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Research Paper

Taxonomy and biology of Helicoverpa Armigera

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Abstract: The taxonomy and biology of Helicoverpa armigera was studied under field and laboratory conditions. H.armigera is a serious pest of Indian crops particularly of legumes and cotton and has a worldwide distribution. In Madhya Pradesh, it is observed throughout year thriving on dozens of crop including grain legumes. It remains active right from October to march with a peak incidence in February. The extensive damage is caused to the crop, seedlings, foliage, and fruits by various pests only H.armigera is regularly occurring and most damaging of all. The biology, population density and damage was studied in the fields of village Hilgan sagar (MP)
Keywords: pest, helicoverpa armigera, legumes.

INTRODUCTION

The Indian council of agricultural research (ICAR) has identified H.armigera as the single most damaging insect on cotton and legumes. The losses of crop from pest attack have been subject of very limited economic studies. It has been conventionally estimated that about 10-20% of crops produce in india is lost due to pest and disease. (tembhare 1997) gram pod borer was a serious pest on chick pea (cicer arietinum). It was found in the pods of chick pea. Gram pod borer was a polyphagous pest also found infesting pigeonpea pods. Cicer arietinum is most important pulse crop of India.

Pigeonpea is second most important pulse crop of india. pigeonpea being a leguminous plant is capable of absorbing atmospheric nitrogen and thereby restore lots of nitrogen in the soil (Parpia, 1981).

In madhya Pradesh, the pest severely defoliated legumes in year 1977-78 and reduced grain yield by 20-30%. In sagar (M.P.) the cotton ballworm in legumes was 67% amounting to a loss of 6,100/Ha (Lal and Rathore, 2001). The pest belongs to order: Lepidoplera, family: Noctuidae (Dudgeon, 1913).

These studies were undertaken with the objective to study the life style, population density and nature of damage caused by H. armigera in Sagar (MP), the paper describes the effects of H. armigera on crops along with the its biology and population density.

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MATERIALS AND METHOD

The crop selected for the study were chickpea and pigeonpea and the pest H. armigera and their life stages infecting these valuable crops were identified. The eggs and larvae were collected from the experimental site of village hilgan in Sagar district.

The eggs, adults, hymphs, and larvae were collected from their host plants in the fields. They were reared in the laboratory in glass jars covered with muslin cloth and larvae were fed on chickpea and pigeonpea leaves. Adult were fed with glucose soaked in cotton. Temperature and humidity were recorded during study period. The population density of the pest was studied in the field by the method applied after Odum (1971), Smith (1996).

RESULTS AND DISCUSSION

The present study was undertaken to investigate the life cycle and population density of insect pests on chickpea and pigeonpea from seeding stage upto harvesting. During this present study (2014-2015), the different stages of Helicoverpa armigera were collected from their host plants and identified-

Eggs – The eggs were small and spherical in shape. They were shining, yellowish when freshly laid but later their colo change to light black. Female laid eggs in groups of 4 to 10, sometime they were scattered (fig-1). The incubation period varied from 4 to 6 days.

Fig:- 1 Photograph showing egg of helicoverpa armigera on chickpea

Larva – The larva moults six time to became adult.

Second instar – These resembled the first instar larvae except that the head was darked and thorax was greenish (fig-2)

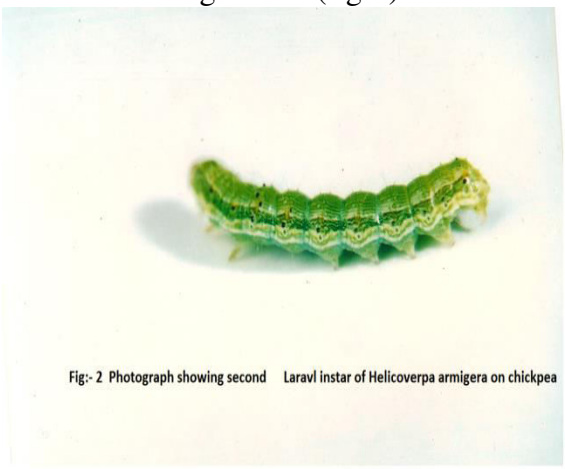
Fig:- 2 Photograph showing second Laravl instar of Helicoverpa armigera on chickpea

Third instar – During this stage the head was yellowish with brown dots black tubercles each bearing a seta became prominent (fig. 3)


Fig:- 3 Photograph showing third Laravl instar of Helicoverpa armigera on

Fourth instar – The larva appeared brownish green with pale brown head. The dorso lateral and lateral strips were dark brownish and chalky green respectively (fig. 4). The thorasic legs were black and abdominal legs were of yellowish colour.

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Fig:- 4 Photograph showing Fourth Laravl instar Helicoverpa armigera on

Fifth instar - The head colour was yellow with brown patches, the body was green yellow in colour. The prothoracic shield was yellowish with greenish black patches. The three dorsal longitudinal lines were brownish and the lateral lines were faint yellowish in colour (fig. 5).

Fig-5 :- Photograph showing fifth Larval instar of Helicoverph armigera on

Nine pairs of spiracles were distinct on the prothorax and first eight- abdominal segments.

Sixth instar - The body was green with brown tinge. The yellowish tubercle were with while setae. Nine pairs of spiracle were very promineat with black and encircled with white (fig. 6).The head was yellowish brown with irregular white lines.

Fig-6 :- Photograph showing pupa and adults of Helicoverph armigera on

Pupa - Freshly formed pupa was light green, some time yellowish green in colour but later on it turns into dark brown prior to emergence of month(fig.7).

