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## Performance of Advance Chickpea Strains Against Gram Pod Borer (*Helicoverpa armigera* Hubner)

Abdul Rashid, Habib Ahmad Saeed, Lal Hussain Akhtar, Sabir Zameer Siddiqi and Muhammad Arshad  
Regional Agricultural Research Institute, Bahawalpur, Punjab, Pakistan

**Abstract:** The present study was carried out to screen 11 advance strains and one approved variety of chickpea (Bittle-98) for pod damage caused by gram pod borer, *Helicoverpa armigera* (Hubner) under field conditions of Bahawalpur during Rabi season, 2001-2002. The results indicated that pod damage ranged from 9.38 to 21.49% in the test strains. Most susceptible strain was BRC-4 with pod damage of 21.49% while BRC-1 was least susceptible with pod damage of 9.38% with corresponding seed yields of 0.137 and 0.333 kg plot<sup>-1</sup> among the 11 strains tested.

**Key words:** Chickpea, gram pod borer, pod damage, seed yield

### Introduction

Chickpea (*Cicer arietinum* L.) is an important pulse crop. It was grown on an area of about 0.780 million hectares with a production of 0.335 million tones during 2000-2001 in Punjab (Anonymous, 2001). It is used for making bread, *pakora*, animal feed and eaten by human beings. It is also used as vegetable. It increases fertility of the soil through nitrifying bacteria. Gram pod borer (*Helicoverpa armigera*), cut worm (*Agrotis ypsilon*) and whitefly (*Bemisia tabaci* Gennad) attack the chickpea crop. But gram pod borer is a devastating pest of chickpea and other crop plants all over the world (Patankar *et al.*, 2001). In server cases, it causes about 75-90% losses in seed yield (Lal, 1996). Due to discriminate use of insecticides, their resistance against insect pests is increasing accompanied by the problem of environmental pollution. Screening of genotypes having inbuilt resistance against gram pod borer is the dire need of the day. Hafeez and Kotwal (1994), Ogenga-Latigo *et al.* (1994), Bhagwat *et al.* (1995), Whightman *et al.* (1995) and Patnaik and Mohapatra (1997) conducted experiments on screening of chickpea genotypes against pod borer infestation and pod damage by *Helicoverpa armigera* and reported varietal differences in terms of resistance or tolerance against gram pod borer. The present study was planned to screen out strains of chickpea resistant or tolerant to gram pod borer under field conditions of Bahawalpur.

### Materials and Methods

Eleven advance strains of chickpea (*Cicer arietinum* L.) (BRC-1, BRC-4, BRC-8, BRC-10, BRC-13, BRC-14, BRC-15, BRC-27, BRC-37, BRC-52 and BRC-55) alongwith 1 check (Bittle-98) were evaluated for pod damage and seed yield caused by gram pod borer (*Helicoverpa armigera*) during

Rabi season, 2001-2002 at Regional Agricultural Research Institute, Bahawalpur. The experiment was laid out according to Randomized Complete Block Design with 3 replications and plot size of 5.4 m<sup>2</sup>. Similar agronomic practices were applied to all genotypes throughout the growing season. The observations regarding the pod damage were recorded at the time of pest appearance by counting the total number of pods and number of pods damaged by the pest from 5 randomly selected plants from each plot at 10 days interval upto maturity of the crop. Thus, (%) of damaged pods was calculated as under:

$$\text{Pod damage (\%)} = \frac{\text{No. of damaged pods}}{\text{No. of total pods}} \times 100$$

Seed yield data were recorded at the time of harvest and were subjected to statistical analysis using a computer package 'MSTATC'. Correlations were computed by using the "Correlation" sub-programme of the same package. Means were compared by Duncan's New Multiple Range Test (Steel and Torrie, 1980).

### Results and Discussions

Statistical analysis of the data revealed highly significant among the mean values of pod damage and seed yield ( $P > 0.01$ ) of all the strains (Table 1). The pod damage ranged form 9.38 to 21.49% in various strains (Table 2). The check variety had 14.58% pod damage (35.7% less than the check). The most susceptible strains were BRC-4 (21.49%), BRC-13 (16.65%), BRC-27 (16.30%) and BRC-37 (17.81%). Strain BRC-1 was found to be tolerant one with least pod damage (9.38%) and the highest seed yield of 0.333 kg plot<sup>-1</sup> (30.08% higher than the check).

Table 1: Analysis of variance of data regarding pod damage and seed yield of various chickpea strains

Parameters	Means squares	P value	CV (%)	Correlation between pod damage and seed yield
Pod damage	36.214**	0.000	18.42	-0.637**
Seed Yield	0.024**	0.000	20.66	

Table 2: Mean pod damage and seed yield of various chickpea strains under filed conditions of Bahawalpur

Strains Tested	Pod damage (%)		Seed yield (kg plot <sup>-1</sup> )	
	Mean	% increase or decrease over check	Mean	% increase or decrease over check
BRC-1	09.38	-35.7	0.333	+30.1
BRC-4	21.49	+47.4	0.137	-46.5
BRC-8	13.80	-5.3	0.273	+6.6
BRC-10	14.60	-0.14	0.200	-21.9
BRC-13	16.65	+14.2	0.240	-6.2
BRC-14	14.05	-3.6	0.267	+4.3
BRC-15	11.80	-19.1	0.280	+9.4
BRC-27	16.30	+11.8	0.250	-2.3
BRC-37	17.81	+22.2	0.180	-29.7
BRC-52	17.65	+21.1	0.100	-41.0
BRC-55	15.53	+6.5	0.150	-41.4
Bittle-98 (check)	14.58		0.256	

BRC-1 out yielded all the test strains and the check. BRC-8, BRC-14 and BRC-15 also gave 6.6, 4.3 and 9.4% higher yields than the check, respectively. All the other strains had poor performance than the check by giving 2.3 to 46.5% less yield than the check. These results are in agreement with those of Bhagwat *et al.* (1995) who designated a genotype having 8% pod damage as least susceptible. BRC-1 is being evaluated at national level. It is hoped that it will be released for general cultivation in the very near future on the basis of its better performance in terms of tolerance to insect pests and higher yield potential.

The present results support the findings of Hafeez and Kotwal (1994), Ogenga-Latigo *et al.* (1994), Bhagwat *et al.* (1995), Whightman *et al.* (1995) and Patnaik and Mohapatra (1997) who reported variety differences in chickpea in terms of pod borer infestation, pod damage and seed yield. Highly significant negative correlation (-0.637) was found between pod damage percentage and seed yield plot<sup>-1</sup> in the present study (Table 1).

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