

Screening Blackgram Genotypes Against Powdery Mildew Caused by *Erysiphe Polygoni*

Key words: *Blackgram, Erysiphe polygoni, Powdery mildew, Resistance.*

Blackgram is one of the most ancient and important pulse crop of Asia, due to its nutritional quality and the suitability to cropping system. It is known as “poor man’s meat” and constitutes a major source of dietary protein of the large section of vegetarian population of the world. Blackgram is an excellent source of easily digestible protein with low flatulence. In addition to 26% protein, 57% carbohydrate and 1.2% fat, it is a good source of phosphoric acid, calcium, thiamine (B₁), riboflavin (B₂) and niacin (B₃) (Singh and Awasthi, 2004). It is the third important pulse crop in India and occupies an area of 36.24 lakh ha producing 19.45 lakh tons with a productivity of 537 kg ha⁻¹. In India, Andhra Pradesh is one of the major blackgram cultivating states with in an area of 4.56 lakh ha, with a production and productivity of 4.11 lakh tons and 901 kg ha⁻¹, respectively (Ministry of Agriculture and Farmers Welfare, Government of Andhra Pradesh, India, 2015-16). Marked decline in yield was reported due to fungal, bacterial and viral diseases. Out of all the biotic stresses, Powdery mildew caused by *Erysiphe polygoni* is one of the major constraints in the production of blackgram, which causes reduction in photosynthetic activity and other physiological changes leading to potential decrease in yield (40-90%) depending on stage and time at which the disease appears.

The disease has world-wide importance, occurring wherever it is grown, particularly in the Indian sub-continent and south east-Asian countries (Butler, 1918). To obviate these losses, it is imperative to identify the resistant sources. Resistance genotypes play an important role in combating pathogen and there by an important strategy for management of the disease. So, several genotypes need to be screened. Thus, an attempt was made to identify resistant genotypes against blackgram powdery mildew.

Field experiment was conducted during *kharif* 2017-18 at Regional Agricultural Research Station, Lam, Guntur district, Andhra Pradesh to evaluate the blackgram genotypes against powdery mildew disease. The trial was laid out in Randomized Block Design with two replications. Each genotype was sown in two rows of five meter length with the susceptible check

LBG 623 sown as infector row. Sowing was done on 20th July, 2017 at a spacing of 30 cm and 10 cm between rows and plants respectively.

The crop was protected from the pest damage through sprays of selective insecticides in all the experimental plots uniformly to avoid the yield losses due to insect pests. The disease severity of powdery mildew was recorded at weekly interval from 35 DAS to seven days before harvesting by using standard disease rating 0-5 scale AICRP, MULLaRP) given in (Table 1 and Plate1) and PDI was calculated as per the formula given by Wheeler (1969).

$$PD = \frac{\text{Sum of individual disease ratings}}{\text{No. of observations assessed} \times \text{max. disease rating}} \times 100$$

The disease severity was recorded using 0-5 scale by randomly selecting five genotypes. Based on their reaction genotypes were categorized into moderately resistant, moderately susceptible, susceptible and highly susceptible.

RESULTS AND DISCUSSION

None of the genotypes assessed were resistant or moderately resistant to Powdery mildew (Table 2). Eleven genotypes *viz.*, TPU 4, TU 94-2, VBG 12-034, VBG 13-003, VBG 12-111, NDUK 15-222, PU-1518, LBG 645, RBU 12-02, PU-6 and LBG 787 were moderately susceptible (MS). Twenty six genotypes *viz.*, AKU 13-16, Barabanki Local, PU-1534, PU-1515, Shekhar-3, NUK 15-09, NUL 242, PU-1540, IPU 94-1, KPU 128-105, RU 03-22, PU 10-23, COG 13-08, KUG 479, PU-1542, PU-1531, PU-1504, PU-1503, IPU 2-43, KU 96-3, KU 16-4, TJU 98-14, DGU 11, VBG 14-016, LBG 888 and RU (IU) 02-1-3 were susceptible (S). Sixteen genotypes *viz.*, PU 14-28, PU-1530, KU 16-07, PU-1526, PU-1527, KPU 12-213, NUL 7, PU-1517, MDBGV-04, LBG-623, KPU 1720-140, KPU 12-1730, Pant U 14-19, KUG 791, PU-1529 and PU-1520 were highly susceptible (HS).

