SHORT COMMUNICATION

Screening of promising lines/varieties of linseed against Alternaria blight (*Linum usitatissimum* L.)

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J. Mycopathol, Res, 54(2) :303 -306 2016;
ISSN 0971-3719

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Screening of promising lines/varieties of linseed against Alternaria blight (*Linum usitatissimum* L.)

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Received : 08.01.2016 RMS Accepted : 16.03.2016 Published : 25.07.2016

Field experiments were conducted during 2009-10, 2010-11, 2011-12, 2012-13 and 2013-14 to evaluate the performance of promising lines/varieties of linseed against Alternaria blight disease caused by *Alternaria lini* Dey and *A. linicola* Grooves and Skolko. Twenty four promising lines/varieties with one susceptible check variety (Chambal) and one resistant check variety (Sheela) were screened against Alternaria blight under natural condition. All were identified with significantly lower disease intensity in leaf and bud of Alternaria blight. But Meera, Gaurav, EC-41590, A-202 and JRF-3 showed lowest per cent disease intensity in leaf (<10%) as well as bud infection to the extent of 8.4, 8.0, 9.0, 7.5, 7.8 % respectively. These lines/varieties can be used as good donor for evolving resistant varieties against Alternaria blight in linseed.

Key words : Screening, linseed, Alternaria blight, promising lines/varieties

Linseed (*Linum usitatissimum* L.) is an important *rabi* oilseed crop and a major source of oil and fibre. There are different varieties of linseed meant for dual purposes. It is one of the most important oilseed crops of temperate and subtropical region of the world. It has nutritional, medicinal, industrial and agricultural uses. The major causes behind low production of linseed are that the crop is cultivated mostly in rainfed marginal/sub-marginal lands and also due to the biotic and abiotic stresses. Alternaria blight caused by *Alternaria lini* Dey and *A. linicola* Grooves and Skolko, is a major biotic stress limiting crop yield in hot and humid environment. Only few resistant genotypes are available at the National level against this disease (Singh *et al*, 2006; Singh *et al*, 2009). 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. Under these circumstances there is a need to exploit genetically host resistance in existing lines/ varieties for the identification of resistant sources.

Investigations were carried out during *rabi* of 2009-10, 2010-11, 2011-12, 2012-13 and 2013-14 at the experimental site of Pulses and Oilseeds Research Station, Berhampore, Murshidabad, West Bengal (Lat. 24°50' N, Lon. 88°13' E, Alt. 66.69 m above msl, Soil type was clay loam and neutral in pH). Trials were conducted using a single row with 3 m length in two replications. Seeds were sown on third week of November during testing years and grown under prevailing epiphytotic condition for the disease. Nitrogen (N), and phosphate (P_2O_5) fertilizers were applied at the rate of 100:50 kg

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Table 1 : 0-5 rating scale for disease severity of Alternaria blight in linseed

Rating	Category/Reaction	Area of leaves infection (%)	Bud infection (%)
0	Immune (I)	0	0
1	Resistant (R)	0.10-10	0.10-10
2	Moderately resistant (MR)	10.10-25	10.10-25
3	Moderately susceptible (MS)	25.1-50.0	25.1-50
4	Susceptible (S)	50.1-75	50.1-75
5	Highly susceptible (HS)	75.1-100	75.1-100

Table 2 : Varieties/lines in which Alternaria blight severity was recorded at PORS,Berhampre (WB)

Rating	Scale	Number	Varieties/lines Name
0	0	Nil	-
1	0.10-10	05	Meera, Gaurav, EC-41590, A-202 and JRF-3
2	10.10-25	19	LCP-147, Polf-22, EC-22799, BAU-610A, JRF-1, Polf-15, Polf-17, Polf-19, ES-44, H-15, H-43, LCK-9436, Polf-5, Polf-34, LC-2279-4, NDL-2004-5, PKDL-62, Surabhi
3	25.1-50.0	Nil	-
4	50.1-75	Nil	-
5	75.1-100	Nil	-

Table 3 : Disease severity percentage of promising lines/varieties of linseed against Alternaria blight disease under natural condition (2009-10 to 2013-14)

Lines	Leaf (0 - 5 Scale)						
	2009-10	2010-11	2011-12	2012-13	2013-14	Mean	Reaction
LCK 7002	2	2	1	1	1	1	R
LCP-147	3	2	1	1	1	1	R
Meera	3	2	1	1	1	1	R
Polf-22	2	2	1	1	1	1	R
Gaurav	2	2	2	1	1	1	R
EC-22799	3	3	1	1	1	2	MR
EC-41590	3	1	2	1	1	1	R
A-202	2	1	2	2	1	1	R
BAU-610A	2	3	1	1	1	2	MR
JRF-1	2	1	1	1	1	1	R
Polf-15	3	2	1	1	1	2	MR
Polf-17	2	2	1	1	1	1	R
Polf-19	2	2	1	1	1	1	R
JRF-3	1	2	2	1	1	1	R
ES-44	2	1	2	1	1	1	R
H-15	2	2	2	1	1	1	R
H-43	2	2	1	1	1	1	R
LCK-9436	2	1	2	1	1	1	R
Polf-5	2	2	1	1	1	1	R
Polf-34	2	2	1	1	1	1	R
LC-2279-4	3	2	1	1	1	1	R
NDL-2004-5	3	2	1	1	1	2	MR
PKDL-62	3	2	1	1	1	2	MR
Surabhi	2	2	2	1	1	1	R
Sheela (RC)	2	2	1	1	1	1	R
Chambal (SC)	3	4	4	4	4	4	S

Contd.

