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Identification of resistant source against alternaria blight disease of rapeseed-mustard

R. DAS

Department of Plant Pathology, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal, India

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ABSTRACT

The study was conducted with the objective to assess the resistance source against Alternaria blight in rapeseed-mustard at Pulses and Oilseeds Research Station, Berhampore, Murshidabad, West Bengal, India during Rabi, 2013-14. 134 entries were screened against Alternaria blight of the rapeseed-mustard. None of the entries was found immune or highly resistant or resistant. Only five entries i.e., RSPN-29, CNH-13-2, AKGS-1, RSPN-28 and CNH-13-1 were found to be moderately resistant (Disease severity 11 to 25%). Rest one hundred seventeen entries were categorized as susceptible (Disease severity 26 to 50%) and twelve entries were found as highly susceptible (Disease severity > 50%). These five moderately resistant entries can be used as good donor for evolving resistant varieties against Alternaria blight in rapeseed-mustard.

Keywords*:* Alternaria Blight, disease severity, rapeseed-mustard, resistance

Rapeseed-mustard (*Brassica* sp.), a major group of oilseed crop of the world being grown in 53 countries across the six continents with India, is one of the largest rapeseed-mustard growing country, occupying the third position in acreage (21.01%) and production (12.58%) after Canada and China during 2011-12. Rapeseed-mustard oil in India contributes 26.5 per cent to the total domestic edible oil production (DRMR, 2013). It is also important *rabi* oilseed crop of West Bengal cultivated in about 410.793 thousand ha with total production of about 419.58 thousand tones and average productivity of 1021 kg/ha (Anon., 2011). Wide gap exists between the potential yield and the realized yield of rapeseed-mustard at the farmer's field, which is largely attributed to the number of biotic and abiotic stresses. Among biotic stresses, Alternaria blight has been reported to be most wide spread and destructive fungal diseases of rapeseed-mustard throughout the world which causes up to 47 per cent yield losses (Kolte, 1985). Alternaria blight disease [*Alternaria brassicae* (Berk.) Sacc.] has been reported to affect most of the cruciferous crops throughout the world and is one among the important diseases of rapeseed-mustard with no proven source of transferable resistance in any of the hosts. The pathogen is greatly influenced by weather as the highest disease incidence is reported in wet seasons and in areas with relatively high rainfall. *A. brassicae* can affect host species at all stages of growth, including seed. Symptoms of the disease are characterized by formation of spots on leaves, stem and siliqua. This blight also reduces seed size and impairs seed color and oil content (Kaushik *etal*., 1984). Various fungicides control the Alternaria blight disease with dissimilar cost-benefit ratio (Das, 2015). But the ideal and most economical means of managing the blight disease of linseed would be the use of resistant varieties. The ideal and most economical mean of managing the blight disease of rapeseed-mustard would be the use of resistant varieties. Under these circumstances there is a need to exploit genetically host resistance in existing varieties and germplasm lines for the identification of resistant sources.

Investigations were carried out in November, 2013 to March, 2014 at an experimental site of the Pulses and Oilseeds Research Station, Berhampore (Lat. 24°50'N, Lon. 88°13' E, Alt. 66.69 m above msl, Soil type-clay loam and neutral pH), Murshidabad, West Bengal, India. 134 entries and 1 check (B-9) were screened against Alternaria blight. The entries were sown in single row each of three meter length with spacing of 30x10 cm in two replications and one row susceptible check was used after two test rows. Nitrogen (N), phosphate (P_2O_5) and potash (K_2O) fertilizers were applied at the rate of 100:50:50 kg ha^{-1} in which nitrogen was used in two split doses. Seeds were sown on 26th November, 2013 and grown under prevailing epiphytotic condition for the disease. 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 varieties/lines. The severity of the disease percent in leaf was assessed at 75 DAS while disease severity percent in pods was assessed at 15 days before harvesting (DBH) using 0-9 scale (Anon., 2010). Finally the disease severity on leaf and pod were also calculated. On the basis of disease

Short Communication

E-mail: rajudas05@gmail.com

intensity varieties/lines were classified into different groups *viz*., near immune/highly resistant, resistant, moderately resistant, moderately susceptible, susceptible, and highly susceptible.

Screening of rapeseed-mustard varieties/lines done at PORS, Berhampore (WB) revealed that among 134 entries, none was found immune or highly resistant or resistant against Alternaria blight of rapeseed-mustard (Table 1 and 2). Only five entries *i.e*., RSPN-29, CNH-13-2, AKGS-1, RSPN-28 and CNH-13-1 were found to be moderately resistant (Disease severity 11 to 25%). Rest one hundred seventeen entries were categorized as susceptible (Disease severity 26 to 50%) and twelve entries were found as highly susceptible (Disease severity > 50%).

