

## Biochemical factors imparting resistance to leaf blight of barley

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Overall the resistant genotypes of barley recorded higher amount of total phenol, total protein, sugars, chlorophyll content as compared to genotypes susceptible to leaf blight disease. The amount of these biochemical components increased from 30 days after sowing (DAS) to 60 days after sowing (DAS). However, healthy counterparts of plant samples recorded higher biochemical content (total phenol, total protein, sugars, chlorophyll content) as compared to inoculated counterparts at both the stages. The study revealed that higher sugars, phenols, proteins, chlorophyll contents are some of the possible reasons for resistance to leaf blight disease in barley.

**Key words :** Resistance, Leaf Blight Barley.

### INTRODUCTION

It is well known that the disease resistance mechanism is a complex phenomenon and in response to invasion by a disease causing organism, plant produces various kinds of reactions. In recent years, it is becoming increasingly evident that several natural and induced defense mechanisms operate in host plants against different diseases. One such defense mechanism is the presence of certain biochemical compounds inhibitory to the pathogen (Prabhu *et al.*, 1984; Singh and Chand, 1982). During these processes considerable changes takes place in biochemical and physiological aspects like changes in the concentrations of total phenol, total protein, reducing sugar, non reducing sugar, total sugar, chlorophyll-a, chlorophyll-b and total chlorophyll (Sharma and Sharma, 1994) in plant tissues and at the same time activities of various isozymes are also modified. Therefore, analysis of biochemical in selected resistant and susceptible genotypes to leaf blight disease was carried out at two different stages to understand their role in resistance / susceptibility to blight pathogen.

4 genotypes, DWR 28 and PL 760 were moderately resistant to leaf blight pathogen and RD 2508, RD 2653 were found to be susceptible to leaf blight pathogen by considering the data resulted by field experiments conducted at the Main Agricultural Research Station, University of Agricultural Sciences, Dharwad during Rabi 2003- 04 and 2004-05. PL 760 and RD 2508 are six rowed barley genotypes where as DWR 28 and RD 2653 are two rowed barley genotypes. The genotypes were allotted in Randomized Block Design (RBD) with three replications of 1m x 1 m plots and four rows in each plot. In the field one set was maintained healthy and another set was artificially inoculated with leaf blight pathogen (*Helminthosporium sativum* Pam., king and Bakke). For different biochemical analysis, top two leaves were collected at 30 and 60 days after sowing (DAS) from random plants and composite leaf sample was made for estimation of total phenol, total protein, sugars, total chlorophyll in the ethanol extracts of fresh leaves of resistant and susceptible genotypes. Total phenol was estimated by Folin – ciocalteu reagent method (Bray and Thorpe, 1954). Total protein was estimated by following the procedure of Lowery *et al.* (1951) sugars were estimated by Nelson's modification of Somogyi's method (Nelson, 1944). Chlorophyll were estimated

### MATERIAL AND METHODS

Four barley genotypes were selected for the study. Among the

**Table 1 :** Total Phenol content in different barley genotypes as influenced by H. sativum

Genotypes	Total phenol (mg / g fresh weight)							
	30 DAS				60 DAS			
	Healthy	Inoculated	Mean	% increase or decrease over healthy	Healthy	Inoculated	Mean	% increase or decrease over healthy
DWR 28	2.120	2.607	2.362		2.293	3.107	2.700	
PL 760	2.307	2.817	2.562		2.933	3.813	3.373	
Mean	2.214	2.712		18.36	2.613	3.460		24.47
RD 2653	1.607	1.703	1.655		1.160	2.200	1.680	
RD 2508	1.793	1.857	1.825		0.990	1.993	1.492	
Mean	1.700	1.780		4.49	1.075	2.096		48.71
% increase or decrease over resistant	- 23.21	- 34.3			- 59.01	- 39.42		
Grand mean	1.957	2.246			1.844	2.778		
Source	S. Em±	CD (0.01)			S. Em±	CD (0.01)		
Genotypes (G)	0.006	0.024			0.009	0.039		
Inoculation (I)	0.004	0.017			0.007	0.028		
G x I	0.008	0.034			0.013	0.055		

DAS - Days After Sowing

NS - Non Significant

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