Lines	Bud damage (%)						
	2009-10	2010-11	2011-12	2012-13	2013-14	Mean	Reaction
LCK 7002	7.0	9.2	35.4	9.6	13.2	14.9	MR
LCP-147	6.9	6.4	20.8	10.3	18.2	12.5	MR
Meera	6.6	7.2	17.7	2.2	8.4	8.4	R
Polf-22	6.4	8.2	21.6	2.8	19.9	11.8	MR
Gaurav	3.8	8.4	11.5	8.7	7.6	8.0	R
EC-22799	6.0	7.8	8.5	10.5	6.0	7.7	R
EC-41590	9.9	6.6	7.3	9.7	11.5	9.0	R
A-202	4.0	7.8	12.1	2.8	11.0	7.5	R
BAU-610A	7.6	8.6	22.5	8.4	16.3	12.7	MR
JRF-1	7.0	6.8	21.3	13.5	18.2	13.3	MR
Polf-15	2.8	6.6	29.6	14.7	15.0	13.7	MR
Polf-17	4.1	7.5	23.0	2.6	15.0	10.4	MR
Polf-19	4.5	8.9	26.0	7.9	21.3	13.7	MR
JRF-3	5.3	10.2	11.0	3.3	9.1	7.8	R
ES-44	2.7	6.6	18.3	9.6	24.9	12.4	MR
H-15	5.8	7.2	28.3	7.3	14.9	12.7	MR
H-43	6.8	6.6	23.5	10.7	9.7	11.5	MR
LCK-9436	6.0	8.7	22.5	21.7	12.5	14.3	MR
Polf-5	5.2	7.2	24.2	16.0	13.0	13.1	MR
Polf-34	3.0	7.8	28.8	10.1	15.2	13.0	MR
LC-2279-4	2.9	8.6	24.8	13.9	14.8	13.0	MR
NDL-2004-5	1.8	7.4	15.9	18.0	11.1	10.8	MR
PKDL-62	7.8	9.2	26.6	17.3	17.5	15.7	MR
Surabhi	7.6	6.6	42.9	12.8	14.4	16.9	MR
Sheela (RC)	5.4	6.2	2.9	8.8	9.6	6.6	R
Chambal (SC)	54.2	51.5	57.4	53.8	63.7	56.1	S

RC- Resistant Check; SC - Susceptible Check

ha^{-1}in which nitrogen was used in two split doses. Irrigation was given thrice. Susceptible check and resistant check will be grown after every ten entry. The row to row spacing was maintained at 20 cm apart and plant to plant distance was 10 cm. Observations were recorded on randomly selected five plants from each varieties/lines. The disease severity on leaves at 90 DAS was recorded by using 0-5 scale (Conn *et al*, 1990) and per cent disease severity (PDI) was calculated using formula, PDI = [Sum of numerical rating/total number of observations taken x maximum disease score] x 100. Per cent bud damage at 15 days before harvesting (DBH) was also recorded. On the basis of disease intensity varieties/lines were classified into different groups viz., immune/highly resistant, resistant, moderately resistant, moderately susceptible, susceptible and highly susceptible.

Screening of promising varieties/lines revealed that among 24 varieties/lines, none was found immune or highly resistant against Alternaria blight of linseed (Tables 1 and 2). In case of Alternaria leaf blight severity, 19 lines/varieties were resistant (Disease severity 0.10-10%) and only 5 i.e. EC-22799, BAU-610A, Polf-15, NDL-2004-05, PKDL-62 moderately resistant (Disease severity10.10-25%). In case of bud damage (%) of Alternaria blight, only 6 lines/varieties i.e. Meera, Gaurav, EC-22799, EC-41590, A-202 and JRF-3 were resistant (Disease severity 10.10-25 %) and rest 18 moderately resistant (Disease severity 0.10-10%). But only five lines i.e. Meera, Gaurav, EC-41590, A-202 and JRF-3 were resistant on both leaf and bud. Different workers evaluated the linseed varieties/lines and the results of the present study are in most cases in accordance with those but some otherwise deviation may be due to environmental factors and differences among genotypes and races of pathogens. Ram *et al*, (2007) screened

440 lines/varieties of linseed against blight under natural epiphytotic conditions and reported varying degrees of disease severity. On the basis of disease severity index, none was found highly resistant. Only six Meera, Gaurav, EC-41590, A-202 and JRF-3 appeared to be resistant against the Alternaria blight on both leaf and bud (Table 3).

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