Table 1. Disease scale for Powdery mildew 0-5 scale of (AICRP, MULLaRP)

Disease scale for Powdery mildew (0-5 scale)		
Grade	Description	Reaction
0	Plants free from infection	Free (F)
1	Plants showing traces to 10% infection on leaves, stem free from disease	Highly
		Resistant (HR)
2	Slight infection with thin coating of powdery growth on leaves covering 10.1 - 25% area. Slight infection on stem, pods visually free of disease.	Moderately resistant (MR)
3	Dense powdery coating covering 25.1 to 50% leaf area. Moderate infection on stem, slight infection on pods	Moderately susceptible (MS)
4	Dense powdery coating covering 50.1 to 75% leaf area, stem heavily infected, on pods moderate infection. Infected portion turns greyish	Susceptible (S)
5	Severe infection with dense powdery growth covering more than 75% area of the whole plant including pods, plants resulting in premature defoliation and drying	Highly Susceptible (HS)

Table 2. Grouping of blackgram genotypes based on powdery mildew reaction under field conditions

Grade	Reaction	No. of Genotypes	Genotypes
0	Free (F)	-	-
1	Resistant (R)	-	-
2	Moderately Resistant (MR)	-	-
3	Moderately Susceptible (MS)	11	LBG 787, LBG 645, RBU 12-02, TPU 4, TU 94-2, VBG 12-034, VBG 13-003, VBG 12-111, NDUK 15-222, PU-1518, PU-6.
4	Susceptible (S)	26	Shekhar-3, IPU 2-43, IPU 94-1, LBG 888, KU 96-3, KU 16-4, KPU 128-105, TJU 98-14, RU 03-22, RU (IU) 02-1-3, DBG 11, PU 10-23, AKU 13-16, NUK 15-09, NUL 242, VBG 14-016, COG 13-08, Barabanki Local, KUG 479, PU-1534, PU-1542, PU-1540, PU-1531 PU-1515, PU-1504, PU-1503.
5	Highly Susceptible(HS)	16	MDBGV-04, LBG 623, KU 16-07, KPU 12-213, KPU 1720-140, KPU 12-1730, Pant U 14-19, PU 14-28, NUL 7, KUG 791, PU-1529, PU-1520, PU-1527, PU-1517, PU-1530, PU-1526.

Previously several workers reported that there is variation in resistance among the genotypes against powdery mildew of blackgram Channaveeresh *et al.* (2014) evaluated 12 genotypes against powdery mildew of blackgram, none of them found to be immune whereas, one genotype LBG-17 was resistant. Hadimani *et al.* (2015) reported that out of 64 blackgram genotypes evaluated under natural conditions, none of the genotypes showed immunity, 15 genotypes showed moderate resistance, remaining all genotypes showed moderately susceptible to susceptible reaction against *E. polygona*.

Bhaskar (2017) identified four blackgram genotypes *viz.*, PU-31, MASH-338, LBG-752 and MBG- 1050 as moderately resistant to powdery mildew. Gunasri *et al.* (2017) evaluated sixteen blackgram genotypes, found ten genotypes as moderately resistant, three as moderately susceptible while three were susceptible to powdery mildew.

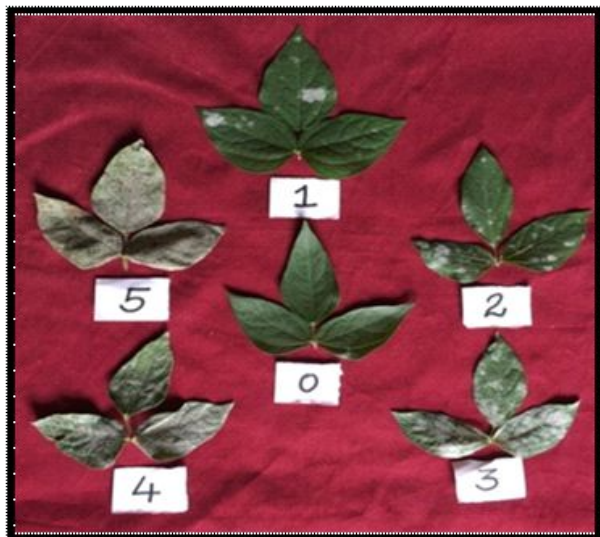


Plate 1. Differential severity grades of powdery mildew disease on blackgram

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