

INHERITANCE OF POWDERY MILDEW RESISTANCE IN LINSEED
(*LINUM USITATISSIMUM* L.)

N. K. SINGH, Y. S. CHAUHAN,* K. KUMAR AND R. P. GUPTA

Department of Genetics and Plant Breeding
Narendra Dev University of Agriculture and Technology
Faizabad 224229

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Genetics of powdery mildew was studied in crosses involving resistant × susceptible parents of linseed. A single dominant gene determines resistance to powdery mildew in the parents SPS 77/23-10, Flake 1, LHCK 222 and R 552.

Powdery mildew, caused by *Oidium lini*, is a serious disease of linseed in India. It attacks all vegetative plant parts in seedling as well as in later stages of crop growth [1]. The yield losses reach 60% when infection is severe under continuous humid weather condition. Since chemical control measures of the disease are expensive, there is urgent need to develop resistant varieties of this crop. The scope of transfer of resistance to the high yielding types is hampered due to meagre information available on the inheritance and source of resistance [2, 3]. The present study deals with the inheritance of this disease for evolving powdery mildew resistant varieties of linseed.

Four powdery resistant lines, namely, SPS 77/23-10, Flake 1, LHCK 222 and R 552, and three susceptible cultivars, T 397, CI 1889 and Neelum, were used as parents. Seven crosses were made among these parents during winter season of 1984-85. Twenty five seeds of each cross were advanced in the off-season nursery during summer in Lahaul Valley (H.P.). The experimental materials consisting of 7 parents, 7 F₁ and F₂ populations were grown at the Students Instructional Farm of N. D. University of Agriculture and Technology, Narendranagar, Faizabad, during winter season of 1985-86. The parents and F₁ were sown in single rows of 3 m length each and F₂ in 3-6 rows depending on seed quantity. Interrow and interplant spacings were 30 cm and 10 cm, respectively. Four rows of the susceptible varieties Chambal and Neelum were sown as infectors along the perimeter of the entire experimental field.

Artificial epiphytotic conditions were created to identify resistant genotypes. The crop was sprayed with aqueous suspension of spores three times at 15-day intervals. The first inoculation was done when the plants were 60 days old. High humidity was maintained by spraying water on alternate days in the evening and by providing irrigations. The disease symptoms appeared within 10 days, however, recording was

done after a fortnight on individual plant basis when the plants were 90 days old on a 0-5 scale where score 0 meant no infection and score 5 was assigned to the plants with >75% infection. Plants with 0-2 ratings were grouped as resistant and those with 3-5 as susceptible. The χ^2 test was used to verify the goodness of fit to genetic ratio.

The incidence of powdery mildew observed on the infector rows of varieties Chambal and Neelum varied from 80 to 90%. All F_1 plants were resistant to powdery mildew, indicating that resistance was dominant in the material studied. The plants of resistant parents were disease free, while none of the plants in the susceptible parents escaped the disease.

Table 1. Mode of inheritance in F_1 and F_2 crosses of *Linum usitatissimum* L. against powdery mildew

Cross	Disease reaction in F_1	F_2 plants		Segregation ratio	χ^2	P
		R	S			
T 397 (4) × SPS 77/23-10 (1)	R	85	31	3:1	0.184	0.70-0.50
T 397 (4) × Flake 1 (1)	R	104	40	3:1	0.573	0.50-0.30
T 397 (4) × LHCK 222 (1)	R	68	23	3:1	0.004	0.95
CI 1889 (4) × SPS 77/23-10 (1)	R	123	45	3:1	0.306	0.70-0.50
CI 1889 (4) × Flake 1 (1)	R	62	17	3:1	0.540	0.50-0.30
CI 1889 (4) × LHCK 222 (1)	R	95	28	3:1	0.328	0.70-0.50
R 552 (1) × Neelum (4)	R	87	30	3:1	0.025	0.90-0.80

R—resistant, S—susceptible. Disease score of parents in each cross given in parentheses.

The F_2 population of seven resistant × susceptible crosses segregated in the ratio of 3 resistant (R): 1 susceptible (S) (Table 1). The segregation pattern in the F_2 population indicated that resistance in these lines was governed by a single dominant gene. Resistance to *Oidium lini* was also reported to be governed by a single dominant gene in the strains EC 98522, EC 216, LC 255, LC 256, and L C 259 of linseed [3].

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