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LOSSES IN GRAIN YIELD DUE TO INFESTATION OF *HELICOVERPA ARMIGERA* (HUBNER) ON CHICK PEA CROP SOWN AT TWO DIFFERENT DATES

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ABSTRACT

The infestation and losses in grain yield due to *Helicoverpa armigera* (Hubner) were determined in four chickpea varieties *viz.* Vijay, Vaibhav, JG–74 and ICC–37 in normal and one month late sown crop during 2009–10. Mean larval population was found significantly higher (4.40 larvae / m. row length) late sown crop than normal sown crop (2.97 larvae/ m. row length). Among the varieties sown on normal date maximum larval population was found in ICC–37 (3.72 larvae/ m. row length) and minimum in Vijay (2.11 larvae/ m. row length) but in late sown crop maximum larval population was recorded in ICC–37 (4.94 larvae/ m. row length) and minimum in JG–74 (3.28 larvae/ m. row length). Overall mean pod damage was higher in late sown crop (27.15%) than normal sown (11.38%). Among varieties, maximum and minimum pod damage was observed in ICC–37 (14.27%) and JG–74 (11.71%) in normal sown crop, while in late sown crop it was observed in variety Vijay (34.74%) and ICC–37 (18.80%). Overall mean grain yield was higher in normal sown crop (1809.03 kg/ha) than late sown crop (1350.59 kg/ha). Overall varietal performance was better in 1st date sown crop with highest grain yield of 2055.55 kg/ha in JG–74 and lowest of 1597.23 kg/ha in ICC–37; where as in the late sown crop highest and lowest grain yield was recorded in JG–74 (1444.45 kg/h and Vijay (1250.00 kg/ha) respectively.

Key words: Grain yield, *Helicoverpa armigera*, Chickpea

INTRODUCTION

Chickpea is attacked by 57 species of insects, about half a dozen of which are considered to be of economic significance. However, the gram pod borer, *Helicoverpa armigera* (Hubner), which is the most important pest causes 70 per cent damage. The gram pod borer attacks the crop right from seedling stage and reduces the total foliage area of the crop as a result the photosynthesis is affected and the crop takes more period to complete the vegetative growth. Considerable losses are also caused at later stage of the crop due to feeding on developing grains. The first and second larval instar damage the crop by making scratches due to scribbling on leaves and pods. Third instar larvae feed on the leaves, flower buds, flowers and on pods at pod formation. Third and fourth instar larvae feed on developing grains with whole body or anterior half portion of the body inserted inside the pod.

MATERIAL AND METHODS

This experiment was conducted to study the incidence of *H. armigera* in chickpea sown on two different dates *viz.*, 3/12/2009 (normal) on 3/01/2010 and in four popular varieties namely JG–74, Vijay, Vaibhav and ICC–37. The experiment was conducted in split plot design with three replicants. The net plot size was $6m^2$ with a spacing of 30x10 cm. Nitrogen @20 kg & P_2O_5 @ 50 kg was applied at vegetative stage of the crop.

Observations were recorded for total number of larvae at 15 days interval from 1m. row length at three spots from each plot. The total number of pods and damaged pods were also counted for recording mean infestation of pest at the time of harvesting along with yield.

RESULTS AND DISCUSSIONS

Larval population: The mean larval population was found to be significantly higher (4.40 larvae/ m. row length) in late sown crop than to 1st normal sown crop (2.97 larvae/ m. row length).

Among the varieties, in case of normal sowing highest larval population in ICC–37 (3.72 larvae/ m. row length) and lowest in Vijay (2.11 larvae/ m. row length) was recorded In the late sown crop even though non significant differences between the varieties were seen, it was maximum in ICC–37 (4.94 larvae/ m. row length) and minimum in JG–74 (3.28 larvae/ m. row length) (Table.1).

Table 1. Effect of sowing dates and varieties on the population of *H. armigera* larvae

Date of sowing	Larval population				Mean
	JG–74	Vijay	Vaibhav	ICC–37	
D1					
3/12/2009	3.61	2.11	2.44	3.72	2.97
D2					
3/01/2010	3.28	4.67	4.72	4.94	4.40
Mean	3.44	3.39	3.58	4.33	

Thus, it can be concluded that the variety ICC–37 horboured maximum larval population on both dates of sowings, showing maximum susceptibility to the attack of *H. armigera* under the present agro–climatic condition of this area.

Overall percent pod damage: Overall mean percent pod damage was higher in late sown crop (27.15%) in comparison to normal sown crop (11.38%).

In normal sown crop maximum and minimum pod damage was observed in ICC–37 (14.27%) and JG–74 (11.71%), while in the late sown crop maximum and minimum pod damage was observed in variety Vijay (34.74%) and ICC–37 (18.80%) (Table 2 & 3).

Table 2. Effect of sowing dates an varieties on mean pod damage

Treatment	Percent Pod damage	Yield (kg/ha)
Date of sowing		
D1 (3/12/2009)	11.38(19.73)	1809.02
D2 (3/01/2010)	27.15(31.37)	1350.70
SEm±	1.36	25.87
CD	6.11	116.40
Variety	Percent Pod damage	Yield (kg/ha)
JG–74	18.48(24.85)	1750
Vijay	23.8(28.25)	1500
Vaibhav	18.23(23.25)	1611.11
ICC–37	16.54(23.87)	1458.33
SEm±	1.46	117.64
CD	4.50	362.53

Grain yield: Overall mean grain yield was higher in normal sown crop (1809.03 kg/ha) than late sown crop (1350.59 kg/ha).

As far as the overall varietal performance based on two different dates of sowing was concerned, in the normal sown crop highest grain yield was recorded in JG–74 (2055.55 kg/ha) and lowest in ICC–37 (1597.23 kg/ha). In late sown crop highest grain yield was recorded in JG–74 (1444.45 kg/ha) and lowest was in Vijay (1250 kg/ha) (Table 3 & 4).

Table 3. Interaction between different date sown crop and variety on grain yield

Date of sowing	Grain Yield			
	JG–74	Vijay	Vaibhav	ICC–37
D1 3/12/2009	2055.55	1750.00	1833.33	1597.23
D2 3/01/2010	1444.45	1250.00	1388.80	1319.45
Mean	1750.00	1500.00	1611.11	1458.33
		SEm±		C.D. at 5%
Comparison of varietal (means) at the same level of main plot		166.38		512.7
Comparison of Date of sowing (means) at the same level of variety		146.4		439.27

Table 4. Interaction between different date sown crop and variety on percent pod damage

Date of sowing	Percent pod damage			
	JG–74	Vijay	Vaibhav	ICC–37
D1 3/12/2009	11.71	12.86	6.65	14.27
D2 3/01/2010	25.25	34.74	29.80	18.80
Mean	6.16	7.93	6.08	5.51
		SEm±		C.D. at 5%
Comparison of varietal (means) at the same level of main plot		2.07		6.38
Comparison of Date of sowing (means) at the same level of variety		2.24		7.47

The present findings are in agreement with Lal *et al*., (1980), Prasad *et al*., (1985), Deka *et al*., (1989), Singh *et al*., (2002), Bharti and Prasad, (2003) who also reported that early sowing of chickpea received lower incidence of pest as well as higher yields of chickpea as compared to late sown crops. But Hossain *et al*., **(**2008**)** had a different opinion that both the early and late sown chickpea crops received higher pod borer damage and yielded lower, but mid sown (November 08 to 30) crops received less pod borer damage and produced higher yield.

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