Table 1: 0-9 scale for scoring disease severity of Alternaria blight in rapeseed-mustard

Rating	Scale	Disease reaction
0	0	Immune (I)
1	<5	Highly Resistant (HR)
3	5-10	Resistant (R)
5	11-25	Moderately Resistant (MR)
7	26-50	Susceptible (S)
9	>50	Highly Susceptible (HS)

Table 2: Field validation of rapeseed-mustard entries against Alternaria blight

Rating	Scale	Number of entries	Entries
0	0	00	-
1	<5	00	-
3	5-10	00	-
5	11-25	05	RSPN-29, CNH-13-2, AKGS-1, RSPN-28, CNH-13-1
7	26-50	117	PT-303, CS-2200-2-6, RH-1063,GSL-1, CS-13000-3-1-14-2, DRMRIJ-13-38,DLSC-1, TKM-13-2,RMWR-09-5, RTM-314, RMT-08-4, HNS-1102,PTC-2009-3, RAURD-1002, PTC-2011-3 and rest.
9	>50	12	NPJ-182, RB-74, DRMR-1153-12, Q-90009, RAUDYS-10-06, RMT-08-10, RSPT-6, TH-11101, RLC-3, PDZ-1, PMH-13-1, PMH-13-2

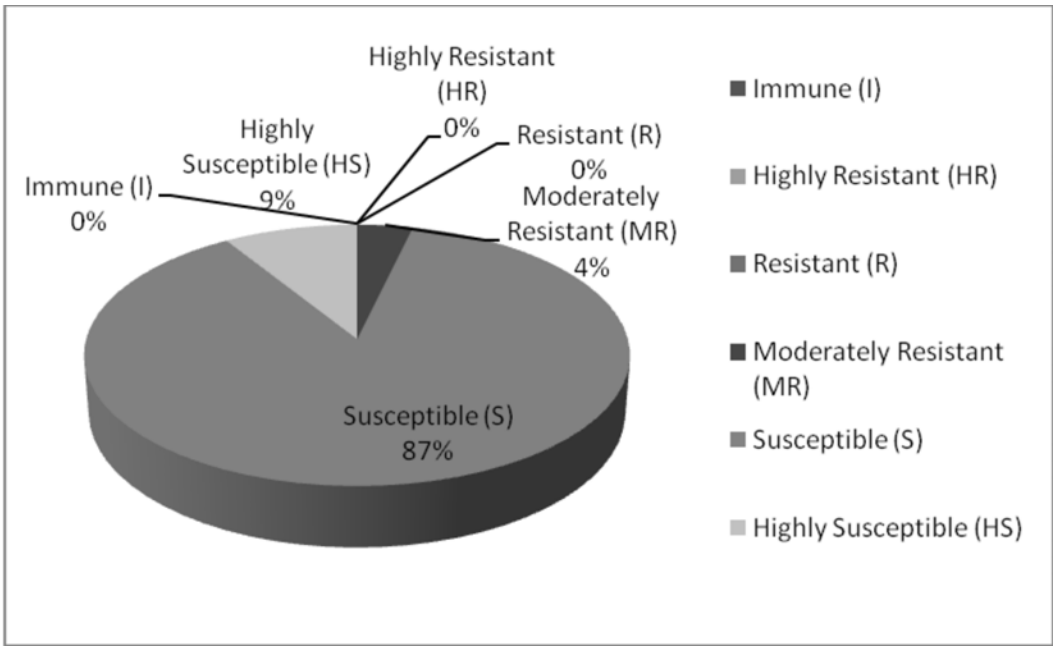

Fig. 1: Percentage of pathogen reaction of rapeseed mustard entries against Alternaria blight

It could be noticed that the vulnerability level was relatively quite high as compared to resistance status (fig. 1). Among the screened entries only 4 per cent was found moderately resistant, 87 per cent susceptible and 8 per cent highly susceptible against Alternaria blight. Different workers evaluated the rapeseed-mustard entries and our results are in accordance with those in many cases. Where there is some deviation that may be due to environmental factors and differences among genotypes and races of pathogens. At Etawah (U.P.), 311 lines/varieties of Indian mustard were screened against blight under natural epiphytotic conditions in rabi, 2006-07 and reported that none of the genotype was found to be completely free from visible symptoms of disease. Only five were reported moderately resistant (Yadav *et al.*, 2014). On the basis of disease severity index five entries i.e., RSPN-29, CNH-13-2, AKGS-1, RSPN-28 and CNH-13-1 were found to be moderately resistant against the Alternaria blight on leaf and pod. These entries can be used as good donor for evolving resistant varieties against Alternaria blight in rapeseed-mustard.

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