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Studies on population dynamics of gram pod borer *Helicoverpa armigera* (Hubner) on chickpea (*Cicer arietinum* L.)

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Abstract

The present investigations entitled “Studies on population dynamics of *Helicoverpa armigera* (Hubner) on chickpea” was carried out at Students’ Instructional Farm of Narendra Deva University of Agriculture and Technology, Kumarganj, Faizabad during *Rabi*, 2016. It is evident from the data that the *Helicoverpa armigera* population was started since the vegetative stage and continued up to maturity stage of the crop. Larvae were found on whole plant. Due to its attack, the leaflets become cup shaped and yellow at the edges. Heavy infestation whole plant become dried and finally defoliate at last.

Helicoverpa armigera population were noticed for the first time during 46th SW of 2016 and respective mean population were 0.33 larvae/plant. The lowest mean population *H. armigera* is 0.33 larvae/plant was recorded during 46nd and 47th SW at the minimum temperature of 11.8 °C, maximum temperature of 29 °C, relative humidity 67.4 and there were no rainfall. Whereas maximum mean population of *Helicoverpa armigera* population of 5.67 larvae/plant was recorded during 08 SW of 2017 at the minimum temperature of 11.1 °C, maximum temperature of 27.9 °C, relative humidity 63.9 and there were no rainfall.

Keywords: Gram, *Helicoverpa armigera* and population dynamics

Introduction

India ranks first in the production and consumption of chickpea (*Cicer arietinum* L.) in the world. Chickpea is a most important pulse crop of India which is mostly grown under dry land condition with heavy cloudy soil. It is a rich source of nutritional values in the diet of Indian people because of containing 21.5 per cent protein, 64.5 per cent carbohydrates and 4.5 per cent fat which is comparatively deficient in the cereals and oilseeds. Its green leaves and pods are used as green vegetables and germinated grains for breakfast and other delicious dishes by the people in their daily meals.

Gram pod borer, *Helicoverpa armigera*, is considered as a notorious pest of chickpea. It also attacks pigeon pea, moong bean, lentil, soybean okra, maize, berseem, sunflower, sorghum, tobacco and tomato. Besides gram pod borer, it is also known as cotton bollworm, gram caterpillar, tomato fruit worm and tobacco bud worm. Pod borer is the most serious insect pest of Chickpea. Percent larval survival and pupation were the maximum on chickpea as compared to other host plants.

Materials and Methods

The gram crop regularly was monitoring for occurrence of insect-pests from germination to pre-harvest stage of the crop at Students’ Instructional Farm of Narendra Deva University of Agriculture and Technology, Kumarganj, Faizabad. Insect pest population was recorded on 5 randomly selected plants at weekly interval in each plot after germination (Table-1). The mode of observation for *Helicoverpa armigera* are the ETL (3 eggs or 2 larvae/plant) regular weekly recording selected plat of gram pod borer population was done from 50% flowering till harvested in the experimental field.

Table 1: Mean larval population of gram pod bore on chickpea Variety Pant-G 186 during Ravi 2016-2017

SW	Mean larval population	Temperature (°C)		RH (%)	Rainfall (mm)
		Min	Max		
44	0	14.1	31	65.4	0.00
45	0	12.7	29.7	67.2	0
46	0.33	11.8	29	67.4	0
47	0.33	11.8	27.3	67.4	0
48	0.67	12.2	25.8	79.9	0
49	1.00	11.7	19.2	86.6	0
50	0.67	9	19.5	86.9	0
51	1.33	7.5	23.2	74	0
52	1.67	10.6	20.1	84.1	0
1	2.33	10.2	18	88.2	0
2	1.00	4.9	20.1	66.3	0
3	1.33	5.9	22.4	68	0
4	0.33	9.1	23.7	76	16.8
5	1.67	8.2	21.9	80	0
6	2.67	8.4	24.5	69.3	0
7	4.00	9.9	25.7	70.3	0
8	5.67	11.1	27.9	63.9	0
9	3.67	11.5	28.8	57.8	0
10	2.33	12.3	27.8	62.4	0
11	1.67	10	29.4	56.8	0.7
12	0.67	15.5	33.4	50.9	0
13	0	18.8	37.8	52	0

