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Documentation Variation for Alternaria Blight Resistance in Diversity Stock of Indian Mustard (*Brassica juncea* (L) Czern and Coss)

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A B S T R A C T

In the present investigation 234 Indian mustard germplasm were screened in infested field against major disease of Indian mustard. Out of 234 Brassica germplasm, these screening was not found immune or highly resistant and resistance against Alternaria blight. Seven genotypes viz., PRG-909, CN-107719, CM-8, PRG-2001-62, LM-114-6, Bio-179, Bio-169-95 were found moderately resistant with disease severity of 5-10 percent were rated as moderately susceptible were found 114 genotypes with disease severity 11-25 percent. 131 genotypes were marked as susceptible in which disease severity was found to be 26 to 50 percent. The highly susceptible only two genotypes was found to be >50 present with disease severity respectively.

Introduction

Indian mustard (*Brassica juncia* (L.) Czern and Coss) is the third important oil seed crop in the world after soybean (*Glycine max* L.) and palm (*Elaeis guineensis* Jacq.) oil. It is grown in subtropical and tropical countries in theworld comprise eight cultivated crops of tribe *Brassiceae* within the family Cruciferae (*Brassicaceae*). In India, it is the second most important edible oil seed after groundnut and sharing 27.8% in the India's oilseed production. The oil of the Rapeseed mustard is mainly used in human diet. The crop also has important place in industrial uses such as for manufacturing soap, paints, varnishes, hair oil, lubricants, textile auxiliaries and various other products. Indian mustard [*Brassica juncea* (L.) Czern and Coss.] is predominantly cultivated in Rajasthan, Uttar Pradesh, Haryana, Madhya Pradesh and Gujarat. Among these states, Rajasthan, Uttar Pradesh and Madhya Pradesh hare the major Rapeseed-mustard growing state to the national acreage during The corresponding contribution to production was 48.6%, 13.4%

and 9.8%, respectively the last five years, (Chauhan *et al.,* 2011).The biotic stresses, blight disease of Rapeseed-mustard caused by brassicae (Berk.) Sacc. Has been reported from all the continents of the world which affects most cruciferous crops. It is one among the important diseases of Rapeseed-mustard causing yield losses up to 47% (Kolte, 1985), 32.5% (Shrestha *et al.,* 2005) and10-71% (Chattopadhyay, 2008). These diseases are very destructive and causing a wide spread destruction in vegetables and other economically important crops (Mamgain *et al.,* 2013).

Materials and Methods

Indian mustard genotypes (two hundred thirty four genotypes) Planting of under natural conditions in order to promote a severe natural epidemic of disease. The genotypes were sown in two rows each of 3meter length with spacing of 30x10 cm in Alfa Lattice Design with two replications. To maintain the high humidity level in microclimate of the field, time to time irrigation was applied for favouring the development of the disease. Observations were recorded on randomly selected five plants from each genotype.

Numerical rating grade was given on the basis of percentage of area covered by pathogen on the leaves. On the basis of disease intensity genotypes were classified into different groups viz., near immune/highly resistant, resistant, moderately resistant, moderately susceptible, susceptible, and highly susceptible.

$$\left[\text{Average severity score} = \frac{(N-1X0)+(N-2X1)+(N-3X3)+(N-4X5)+(N-5X7)+(N-6X9)}{\text{No. of leaf samples}}\right]$$

Where

N-1 to N-6 represents frequencies of leaves in the respective score (Table 1).

Results and Discussion

Screening of Indian mustard 234 genotypes, these screening was not found immune or highly resistant and resistance against. Alternaria blight of Indian mustard (Table 2). Seven genotypes viz., PRG-909, CN-107719, CM-8, PRG-2001-62, LM-114-6, Bio-179, Bio-169-95 with disease variety of 5-10 per cent, respectively, were rated as moderately susceptible were found 114 genotypes with disease severity 11-25 percent. 131 genotypes were marked as susceptible in which disease severity was found to be 26 to 50%. The highly susceptible only two genotypes was found to be >50 present with disease severity respectively. It could be noticed that the vulnerability level was relatively quite high as compared to resistance status (Fig. 1).