Adult - The adult was brownish in colour, fore wings were pole brown with a series of dots on margins and black kidneys shape mark on the underside of each fore wings (fig.8). His total cycle from egg to adult was completed in 35 to 75 days depending on the climate.

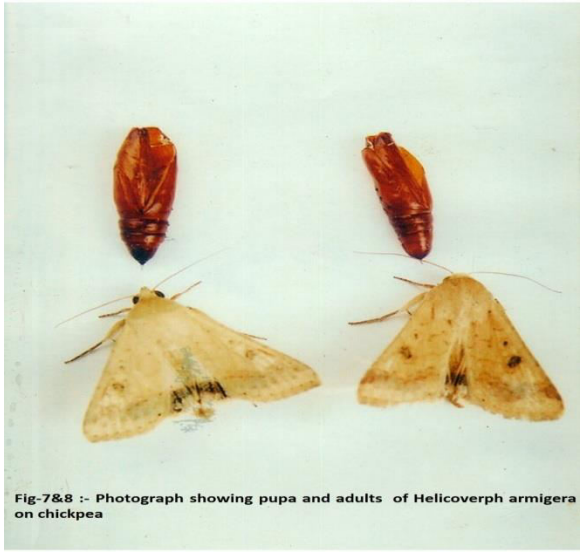

Fig-7&8 :- Photograph showing pupa and adults of Helicoverph armigera on chickpea

Helicoverpa armigera was a serious pest on chickpea. Observations reveal that the caterpillers of varying colours feed on developing grains by making hole on the

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pod and thrusting their heads inside. During 2014-2015, the pest was found from December 3 to 24 February 24. Pest population fluctuatied from December 24 to January 13, When the average maximum, minimum temperatures and relative humidity were 28.3˚C, 7.2˚C and 56% respectively (Table 1 and fig. 9).

Table 1- Showing population of *Helicoperva armigera* (In chickpea pods)

Period 2014-2015	Egg	Larvae	Adult
Dec. 03 to Dec. 23	55	42	01
Dec. 24 to Jan 23	88	230	21
Jan. 14 to Feb 23	45	122	02
Feb.04 to Feb. 24	05	63	01
Mean	48.25	114.25	6.25
±SD	29.6089	72.9807	8.5256
SE	14.80445	36.49037	4.262848

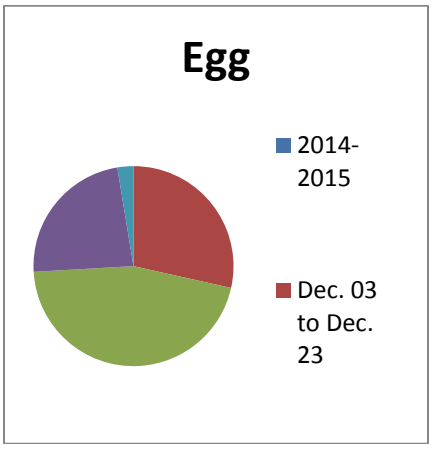

Fig. 9

Helicoverpa armigera was a polyphagus pest also found infesting pigeon pea pods. In 2014-2015, larval population of H. armigera ranged from 37 to 65 larvae/ 100 plants, The pest was found in the crop from December 03 to feb 12 (Table 2, fig.10).Highest In chickpea the total life cycle was completed in 35 to 75 days and pigeonpea in 28 to 70 days, depending on the climate. Eggs were small and spherical, larva moults

population was recorded from December 27 to January 19.

Table 2- Showing population of Helicoverpa armigera (In pigeonpea pods)

Period 2014-2015	Egg	Larvae	Adult
Dec.03 to Dec. 26	42	37	00
Dec. 27 to Jan 19	30	65	07
Jan. 20 to Feb 12	50	40	03
Total	122	142	10
Mean	40.6666	47.33333	3.33333
±SD	6.57717	14.1591	3.350132
SE	3.797446	8.175028	2.021549

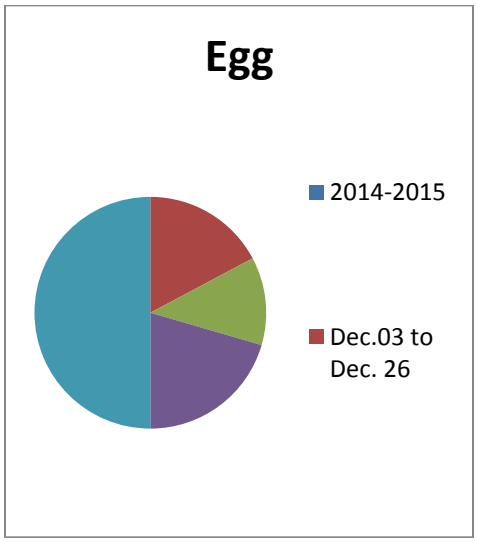

Fig. 10

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six times to become adult. Pupa was dark brown prior to emergence of moth. The adult was brownish in colour, fore wings were pole brown with a series of dots on margins and black kidney shaped mark.

During the study period it was found that the pest caused greater damage to chickpea than to pigeonpea. Earluer various workers Nair (1975), Nyiira (1978), Naresh and Singh (1984), Atwal and Dhariwal (2001) Nayer et.al. 2002, Demirumlant (2012) and Krinski *et. al.,* (2015) also reported that it as a polyphagous and sarious pest on a large number of cultivated crops and its life cycle depends on climate.

In confirmation with the present finding similar observation were reported by Lal (1996). It was damaging leaves tender, shoots, apical tips, flower buds and the pods. The present data indicates that pest caused losses so that adequate pest management could greatly increase production and profits from the existing crop.

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