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Pathogenic Variability Within Isolates of *Ascochyta lentis* from Pakist

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Abstract

Pathogenicity of twenty isolates of *Ascochyta lentis* was studied using seven genotypes of lentil i.e Matilda, Precoz, Cobber, Digger, North field and Masoor-93 under greenhouse conditions. A distinctive pathogenic v observed on the basis of disease reaction. The isolates were divided into five distinct pathotype groups. Al belonging to group-5 proved to be more virulent as compared to isolates of other groups. The seven genotypes study can be used to differentiate isolates of *A. lentis* with respect to their pathogenicity.

Introduction

Ascochyta blight caused by *Ascochyta lentis* (Vassiljevsky) is an important disease of lentil in Pakistan. Lentil blight was first reported in Pakistan during 1982 (Khan *et al.*,1983). The disease symptoms appear on aerial plant parts in form of leaf blight, stem girdling, defoliation and pod abortion (Gossen and Morrall, 1983). Under severe disease condition, 30-40 per cent yield losses are reported (Malik, 1983).

Evidence for presence of variability in *Ascochyta fabae* of faba bean and *Mycospharella pinodes* of pea have been documented (Nasir and Hoppe, 1991; Rashid *et al.*,1991). Recently, six distinct pathotypes of *A. lentis* were identified on six genotypes from Australia by Nasir and Bretag, (1997), whereas Ahmed and Morrall (1996) reported variation in the virulence of isolates of *A. lentis* from Canada. Similarly different mating types of *A. lentis* have also been reported (Ahmed *et al.*, 1996a).

The use of blight resistant cultivars is the best approach to control lentil blight, as the other methods are either impractical or uneconomical. Sources of resistance to lentil blight have been identified (Hussain *et al.*, 1998; Nasir and Bretag 1996; Erskin *et al.*, 1996; Sugha *et al.*, 1991; Iqbal *et al.*, 1990) and differential disease reaction of lentil lines to *Ascochyta blight* also have been observed (Tay, 1989; Andrehanndi, 1994; Ahmed and Morrall, 1996; Nasir and Bretag, 1996; Hussain *et al.*, 1998). The objective of present study was to determine the pathogenic variation among isolates of *A. lentis* from Pakistan.

Materials and Methods

In our previous study, 68 genotypes were evaluated against two isolates of *Ascochyta lentis* (Hussain *et al.*, 1998). Based on variable reactions, seven genotypes i.e. North field, Cobber, Digger, Matilda, Indian head, Mansera-89 and Masoor-93 were selected for further study to determine the variability of other isolates. Ten seeds of each genotype were planted in a single row with two replications in iron trays (45x37x13cm) filled with sterilized soil. Plants were grown under glasshouse conditions at $20 \pm 2°C$ temperature.

Twenty isolates of *A. lentis* were obtained fr infected lentil seeds harvested from experime NARC, Islamabad during 1996-97. Extract M Bretag, 1997a) was used to maintain the c laboratory. Single spore culture of each obtained on lentil seed extract medium. T seedling were inoculated with spore suspe spores/ml). The inoculated plants were i $22 \pm 2°C$ temperature with 90-100 per cent hu hrs under the cages mounted with polyethylen cages were removed and trays were sprayed twice a day to create humidity for developmen Disease reactions were recorded at 10 day i inoculation on 1-9 scale (Nasir and Bretag, 1 1 = No visible lesion, 3 = Small flecks on leave lesions on leaves with or without chlorotic Extensive lesions on leaves and defoliation sporulating stem lesions, and 9 = Collapsed girdled stems and plant dead.

Results and Discussion

A great variation in pathogenicity among all was observed. On the basis of disease react genotypes, the isolates were divided into groups representing each group as a pathotyp Ahmed *et al.* (1996b) reported pathogen vari the isolates of *A. lentis* from Canada. Similarl Bretag (1997) reported six pathotypes in *A.* Australia. In this study, we found two cultivars and Indian head resistant to all the isolates. Ou 8 isolates showed resistant reaction to lentil Masoor-93 is the released variety of le recommended to the farmer for its cultivat growing area, but in our study, the variety p susceptible to a number of isolates of l Pathotype 3, 4 and 5 induced disease infectio which was identified as resistant cultiva Pathotype 5 caused infection in Digger wh tolerant reaction in our preliminary tests (Hu 1998). These lentil differentials can be us identification of more variable isolates from di

Table 1: Pathogenic reaction of twenty isolates of *Ascochyta lentis* to seven lentil genotypes.

	Pathotypes				
Genotypes	1	2	3	4	5
Matilda	R	R	R	R	R
Indian head	R	R	R	R	R
Digger	R	R	R	R	S
M-89	R	R	R	S	S
North field	R	R	S	S	S
Cobber	R	R	S	S	S
Masoor-93	R	S	S	S	S
Isolates in each pathotype	8	6	1	1	4

Rating up to 3 considered resistant (R), whereas above susceptible (S).

locations. Ahmed *et al.* (1996b) included North field and Indian head in their differentials and found highly resistant to their local isolates, whereas, our results showed that North field was susceptible to several isolates but Indian head showed resistant reaction against all the isolates. Difference between these results is due to the presence of different fungal populations in Canada. It has been reported that North field has single dominant gene for resistance (Ra11) (Tay 1989; Andrahennadi, 1994) when tested against 84 isolates of *A. lentis* from Canada (Ahmed *et al.*, 1996b). Similarly, Precoz is also resistant to Canadian isolates (Ahmed *et al.*, 1996b) but susceptible to certain Pakistani pathotypes. These difference in diseases reaction indicate the possibility of existence of pathotypes within populations of *A. lentis* from Pakistan.

Evaluation of lentil breeding material is crucial to identify resistant sources which can be used in breeding programme to develop resistant cultivars. Due to existence of high level of virulence in the isolates of *A. lentis*, screening should be done by using highly virulent isolates.

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