No	Name of varieties	PDI (%)	Disease reactions
1	BPMR 37	05.14	R
2	BPMR 135	05.31	R
3	BPMR 13	07.12	R
4	BPMR 183	07.32	R
5	BPMR 132	03.67	R
6	BPMR 156	04.18	R
7	BPMR 184	02.67	R
8	BPMR 55	05.87	R
9	BPMR 182	03.17	R
10	BPMR 62	05.48	R
11	BPMR 84	10.00	MR
12	BPMR 93	05.14	R
13	BPMR 126	03.54	R
14	BPMR 137	03.24	R
15	BPMR 29	05.47	R
16	BPMR 207	03.17	R
17	BPMR 48	06.71	R
18	BPMR 68	04.90	R
19	BPMR 21	05.00	R
20	BM 2002-1	10.00	MR
21	BPMR 38	04.28	R
22	BPMR 1	04.10	R
23	BPMR 145	01.98	R
24	BPMR 110	04.11	R
25	BPMR 129	04.72	R
26	BPMR 39	08.15	R
27	BPMR 27	05.62	R
28	BPMR 131	04.51	R
29	BPMR 48	07.80	R
30	BPMR 75	06.58	R
31	BPMR 118	07.25	R
32	BPMR 89	07.55	R
33	BM-4	27.14	MS
34	Kopargaon	48.33	S
35	JL 781	57.12	HS

% of PDI- Average of two replication, R- Resistant, MR-Moderately Resistant, MS- Moderately Susceptible, S- Susceptible, HS- Highly Susceptible, PDI-Per cent Disease Intensity

Table.2 Categorization of mungbean varieties/ germplasm showing various reactions against *M. phaseolina* under field condition during *Kharif*, 2016

Grade	Reactions	Range PDI (%)	Varieties	No. of entries
1	Resistant (R)	00 to 10	BPMR-37, BPMR-135, BPMR-13, BPMR-183, BPMR-132, BPMR-156, BPMR-184, BPMR-55, BPMR-182, BPMR-62, BPMR-93, BPMR-126, BPMR-137, BPMR-29, BPMR-207, BPMR-48, BPMR-68, BPMR-21, BPMR-38, BPMR-1, BPMR-145, BPMR-110, BPMR-129, BPMR-39, BPMR-27, BPMR-131, BPMR-48, BPMR-75, BPMR-118, BPMR-89	30
2	Moderately Resistant (MR)	10.1 to 20	BPMR-84, BM 2002-1	2
3	Moderately Susceptible (MS)	20.1 to 30	BM-4	1
4	Susceptible (S)	30.1 to 50	Kopargaon	1
5	Highly Susceptible (HS)	>50	JL-781	1

Results indicated that, thirty five mungbean entries exhibited different reactions against *M. phaseolina*. However, twenty nine cultivar BPMR-37, BPMR-135, BPMR-13, BPMR-183, BPMR-132, BPMR-156, BPMR-184, BPMR-55, BPMR-182, BPMR-62, BPMR-93, BPMR-126, BPMR-137, BPMR-29, BPMR-207, BPMR-48, BPMR-68, BPMR-21, BPMR-38, BPMR-1, BPMR-145, BPMR-110, BPMR-129, BPMR-39, BPMR-27, BPMR-131, BPMR-48, BPMR-75 and BPMR-118 was found Resistant (0-10 %). However two cultivar viz., BPMR-84 and BM 2002-1 were found Moderately resistant (10.1-20 %). one cultivar BM-4 were found Moderately susceptible (20.1-30 %) again one Cultivars Kopargaon were found Susceptible (30.1-50 %) and JL-781 were found Highly susceptible (>50 %). Thus, mungbean genotypes, germplasm lines, varieties found resistance against *Macrophomina* blight could be further exploited either for breeding disease

resistant varieties of mungbean or encouraged for commercial cultivation on large scale.

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