

SCREENING OF RAPESEED-MUSTARD CULTIVARS/LINES FOR RESISTANCE AGAINST *Alternaria* BLIGHT

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ABSTRACT

The study was conducted with the objective to assess the resistance source against *Alternaria* blight in rapeseed-mustard at Student's Farm, Chaudhary Charan Singh P.G. College, Heonra, Etawah (U.P.) during Rabi 2006-07. None of the 31 varieties/lines screened against *Alternaria* blight of the rapeseed-mustard was found immune or highly resistant. The variety NPN-1 was found to be resistant with 9.2% incidence of disease. Five genotypes viz. NPC-15, PBC-2004-1, PRQ-2004-1, NDR-03-06 and PR-2003-30 were found to be moderately resistant. Ten lines were found to be moderately susceptible exhibiting 26 to 50% disease incidence. Nine lines were categorized as susceptible (51 to 75% disease incidence) and highly susceptible group comprised of 6 lines. Among all, line NPJ-102 exhibited the highest disease incidence (79.2%).

KEYWORDS : Rapeseed, Mustard, *Alternaria*, Blight, Disease Resistance

Among various oilseed crops grown in our country, rapeseed-mustard has occupied an important place in the diet of Indian people as a source of edible oil, condiment and vegetable. It is extensively grown traditionally as a pure crop as well as an intercrop in marginal and sub-marginal soils in the eastern, northern and north-western states of India. Globally, 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% to the total domestic edible oil production (DRMR, 2013). With ever increasing population, rising standard of living, aberrant weather and liberalization of import and export policies, imports have reached at 8.4 million tonnes during 2011-12. To meet the growing demand of edible oils from domestic production, rapeseed-mustard has significant role to play. Despite considerable increase in production and productivity a wide gap exists between yield potential and yield realized at farmers' field, which is largely because of a number of biotic and abiotic stresses to which the crop is being exposed. Among the biotic stresses, *Alternaria* blight disease of rapeseed-mustard caused by *Alternaria 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) and 10-71% (Chatopadhyay, 2008). It is estimated that on an average harvest seed yield losses due to *Alternaria* blight ranged from 5 to 15 % and even reach up to 47 % (Kolte et al., 1987). Yield losses from 17-48 % due to *Alternaria* blight have been reported in India (Saharan, 1991). *Alternaria* is a very destructive pathogen causing a widespread destruction in vegetables and other economically important crops (Mamgain et al., 2013). The ideal and most economical mean of managing the *Alternaria* 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.

MATERIALS AND METHODS

The experiment was conducted at the Students' Farm of Chaudhary Charan Singh Post Graduate College, Heonra, Etawah (U.P.) during rabi 2006-07. The planting of thirty one cultivars/lines of rapeseed-mustard were done under natural conditions. In order to promote a severe natural epidemic of disease, the planting of single line of highly susceptible YST-151 and Varuna were incorporated after each five rows. The varieties/lines were sown in two rows each of three meter length with spacing of 30x10 cm in

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Table 1 : Modified 0-5 scale for rating disease intensity of *Alternaria* blight in rapeseed-mustard

Rating Scale	Disease Intensity (%)	Pathogen Reaction
0	0	Near immune/highly resistant (I)
1	1 – 10	Resistant (R)
2	11 – 25	Moderately Resistant (MR)
3	26 – 50	Moderately Susceptible (MS)
4	51 – 75	Susceptible (S)
5	76 – 100	Highly Susceptible (HS)

Table 2 : Varieties/lines in which *Alternaria* blight incidence was recorded at Heonra, Etawah