Table.1 Modified 0-9 scale for rating disease intensity of *Alternaria* blight in Indian mustard (AICARP-R&M 2011)

Rating scale	Disease Intensity (%)	Pathogen Reaction
0	0	Near immune/highly resistant (I)
1	<5	Resistant (R)
3	5-10	Moderately Resistant (MR)
5	11-25	Moderately Susceptible (MS)
7	26-50	Susceptible (S)
9	>50	Highly Susceptible (HS)

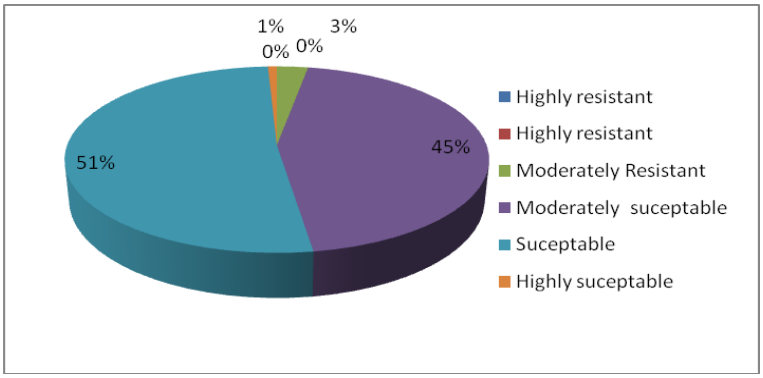
Table.2 Disease reaction of different *Brassica juncea* genotypes to Alternaria blight disease

under field condition

Rating scale	Disease intensity	Pathogen Reaction	No. of Genotypes	Genotypes
0	0	Near immune/highly resistant (I)	**NIL**	---
1	< 5	Resistant (R)	**NIL**	---
3	5-10	Moderately Resistant (MR)	**7**	PRG-909, CN-107719, CM-8, PRG-2001-62, LM-114-6, Bio-179, Bio-169-95
5	11-25	Moderately Susceptible (MS)	**114**	PTJ-3-84, NDRC-190-8-5, ISB-66, CSR-171, Bio-197, ISB-92, BLAZF, Bio -QM-1, CSR 901 PUSA BOLD DT -1, RKL-08-2, PRG-2001-65 JGM-001, CM-101-2-88, GLM-4-1,HLM-39-5 PRG-2006, CSR-78, CM-10-7, CSR-403, CRL-1359-13-15, PRG-920, Bio -2, B-312,CSR-1053 CRL-1359-11-13-5, CRL-1359-1-19-47-21, BPR-55, L-171-7, CM-21-16, CSR-225, CM-21-7, GMCN-187, B-216, CM-4, PBG-1007, GMCN-7, GMCN-8-1, CSR-157, CN-2, CN-6-3, PF-8, CRL-A-2-1-4, CRL-1359-60-1-2-4, PUSA- BOLD-DT,NPJ-17, B-378, CM-21-9-35, NF-1, DNA-3(Self)-8-22, Bio-559, CM-2, PTJ-3-5, JMG-9005, GM-16, DNA(Self)-6, CSR-1034, ELM-103, PRO-9907, CM-6-2, CSR-253, CSR-713, DNA(Self)-8, JGM-02-01, ISB-95, PRG-939, CSR-816, RNN-631, CRL-1359-19-23-52, PRG-1291, CM-38, ELM-105, CRL-1359-19, CRL-1359-13-6-2, B-351, IC-248786, CM-2-1, GMCN-100, CSR-238, PCR-10-3, HULM-02-01, L-65, ELM-38, K-230-27, GLM-3, HES-17, NDR-05-2, CRL-1359-18-11, MCN-11-19-DT-3, GMCN-8,MCN-09-36, NHO-3-2, B-384, MCN-11-19, MCN-13-1, NHO-2-30, MCN-11-25, Bio-209, NHO-3-13, SKM-740, JGM-129, MCN-13-19, B-326, CM-10-1, CM-60-44-3, JMG-951, CM-21-13, MCN-13-8, GMCN-10, HLM-37-1, MCN-13-11, DNA-4(Self), CSR-1037, DNA(Self)-8-10.
7	26-50	Susceptible (S)	**131**	PBG-1188, RK-05-1, ELM-0-97, MCN-13-22 CSR-79, CM-21-11, CRL-1359-159-60, CRL-1359-1-19-75-4-5, Bio-467, PBR-375, ELM-2 DAR-3, JMG-927, CSR-1175, CM-21-1, DAR-7, CM-11, GMCN-182, MCN-10-37, DHR-9901, NHO-3-11, RRN-772, MCN-05-8, NRCQR-837, CSR-158, KMR-13-3, GLM-5-1, MCN-09-38, CSR-392, CCBJ-1, TM-106-1 CSR-60, RK-05-6, KM-555, EC-392021, CM-21-9, CM-11-12, PRG-905, NDR-05-1, MCN-36 DHR-9601, ELM-9, GMCN-79, HLM-41-13-2 ISB-93, MCP-12-211, IC-331818, MCN-09-01 JMM-08-1, GLM-4-2, GMCN-73, CM-11-7 Consult-7-4, CRL-1359-18-19-17, CRL-1359-BC-4-4-1, NR-06-1, RB-55, MCN-14, MCP-12-24, MSC-3, SKM-425, GMCN-12,PRG-151

