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Field Screening of Chickpea Genotypes Against Gram Pod borer, *Helicoverpa armigera*

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ABSTRACT

Twenty five chickpea genotypes were screened at Agricultural Research Station, Tandur for incidence against pod borer under field conditions during *rabi* 2010-11. Oviposition ranged from 1.33 to 5.00 eggs plant $^{-1}$ in vegetative stage and 0.67 to 5.33 eggs plant $^{-1}$ in podding stage while larval abundance ranged from 3.33 to 7.67 larvae plant $^{-1}$ and from 3.00 to 7.33 larvae plant $^{-1}$ during vegetative and podding stages, respectively. ICCV 09314 recorded least larval load during vegetative stage while ICCV 5383 harboured least larvae plant $^{-1}$ during podding stage. The pod damage ranged between 5.84 and 22.43% where in ICC 09317 recorded lowest pod damage followed by ICC 5383 (6.43%). The genotype ICC 5360 recorded significantly high yield of 1498 kg ha $^{-1}$ followed by ICC 3137 (1378 kg ha $^{-1}$).

Key words : Chickpea, Pod borer, Screening.

Chickpea (*Cicer arietinium*) is an important *rabi* pulse crop of India. Pod borer, *Helicoverpa armigera* is the most serious pest causing 80-90% damage to chickpea. Effective management of this pest is essential to realize high yield. Growing insect resistant varieties is an important strategy to minimize economic loss caused due to this pest. Several workers screened different genotypes of chickpea for resistance against pod borer. Development of varieties with resistance to these pests is valuable for subsistence farming in developing countries (Sharma *et al.,* 2005). Information of resistance of certain newly developed cultures is lacking. The present study aims at screening chickpea genotypes against *H. armigera* under field conditions to identify resistant sources.

MATERIAL AND METHODS

The trial was conducted with twenty five chickpea genotypes at Agricultural Research Station, Tandur during *rabi* 2010-11 in randomized block design with three replications. Each entry was sown in a 7.2m^2 plot at intra and inter row spacing of 45 cm and 15 cm, respectively. All the recommended package of practices was followed but no plant protection measures was adopted. Phenological observations like number of days to 50% flowering were recorded in each entry. Observations on pod borer incidence i.e., egg and larval counts were taken on 5 randomly selected plants at vegetative and podding stages. Percent pod damage by pod borer was assessed on pods from five randomly selected plants from each plot at vegetative and podding stages. The percent pod damage was transformed to arc sine values and subjected to statistical analysis.

RESULTS AND DISCUSSION

The data recorded on days to 50% flowering, pest incidence and seed yield are presented in Table 1. Oviposition, larval incidence and pod damage was variable among different test genotypes. Oviposition ranged from 1.33 to 5.00 eggs plant $^{-1}$ in vegetative stage and 0.67 to 5.33 eggs plant $^{-1}$ in podding stage while larval abundance ranged from 3.33 to 7.67 larvae plant $^{-1}$ during vegetative stage and from 3.00 to 7.33 larvae plant $^{-1}$ during podding stage. Maximum oviposition was observed in ICCV 09118 during vegetative stage and in ICCV 14364 during podding stage. ICCV 09314 recorded least larval load during vegetative stage while ICCV 5383 harboured least larvae plant $^{-1}$ during podding stage.

The genotype ICC 14364 harbored large number of larvae plant $^{-1}$ both during vegetative and podding stages which also recorded sufficiently more number of eggs plant $^{-1}$ during both the stages. The genotype ICCV 09104 recorded least number of eggs (1.33 and 1.00) per plant both in vegetative and podding stages, respectively whereas the genotype ICCV 09314 recorded least larval load (3.33) both at vegetative and podding stages. The pod damage among the test entries ranged between 5.84

Table 1. Field screening of twenty five chickpea genotypes against pod borer, *H. armigera*

