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Sources of Resistance to Powdery Mildew (*Erysiphe polygoni* DC.) in Peas

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Abstract

Thirty four pea germplasm lines, obtained from Washington State University, Pullman, USA, were evaluated with two commercial cultivars against powdery mildew under field conditions at Battakundi (Kaghan valley) during summer, 1995 and 1996. The disease appeared in severe form killing the check cultivars ' Meteor and Mingomark' completely in all the past plots. Ten entries were found highly resistant, ten moderately resistant and four tolerant, whereas ten exhibited moderately susceptible or highly susceptible reaction. The two commercial cultivars Meteor and Mingomark were found highly susceptible to the disease.

Introduction

Pea (*Pisum sativum* L.) is an important vegetable and summer cash crop besides potato in upper Kaghan valley of Pakistan. The crop has now covered about >50 of the ultivable land in the valley since its introduction as potational crop for potato in 1989. The powdery mildew, caused by a fungus (*Erysiphe polygoni* DC.), is one of the most important factors limiting the pea green pod yields in the valley (Jan, 1996). The disease is characterized by a bite powdery dust like coating on the leaves, stems and)ds by the mycelium of the fungus (Singh, 1978; Bilgrami and Dube, 1982; Agrios, 1988). A reduction of 21-31 percent in pod number and percent in pod weight due to powdery mildew has been reported previously (Munjal *et al.*, 1963). Dixon (1987) also found that the number of picking was reduced elastically from seven in the healthy crop to one in that infected by the disease. However, powdery mildew is more revalent in late planted or late maturing peas and it can duce the yield by upto 50 percent or more (Gritton and Ebert, 1975).

The disease can be controlled by use of systemic fungicides (Singh, 1978; Singh *et al.*, 1982; Bilgrami and Dube, 1982; Agrios, 1988; Ahmed and Iqbal, 1993 and Ahmad *et al.*, 1995) which are expensive for the poor farmers. The evelopment of resistant varieties is considered to be the best way to combat a disease. In view of the economic importance of the problem, the present study was undertaken to screen exotic pea germplasm against powdery mildew under natural epiphytotic conditions in oder to identify sources of resistance to the disease.

Materials and Methods

Thirty four advanced pea lines obtained from plant genetic esources,WashingtonState University, Pullman, Washington, U.S.A, were sown at Potato Seed & Research Battakundi (Kaghan valley) in the 1st week of June, 995 and 1996. The test entries were planted in two-meter single-row plots spaced 60 cm apart with 10 cm distance between plants within a row. One row of the susceptible cultivar Meteor in 1995 and Mingomark in 1996 was planted after every two test entries as check

Table 1: Reaction of pea germplasm to powdery mildew (*Erysiphe polygoni* DC.) at Battakundi Farm (Kaghan valley) during summer, 1995 and 1996.

Local code No.	Name/Accession/ Pedigree No.	Powderly mildew (1-9)*	
		1995	1996
A-1	PS810034 (Alaska 81)	6	7
A-2	CL840001 (Columbian)	6	8
A-3	P5920002 (Radley)	9	9
A-4	PS920001 (RNK-2100)	6	8
A-5	PS810106	1	1
A-6	P5110028	2	3
A-7	PS210174	1	1
A-8	PS210195	1	2
A-9	PS210246	2	3
A-10	PS210258	1	5
A-11	P5210277	3	3
A-12	PS210308	1	1
A-13	PS210366	1	1
A-14	P5210370	4	5
A-15	PS210377	2	3
A-16	PS310396	1	2
A-17	P5310407	1	2
A-18	P5310495	8	9
A-19	PS310539	1	2
A-20	P5310609	2	3
B-1	PS950001 (Capella)	9	9
B-2	PS000023 (Latah)	9	9
B-3	PS920005 (Rex)	9	9
B-4	PS920004 (Scorpio)	9	9
B-5	P5910431 (Umatilla)	9	9
B-6	PS010603	4	4
B-7	PS110370	3	3
8-8	P5110374	3	3
B-9	PS110407	2	2
B-10	PS110624	4	4
B-11	PS210147	5	5
B-12	PS210154	5	5
B-13	P5210226	3	3
8-14	P5210387	2	2
--	Meteor**	9	9
--	Mingomark**	9	9

*= 1-9 rating (1 = highly resistant and 9 = highly susceptible). ** = Local commercial cultivars.

for comparison and to have a uniform spread of the disease. The experiment was laid out in a check plot design with three replications. Diseased plant debris of the previous year crop were chopped and spread in the experimental field as inoculum to ensure the disease development and its equal distribution in the nursery. Disease assessment was made on 1-9 rating scale (where 1-2 = highly resistant, 3-4 = moderately resistant, 5 = tolerant, 6-7 = moderately susceptible and 8-9 = highly susceptible). The seeds were harvested in the 3rd week of September.

Results and Discussion

Powdery mildew appeared in epidemic form under natural conditions during the course of study and the susceptible check cvs 'Meteor and Mingomark' showed 100 percent disease incidence wherever planted, indicating a good spread of the disease in the experimental field. Out of total 36 germplasm lines, ten test entries were found highly resistant, ten moderately resistant and four tolerant to the disease. The remaining 12 entries including two commercial cvs Meteor and Mingomark were found either moderately susceptible o highly susceptible. The highly resistant lines were A-5, A-7, A-8, A-12, A-13, A-16, A-17, A-19, B-9 and B-14 (Table 1). These results were relatively consistent from the experiment in 1995 to 1996.

There is a need to test these promising pea lines for high yield potential and other economic characters. It is suggested that search for varietal resistance to powdery mildew should continue in order to select broad based sources of resistance to this destructive disease (Munjal *et al*., 1963; Gritton and Ebert, 1975; Bilgrami and Dube, 1982; Agrios, 1988; Ahmed and Iqbal, 1993; Ahmad *et al*., 1995; Jan, 1996) and develop powdery mildew resistant pea varieties.

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