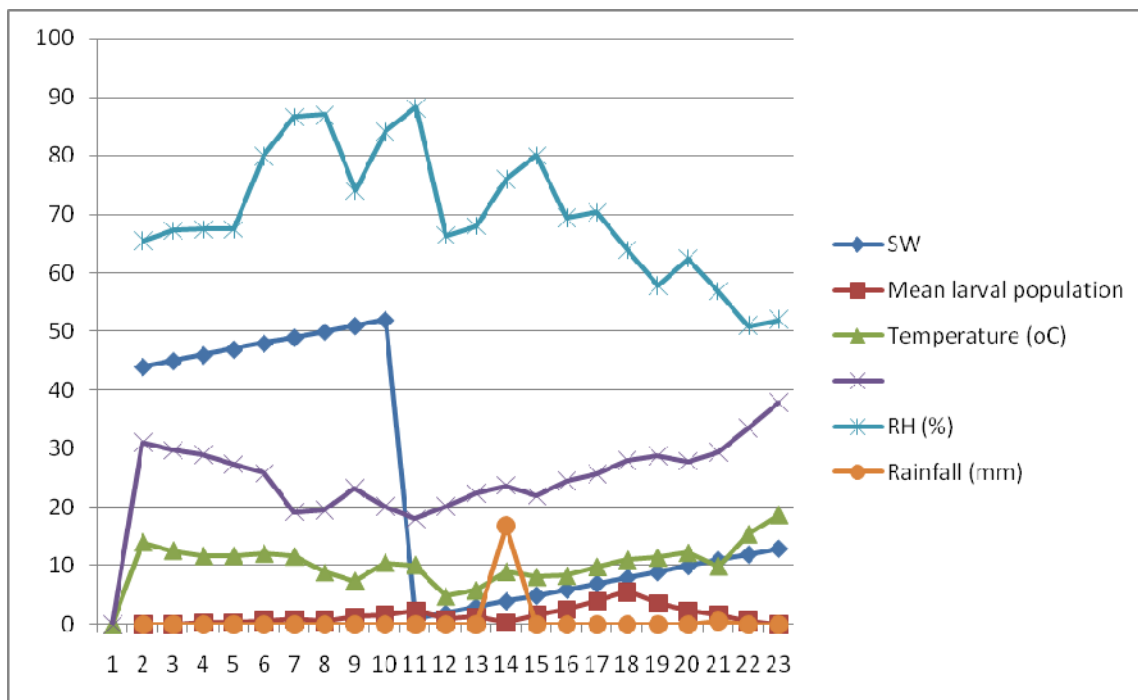


Fig 1: population of gram pod bore on chickpea Variety Pant-G 186 during Ravi 2016-2017

Results and Discussion

Studies on population dynamics of Gram pod borer revealed that population of *H. armigera* started since the vegetative stage and continued till harvesting stage of the crop. The population of *H. armigera* was noticed for the first time in 46th SW of 2016 and continued up to 13th SW of 2017. The minimum population of *H. armigera* of (0.33 larva/plant) and maximum population of *H. armigera* (5.67 larva/plant) were recorded during 46th SW of 2016 and 8th SW of 2017, respectively. The result of present studies corroborated with the findings of Gupta *et al.* (2002) [3] studies the infestation of *H. armigera* was recorded in March and April. The present findings in contrary with the finding of Kant and Kanaujia (2008) [5] who had reported that the larval population

of *H. armigera* was 76.7 and 46.81 plants during 14th SW in high density area and low density area, respectively. The present studies are also accordance with the finding of Dubey *et al.* (1995) [2] who studies the population dynamics of gram pod borer and peak activity in February and March of gram pod borer. The present observations are in centenary with the findings of Joshi and Barar (2003) [4] who recorded the incidence of *H. armigera* revealed that the pest did not appear from December, 2002 to February, 2003 on black gram and kabuli gram. The present investigation are in centenary with the findings of Krishnakant *et al.* (2007) [6] to reported that 9th SW with 0.8 and 0.6 larval/plant respectively in low and high density cops. Population reached at its maximum during 14th SW with 46.8

and 48.2 larvae/plant, respectively in above density crop.

The present studies in contrary with the finding of Singh and Ali (2006) [8] who reported that the larval activity of *H. armigera* continue throughout the crop season with two weeks, 1st in 45 SW and 2nd in 12 SW.

The present finding are partial agreement with the finding of Lomash and Bisht (2013) [7] to reported that the infestation of the pest started in the 2nd forth night of December and attended its peak in the first week of April and last week of march during 2009-2010, respectively. The larval population of the pest occurs throughout the growth period of crop with max at pod and grain formation stage

The present studies are partial agreement with Chatar *et al.* (2010) [11] who reported that pest appeared from 2nd week of December and attend a peak of 3.12 larvae/plant during 2nd week of January. The pest was active during the last week of December to 3rd week of January

Conclusion

The data recorded on population dynamics of *Helicoverpa armigera* during *Rabi*, 2016-17 have been present in Table-1 and Fig.-1. It is evident from the data that *Helicoverpa armigera* population was started since the vegetative stage and continued up to maturity stage of the crop.

The lowest mean population *Helicoverpa armigera* is 0.33 per cent was recorded during 46th SW of 2016 at the minimum temperature of 11.8 °C, maximum temperature of 29 °C, relative humidity 67.4 and there were no rainfall recorded Whereas maximum mean population of *Helicoverpa armigera* Larvae of 5.67 per cent was recorded during 08 SW of 2017 at the minimum temperature of 11.1 °C, maximum temperature of 27.9 °C, relative humidity 63.9 and there were no rainfall.

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