S.No	Genotype	Days to 50% flowering	Eggs per plant		Larvae per plant		Pod damage(%)	Seed yield (kg ha^{-1})
			Vegetative stage	Podding stage	Vegetative stage	Podding stage		
1	ICCV 9308	44.33	2.00	3.00	5.67	5.00	12.99	1115.67
2	ICC 15996	44.00	2.67	2.00	5.67	4.33	15.18	536.00
3	ICC 5360	44.33	3.67	4.00	5.67	5.33	14.98	1498.67
4	ICC 506	48.33	3.33	4.00	6.00	4.67	12.44	862.33
5	ICCV 09116	46.67	3.67	2.67	4.67	5.00	12.16	1173.67
6	KAK 2	46.00	3.33	2.00	4.67	4.67	11.42	615.67
7	ICCV 86111	46.00	2.67	2.67	6.00	4.67	10.68	844.33
8	ICC 14872	44.00	1.33	2.67	4.33	5.67	11.27	1072.00
9	ICC 10807	48.33	3.33	2.67	6.67	6.67	10.74	1202.00
10	ICCC 37	43.33	3.33	4.00	3.67	6.00	18.54	886.33
11	ICCV 95334	45.67	2.33	3.00	6.67	4.33	12.21	805.67
12	ICCV 09106	48.00	4.33	3.00	4.67	6.33	7.16	928.33
13	ICC 14364	48.33	4.67	5.33	7.67	7.33	11.94	521.00
14	ICC 86105	45.33	1.33	1.33	5.00	4.67	20.54	637.67
15	ICC 09317	43.67	3.33	3.67	5.67	5.33	5.84	509.33
16	ICC 11574	48.33	3.67	2.67	5.67	5.33	22.43	729.67
17	ICC 5034	44.33	1.67	3.00	4.33	6.00	10.37	975.33
18	ICCV 08311	51.00	2.33	0.67	6.00	3.33	10.96	1168.67
19	ICC 5383	43.67	2.67	2.00	6.67	3.00	6.43	592.67
20	ICCV 09314	48.67	2.33	2.33	3.33	3.33	6.93	942.00
21	ICCV 10	47.33	2.00	1.67	5.67	5.00	7.51	531.33
22	ICC 3137	50.00	4.67	2.33	5.33	6.67	11.74	1378.00
23	ICC 5282	46.67	2.00	2.33	5.67	6.00	12.07	709.67
24	ICCV 09118	50.33	5.00	2.00	7.00	5.67	15.28	866.00
25	ICCV 09104	48.00	1.33	1.00	4.33	4.00	7.99	985.67

and 22.43%. The differences among the entries with respect to pod damage were significant, though marginal. Significantly lowest pod damage of 5.84% was recorded in ICC 09317 followed by ICC 5383 (6.43%). The genotype ICC 11574 recorded highest pod damage of 22.43% followed by ICC 86105 (20.54%). Among the entries, ICC 5360 recorded significantly high yield of 1498 kg ha^{-1} followed by ICC 3137 (1378 kg ha^{-1}).

The results revealed that entry ICC 10807 though recorded moderate egg load, larval abundance and moderate pod damage of 10.74%, gave sufficiently higher yield of 1202 kg ha^{-1} which is on par with the high yielding genotypes. The entry ICCV 09314 though recorded low egg load, low larval abundance and low pod damage per cent, exhibited relatively low yield of 942 kg ha^{-1} which is lower than ICCV 08311, ICC 10807 and ICC 3137. Another genotype ICCV 09116 which recorded moderate egg load, high larval count and sufficiently higher pod damage of 12.16% exhibited significantly higher yield (1173kg ha^{-1}). These differences could be due to differences in crop phenology and differential insect host interactions. Similar results were reported by earlier workers (Gumber *et al.,* 2000).

The study indicated that there was only marginal, though significant difference in pod borer damage among the test entries. However, none of the entries showed tolerance to the pod borer. These results are in accordance with the earlier findings of Yelshetty (1996) and Singh and Yadav (1999).Though, the entries ICCV 86111, ICC 10807, ICC 5034 and ICCV 08311recorded equivalent pod damage of about 10%, their yield levels differed significantly. Both the lower (ICCV 86111) and the higher yielders (ICC 10807) were among this group. This indicated that the entry ICC 10807 though suffered pod borer damage of 10.74%, it was able to give significantly higher yield. This could be probably due to its ability to tolerate damage i.e., good recovery resistance following *H. armigera* damage. Similar might be the reason with ICCV 08311 and ICC 5360. Existence of all four mechanisms of resistance *viz.*, antixenosis, antibiosis, tolerance and avoidance were reported in various pulse crops. (Dua *et al.,* 2005). The above study revealed that certain genotypes like ICCV 09116, ICC 10807, and ICC 5360and ICCV 08311 inspite of suffering from moderate pod borer damage gave superior yields and can be recommended wherever pod borer is a major problem.

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