Scale	Category	Varieties/lines	
		Number	Name
0	Near immune/ highly resistant	Nil	-
1	Resistant	01	NPN-1
2	Moderately Resistant	05	NPC-15, PBC-2004-1, PRQ-2004-1, NDR-03-06, PR-2003-30
3	Moderately Susceptible	10	NDR-03-5, PR-2003-27, BIO-13-01, Varuna, PR-2002-8, PYS-2001-1, PBN 2004-1, PRQ-2004-2, PR-2002-20, NPJ-99
4	Susceptible	09	PGB-1986, RGN-124, RGN-142, NDYS -128, PR -2001-64, PR-2002-25, PTC-99-11, NDYS-113-1, NPJ-100
5	Highly Susceptible	06	NDYS-133-1, NDT -03-2, NDT -03-3, NDYS -2, PYS -2002-2, NPJ-102

randomized block design with three 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 varieties/lines. Screening was rigorously carried out at modified 0-5 point scale (Table 1) as suggested in the proceeding of All India Coordinated Research Project on Rapeseed-Mustard Pathology Planning and Review Session during 2001-02 (Anonymous, 2002). Numerical rating grade was given on the basis of percentage of area covered by pathogen on the leaves. On the basis of disease intensity varieties/lines were classified into different groups viz., near immune/highly resistant, resistant, moderately resistant, moderately susceptible, susceptible, and highly susceptible.

RESULTS AND DISCUSSION

Screening of rapeseed-mustard varieties/lines done at Heonra, Etawah revealed that among 31 varieties/lines, none was found immune or highly resistant against *Alternaria* blight of rapeseed-mustard (table 2).

Only one i.e., NPN-1 was found to be resistant with 9.2% disease incidence. Five varieties viz., NPC-15, PBC-2004-1, PRQ-2004-1, NDR-03-06 and PR-2003-30 with disease severity of 15.2, 17.2, 18.8, 18.8 and 24.6 per cent, respectively, were rated as moderately resistant (11-25% *Alternaria* blight incidence). Ten varieties/lines were marked as moderately susceptible in which disease incidence was found to be 26 to 50%. These lines were NDR-03-5 (29.0%), PR-2003-27 (30.0%), BIO-13-01 (45.0), PRQ-2004-2 (46.4%), PR-2002-20 (46.4%), PR-2002-8 (47.0%), Varuna (48.0), PYS-2001-1 (49.2%), PBN-2004-1 (50.0%), and NPJ-99 (48.8%). The susceptible group (51-75% disease incidence) comprised of nine varieties/lines; PR-2001-64, RGN-142, NDYS-113-1, NDYS-128, PTC-99-11, RGN-124, PR-2002-25, NPJ-100 and PGB-1986 with 52.9, 54.8, 55.6, 56.2, 67.0, 68.0, 72.0, 72.0 and 72.2 per cent infection, respectively. Six varieties/lines were found highly susceptible (>76% disease incidence) towards *Alternaria* blight disease, among them the line NPJ-102 exhibited the highest disease incidence of 79.2%. It could be noticed that the vulnerability level was

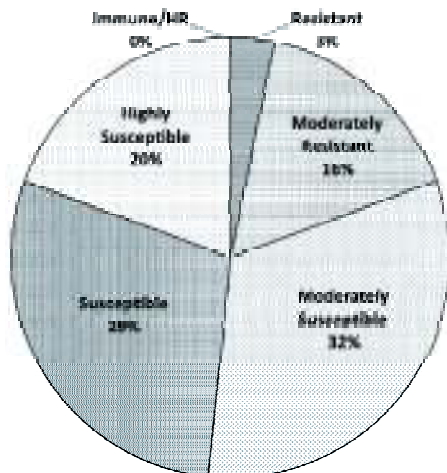


Figure 1 : Screening of Rapeseed-Mustard Varieties/Lines against *Alternaria* Blight

relatively quite high as compared to resistance status (figure 1).

Different workers evaluated the rapeseed-mustard varieties/lines 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 N.D. University of Agriculture & Technology, Faizabad, 81 lines/varieties of Indian mustard were screened against *Alternaria* 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 varying degree of disease severity while evaluating 26 varieties/lines of rapeseed-mustard during their extensive research on *Alternaria* blight at RARS, Jamalpur. 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 *Alternaria* blight.

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