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EVALUATION OF CHICKPEA GERMPLASM AGAINST *ASCOCHYTA* BLIGHT

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Abstract

Of the 269 chickpea breeding lines evaluated against gram blight caused by *Ascochyta rabiei* under glass house conditions, only 7 lines viz., F16-90C, NCS950088, NCS950038, CMC228S, SEL96TH 11488, FLIP96-75C and 86135 were found resistant while 46 lines were tolerant to *Ascochyta* blight. This study provides some additional source of resistant materials against *Ascochyta* blight which can be used in hybridization program for the development of chickpea resistant cultivars for commercial cultivation in Pakistan.

Introduction

Chickpea a major pulse crop is cultivated over 70% of the total area under food legumes. It occupies about one million hectares with an average yield of 550kg/ha^{-1} (Hafiz, 1986). It is a major source of protein for the majority of the poor section of the population. Blight disease caused by the fungus *Ascochyta rabiei* is considered to be the major constraint to chickpea production in Pakistan. It is the most destructive disease of chickpea, especially in north west India, Pakistan, west Asia, north Africa, south and eastern Europe and USA (Nene & Reddy, 1987). It was first reported in the subcontinent by Butler (1918) in Attock district of NWFP, Pakistan. The disease occurred in epidemic form consecutively during 3 years (1980 to 1982) and the crop losses were estimated from 48 to 70% (Malik & Bashir, 1984).

Although certain measures have been taken to control blight diseases such as cultural practices, field sanitation (Ahmad *et al.*, 1949), use of chemicals as a seed treatment and foliar sprays (Bhatti *et al.*, 1984; Ilyas & Bashir, 1983) and utilizing host plant resistance (Reddy *et al.*, 1984). Use of resistant host plant appears to be the best and cheapest method for disease control. As the times passes the released resistant cultivars are becoming susceptible to this disease due to the occurrence of new races of *Ascochyta rabiei* (Hussain & Malik, 1991; Jamil *et al.*, 1995).

To strengthen the existing germplasm against this disease, germplasm screening and evaluation for the identification of new resistant source cultivars was mainly focussed in this study.

Materials and Methods

During 2000-01, in order to identify the sources of resistance in chickpea (*Cicer arietinum*) against *Ascochyta* blight caused by *Ascochyta rabiei*, 269 chickpea lines were obtained from national and international institutes. This material was evaluated against *Ascochyta* blight at seedling stage under glasshouse conditions by artificial inoculation (Iqbal *et al.*, 1994). Five seeds of each entry were planted in plastic pots filled with sterilized soil with single replication. A susceptible variety C727 was kept as control for comparison. Single spore culture of *A. rabiei* was obtained on chickpea grains (Alam *et al.*,1989) and a spore suspension (10^5 spores/ml) was sprayed on 14 days old chickpea seedlings. The inoculated plants were incubated at 22 ± 2°C with 90 to 100% relative

humidity for 72 hrs in a humid chamber. Humidity was maintained by spraying water thrice a day. Disease reaction on each line was recorded at 10 days after inoculation following 1-9 Scale rating (Singh *et al.*, 1981), when susceptible check was completely killed.

Results and Discussion

Blight symptom developed in all the entries irrespective of their sources either exotic or local and produced three types of reaction i.e., resistant (1-3), tolerant (4-5) and susceptible (6-9) on 1-9 scale (Table 1). The frequency of resistant lines was very low since only 7 lines viz., F16-90C, NCS950088, NCS950038, SEL96TH1488, CMC228S, FLIP96-75C and 86135 were found resistant while 46 lines were tolerant against *Ascochyta* blight.

Table 1. *Ascochyta* blight reaction on chickpea accessions under glasshouse conditions.

Material Source	Disease Reactions	
	Resistant	Tolerant
Pulses Program, National Agricultural Research Center, Islamabad.	NCS950088, NCS950038, and CMC228S,	NCS950259, NCS950183, CMC169, NCS9916, NCS96001, NCS9911, NCS9913, NCS2001, 5828, NCS950258, CMC168S, NCS950189, CMC114S, NCS9919, NCS9908, NCS950079, NCS9918, NCS950098, CMC80S, NCS950021, NCS950209, NCS950145, NCS950118, NCS950184, NCS950145, NCS950204, NCS950208, NCS950219, NCS950258, CMC70T, NCS95004, and CMC204S
Ayub Agricultural Research Institute, Faisalabad.	86135	20075, 20117, 20118, 20119, 86205, 20158, 20162
The International Center for Agricultural Research in the Dry Areas, Aleppo, Syria.	FLIP96-75C, FLIP16-90C, and SEL96TH1488	F95-68C, F96-90C, Flip97 132C, Flip97 139C, Flip97 219C, and Flip97 127C

The importance of host plant resistance in controlling chickpea blight, identification of sources of resistance was attempted by many authors in the past (Reddy & Singh, 1984; Singh *et al.*, 1981). The first resistant cultivar F8 was released some 60 years ago in India followed by C12-34 and C-727 released in Pakistan (Bedi & Athwal, 1962). However, these cultivars soon became susceptible due to occurrence of new races of *Ascochyta rabiei* (Hussain & Malik 1991, Jamil *et al.*, 1995; Grewal & Vir 1974).

Several limitations such as the absence of stable source of resistance and effective screening techniques combined with inability to identify physiologic races and ignorance of the genetic control of resistance, have in past inhibited plant breeders from launching aggressive breeding programs. The situation is gradually changing now and the information on sources of resistance, screening techniques and inheritance of resistance is slowly but steadily being generated. Field screening at vegetative stage and pod formation stages needed high as well as continuous humidity for the development of uniform spread of disease which is laborious and time consuming. Large number of

germplasm can be screened under glasshouse conditions in limited time and with less manpower. The genotypes, which give a considerable level of resistance are suggested to be screened at reproductive stage to confirm resistant level.

In the present investigation, the frequency of resistant lines was very low. This indicates that there is either high aggressiveness or narrow diversification of genetic material studied. Bashir *et al.*, (1985) evaluated 3360 chickpea germplasm accessions, obtained from ICRISAT for disease resistance to blight at National Agricultural Research Center (NARC), Islamabad during 1983-1984 and reported that only 55 accessions were resistant. The germplasm, which was found resistant in the present study could be utilized in the hybridization programme for the development of chickpea resistant cultivars for commercial cultivation in Pakistan.

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