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STUDIES ON DISEASE SCORING OF ALTERNARIA BLIGHT TO IDENTIFY THE RESISTANT GENOTYPES IN LINSEED (*Linum usitatissimum* L.)

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ABSTRACT

A field experiment was conducted during rabi season of two trails of linseed germplasm at Main Experimental Station, N.D. Uni. of Agri. And Tech., Kumarganj, Faizabad to find out the disease severity of Alternaria blight based on disease scoring method. Out of Four hundred forty germplasm lines, only one hundred forty entries were screened for resistance against Alternaria blight which compared to check variety Neelam. The germplasm lines A-225 B, A-75, A-226, A-364, A-232 and A-66 were consistently resistant to disease Alternaria blight. These identified germplasm lines may be useful to developed resistant varieties using as donor parents in breeding programme in linseed.

KEYWORDS: Alternaria Blight, Disease Resistant, Linseed

Among the oil seed crops, linseed (*Linum usitatissimum* L.) played a very important role in country and belonging to family linacae. The cultivated species has the chromosome number 2n=30. The genus has a large number of species which varied from 16 to 86 species. In India at present linseed is mainly cultivated for seed, oil and fibres. The linseed fibres importing about 40 crores annually. The cultivation of linseed is very low because of it mainly grown on marginal and sub-marginal land. The major causes of low production are due to biotic and abiotic stresses. Alternaria blight play as major disease of linseed to decreasing the yield per hectare. Singh *et al.* (2003) and Singh and Singh (2004a) revealed that the yield loss is very high about 40.60 to 60.00 per cent due to attacked severe condition of Alternaria blight depending upon the genotypes. Linseed crops have very poor resistant to disease and insect in the nation of gene pool. The available variability present in linseed is more or less exhausted. Therefore, it becomes essential to evaluate large number of available germplasm lines for various matric traits along with the prevailing diseases of the area to categorise them and identifying suitable plant type which is the ultimate product to be used in various crop improvement programme.

MATERIALS AND METHODS

The present investigation 'Evaluation of linseed germplasm for qualitative and quantitative characters' was carried out at the Main Experimental Station, N.D. Uni. of Agri. And Tech., Kumarganj, Faizabad in rabi season. The material for present study collected from P.C. Unit Linseed, (ICAR), C.S.A. Univ. of Agri. And Tech., Kanpur. Four hundred forty linseed germplasm lines and three checks (Neelam, T 397 and Kiran) were grown in Augmented Block Design with 5 cm length of each line (Federer, 1956). The checks varieties allotted randomly in each block. The check variety/cultivar 'Neelam' is susceptible to Alternaria blight disease and all entries of germplasm flanked by this check. Only one hundred forty were evaluated for disease scoring as compared to check. After germination, regularly watched for disease appearance in cropped area to identify. Five competitive plants were selected randomly and tagged to record the data of severity stage on leaves. The observation of disease reaction was recorded following 0-5 scale as suggested in the proceeding of All India Coordinated Research Project (AICRP) on linseed pathology planning and review session 1997-98.

Table 1: Disease scoring scale for Alternaria blight (*Alternaria lini)*

Score No.	Reaction	Disease intensity
O	Free	No disease
1	Resistant	1-10 % leaf area affected
2	Moderately resistant	11-25 % leaf area affected
3	Moderately susceptible	26-50 % leaf area affected
4	Susceptible	51-75 % leaf area affected
5	Highly susceptible	Above 75 % leaf area affected

The per cent disease intensity was calculated by employing following formula:

$$\text{Per cent Disease Intensity (PDI)} = \frac{\text{Sum of total numerical rating x100}}{\text{Total no. of leaves observed x maximum grade}}$$

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RESULTS AND DISCUSSION

The detail list of germplasm lines having significantly lower plant disease intensity of Alternaria blight on leaves than the check is listed in Table 2. The appearance of disease reaction was observed carefully at the one-week alternation. Check variety Neelam has more than 90 per cent of disease intensity in susceptible control indicating good spread of disease Alternaria blight. During the crop season. The disease severity varied from 12.67 to 73.35 per cent of PDI of Alternaria blight on leaves. One hundred forty lines were identified as significant lower PDI of Alternaria blight on leaves than checks. Among them the germplasm lines A-225 B, A-75, A226, A-364, A-232 and A-66 had lowest PDI of Alternaria blight of 12.67, 21.50, 22.34, 22.54, 23.67 and 24.25 per cent, respectively. These germplasm lines showed moderately resistant to the disease. The moderately susceptible response was observed in 102 germplasm lines and remaining 32 germplasm lines were highly susceptible. Arya and Prasad (1952) Singh (2004) and Singh *et al.* (2006) report the similar evidences.