				ELM-85, LM-12727, MCN-21, GMCN-19-218 MCN-09-18, CCJJ-1, DHR-1, PCR-9604-2 HLM-36-25-2, MCN-13-14, PTJ-3-20,MCN-11-29, GMCN-1-2, CM-20-2, MCN-13-3, MSC-13-28, Consult-7-1, CRL-1359-175-1, NRCDR-507 CM-11-9, CRL-1359-64-175-03, DAR-8, JGM-59, MCN-13-18, CSR-841, CM-10-6, CSR-255, , NPJ-2-9, JMG-9901, MCN-13-4, CM-11-8, GMCN-186, CRL-1359-19-12-24, RH-0555-A, MCN-09-06, LJM-96, MCN-11-19-DT-2, RRN-598, MCN-11-30, HYT-33, NRCHB-101-DT-3, CRL-175-13, DNA-3(Self),MCN-08-59, MCN-09-37, PRG-14, MSC-1, MCN-05-4
9	>50	Highly Susceptible (HS)	**2**	NJHO-7-20, RH-03-42.

Fig.1 Pi chart represented is disease reaction in percent of Indian muastard genotype in field condition



Different workers evaluated that 81 genotypes Indian mustard were screened against blight under natural epiphytotic conditions and reported that none of the genotype was found to be completely free from visible symptoms of disease. Only one YET-25 was fairly resistant against leaf blight, however, 10 and 61 lines were reported moderately resistant and moderately susceptible, respectively (Singh *et al.,* 2009). Rahman *et al.,* 2010 found of disease severity while evaluating 26 genotypes of rapeseed-mustard during their extensive research on Alternaria blight. On the basis of disease severity index, none was found highly resistant or resistant. While six among them appeared to be moderately resistant against the blight.

The present finding is supported by many authors such as Khan *et al.,* (1991) who conducted field trial using 100 accessions of sarson for evaluation of resistance to *A. Brassicae* by artificial inoculation. They reported 2 resistant,4 moderately resistant, 16 moderately susceptible, 53susceptible and 26 highly susceptible against Alternaria blight; Yadav *et al.,* (1999) screened 74 Indian mustard (*Brassica juncea*) germplasm lines for resistance to Alternaria blight and found none of the genotype was completely resistant to Alternaria blight disease. PBR-176, PBR-178 and PBR-180 were found moderately resistant to Alternaria blight, 16 genotypes were highly susceptible to Alternaria blight and 4 were susceptible; Kolte *et al.,* (2001) reported that genotypes PR-8988 and PR-9024 showed high degree of resistance to Alternaria blight and genotypes PR-9301 and

PR-9650 showed high degree of susceptibility.

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