Table 2: Disease reaction of Alternaria blight in 140 germplasm lines

Disease Reaction	Germplasm lines
Moderate Resistant	A-225 B (12.666) A-75 (21.504) A-226 (22.341) A-364 (22.541) A-232 (23.666) A-66 (24.254)
Moderate Susceptible	A-184 (25.466), A-202 (25.541), A-313 (26.566), A-69 (27.004), A-373 (27.416), A-193 (28.541), CI-1892 (29.912), A-44 (30.004), A-310 (30.166), A-366 (30.291), BR-28 (30.471), BR-20 (30.546), A-6-1-5 (31.154), 9 X 17 (31.374), A-70 (32.004), A-196 (32.216), BAU-175-4 (32.971), A-49 (34.254), A-225 (34.541), A-89 (35.379), A-223 A (36.416), A-371 (36.541), CI-1543 (37.687), A-314 (38.291), A-171 (38.421), A-207 (38.491), 474-3/2 (38.504), BILASPUR (38.512), 4-17-1 (38.549), CI-1888 (38.787), A-71 (39.004), BAULK-160 (39.121), BR-3 (39.596), A-370 (39.666), A-374 (40.191), CI-1383 (40.287), CI-1459 (40.352), CI-1427 (40.387), CI-1419 (40.512), CI-1466 (40.527), 9 X 16 (40.774), A-95 (40.829), BS-25 B (41.096), A-362 (41.166), A-60 (41.504), A-195 (41.541), CI-1550 (41.762), CI-1677 (41.912), A-47 (42.254), CI-270 (42.387), A-301 (42.541), A-173 (42.596), BS-25 (42.721), BR-9 (42.721), BR-25 (42.896) A-210 (42.91), BS-26 (42.971), BR-3-62 (42.971), A-199 (43.066), BR-26 (43.196), A-305 (43.416), A-200 (43.541), A-198)43.666), A-170 (43.846), CI-1696 (43.912), A-367 B (44.041), A-180 (44.096), CI-1477 (44.132), BR-5 (44.596), A-308 (44.966), A-159 (44.971), 03-1 (45.049), A-59 (45.129), BR-8 (45.191), BS-18 (45.246), LC-2045 (45.379), A-176 (45.846), BS-14 (45.856), 388 (45.874), BAU-154 (46.346), A-236 (46.416), CI-1876 (46.587), A-179 (46.596), CI-1469 (46.632), CI-1138 (46.887), CI-1557 (47.137), CI-C897 (47.337), A-238 (47.416), A-376 (47.541), CI-1900 (47.662), CI-1900 (47.662), BS-12 (48.096), BS-3 (48.271), A-389 B (48.979), AJGAN-11 (48.979), A-72 (49.004), A-65 (49.004), A-56 (49.379), A-76 (49.504), 9 X 11 (49.524), A-156 (49.596),9 X 12 (49.599), A-223 B (49.916).
Susceptible	A-164 (50.096), CI-169 (50.162), BALWANI (50.187), CI-1402 (50.337), CI-1413 (50.337), A-52 (50.379), CI-1697 (50.712), A-43 (50.754), A-95 B (50.804), CI-1558 (51.262), A-315 (51.316), CI-1692 (51.487), A-202 B (51.516), A-181 (51.721), A-174 (51.796), A-386 (52.146), A-85 (52.24), CI-1099 (52.387), BR-29 (52.396), 448-5 (52.499), A-61 (52.504), CI-1561 (52.537), BR-I (52.596), BR-1 (52.721), A-381 (52.77), 5/47-2/1-10/10 (52.849), CI-824 (52.887), A-19-6 (52.904), CI-1476 (53.062), 5/37-2/1-61/1 (53.474), A-58 (54.379), BS-2 (73.346).

CONCLUSION

In view of these facts large number of germplasm lines (440) were evaluated on the experimental field. All the germplasm lines perform well over a wide range of environment to express the sever condition for disease Alternaria blight, emphasizing immense use of screening a large number of genotypes over several environments. The genotype A-225 B had the significantly minimum infestation against Alternaria blight disease, and it has per se performance for yield per plant, number of capsules per plant, number of secondary branches per plant and number of capsules per plant. Besides, 5 germplasm lines has also better performance. In fact, it may be useful to improve in linseed cultivars against Alternaria blight disease and yielding potential by effort t of breeders through breeding programme.

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