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Biology of leaf webber and capsule borer, *Antigastra catalaunalis* at Raipur, C.G

Santoshi Choudhary, Sonali Deole and SS Shaw

Abstract

Present study was carried out in the laboratory at Department of Entomology IGKV, Raipur (C.G.) during 2018. Freshly laid eggs of leaf webber and capsule borer, *Antigastra catalaunalis* are conical in shape and white in colour. The egg measures about 0.40-0.49 mm in length and 0.20-0.25 mm in width. The fecundity ranged from 39 to 79. The incubation period ranged between 2 to 3 days with an average of 2.34 days. The total larval period completed in 9-12 days with an average of 10.51 days. The pupation occurred inside the webbed leaves and the total pupal duration ranged between 5-7 days with an average of 6.33 days. The duration of male pupae varied from 3 to 4 days, with an average of 3.42 days, whereas the duration of female pupa varied from 3 to 5 days with an average of 4.32 days. The total life cycle (egg to adult emergence) varied from 21 to 29 days with an average of 25.40 days.

Keywords: *Antigastra catalaunalis*, fecundity, pupation, sesame

Introduction

Sesame (*Sesamum indicum* L.) is an important oilseed crop and has been under cultivation since classical times. It is also known as Til, Gingely, Ajonjoli, Simsim, and Benniseed. Sesame belongs to family Pedaliaceae and commonly grown in the tropical and warm subtropical region (Bedigian and Harlan, 1986) [1]. The crop is highly tolerant to drought, grows well in most of the well-drained soils and is well adapted to different rotations. The plant genus consists of thirty seven species, of which *Sesamum indicum* L. is the predominant cultivated species. Sesame seeds are small and flattened and can vary in many colours.

One of the major obstacles in sesame production is the heavy "damage caused by various insect pests. Leaf webber and capsule borer, *Antigastra catalaunalis* is one of the major pests of sesame. This can cause damage up to ninety per cent yield. It attacks all parts of the sesame plant except the root. In the early stage of the crop, the caterpillar feeds on the tender leaves by binding the top leaves. In the flowering stage, the "larvae entered the bud and flower and feed inside the flowers." In the capsule stage, it bore and penetrates inside the capsule, feeding on developing capsule seeds and destroying the pod material partially or completely. "If the infestation occurs at a very early stage, the plant dies without any branch or shoot". A single caterpillar can destroy 2 to 3 plants in an excessive "week. If infestation occurs at a later stage", infected shoots persist without further growth.

Different insects have different forms of life cycles. The knowledge of life cycle is important for the management of insect pest because the habitat, habits and appearance of the insect can change dramatically throughout the life cycle.

Materials and Methods

The study was carried out in the laboratory at Department of Entomology IGKV, Raipur (C.G.) during 2018.

Insect culture: The insect larvae were collected from the sesame plants from the experimental field and kept in transparent glass jars covered with a fine muslin cloth secured with rubber band. The larvae were transferred to another clean jar containing fresh food for every 2-3 days till all the larvae pupated.

The pupae thus collected from each jar were kept separately in jars for the emergence of moth. The moths after emergence were kept in ovipositional glass jars. The inner surface of jars was lined with a black paper sheet, which provided clear visibility of eggs on the surface. 10% honey solution on a cotton swab was placed in each jar for moth feeding.

Eggs laid on the bottom were collected for further multiplication and study. These eggs were used as nucleus culture for mass rearing of *A. catalaunalis*. The egg diameter was measured by means of an ocular micrometer after calibration.

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Biology of *A. catalaunalis*

The biology of leaf webber and capsule borer, *A. catalaunalis* was studied under 26 ± 2 °C temperature and 70 ± 5 per cent RH. Twenty five eggs were collected from stock and kept in petri dishes for hatching. The newly emerged larvae were fed on newly emerged leaves of sesame and later on food was changed daily. Observations regarding the moulting, duration, size and number of each larval instar, pupal period, adult longevity and fecundity were recorded.

Result and Discussion

The following biological parameters were observed

Eggs: The freshly laid eggs by the female are conical in shape, white colour, laid in batches. The egg measures about 0.40-0.49 mm in length and 0.20-0.25 mm in width. The fecundity is 39-79 in numbers. The incubation period of the eggs under laboratory conditions ranged between 2 to 3 days with an average of 2.34 days.

Larva: The larvae after hatching fed on epidermal layer of the leaf tissue. The newly hatched caterpillar (first instar) was a tiny, cylindrical, semi translucent, cream coloured caterpillar with reddish brown head capsule. Caterpillar had four pairs of prolegs and one pair of anal proleg besides three pairs of thoracic legs. The first, second, third, fourth, and fifth instar larva measures about 4.5 to 5.5 mm, 7.15 to 9.5 mm, 11.15 to 13.0 mm, 13.50 to 13.90 mm and 14.5 mm to 16.5 mm, respectively in length. Fifth instar caterpillar which fed on leaves and other vegetative parts was dark green or pink in colour. The total larval period completed in 9-12 days with an average of 10.51 days. To characterize the webbing (spinning) behaviour of the larvae, spinning was observed directly, since larvae in the feeding stage start to web (spin) almost immediately when placed on a fresh leaf (Fraenkel and Fallil, 1981) [2].

Pupa: The pupation occurred inside the webbed leaves and the total pupal duration ranged between 5-7 days with an average of 6.33 days in the laboratory. The duration of male pupa varied from 3 to 4 days, with an average of 3.42 days, whereas the duration of female pupa varied from 3 to 5 days with an average of 4.32 days. The average length and breadth of pupa was 8.29 ± 0.40 and 1.36 ± 0.30 mm.

Adult: Adults were stout and medium in size. The colour varied from light reddish brown to dark reddish brown. The females lived slightly longer than the males. The total life cycle (egg to adult emergence) varied from 21 to 29 days with an average of 25.40 days. The adult female period was 5-7 days and male period was 4-6 days, respectively with an average of 6.16 days and 4.83 days.

Table 1: Duration of different life stages of leaf webber and capsule borer, *A. catalaunalis* on sesame crop under laboratory conditions

Biological stages	Range (days)	Mean
Fecundity (number)	39-79	58.66
Incubation period	2-3	2.34
Larval period	9-12	10.51
Pre Pupa	2-3	2.16
Pupal period	5-7	6.33
Male	3-4	3.42
Female	3-5	4.32
Total life cycle (Egg to Adult emergence)	21-29	25.40
Adult longevity		
Female	5-7	6.16
Male	4-6	4.83

The present findings are in agreement with the results of Pandey *et al.*, (2018) [3] who studied that the eggs are conical in shape and white in colour with length and width varied from 0.35 - 0.45 mm and 0.18 - 0.25 mm, respectively. Incubation period varied from 2.32 to 2.42 days. There were five larval instars and total larval period varied from 9.88 to 13.08 days. The pupal period lasted from 5.25 to 7.25 days. The average length and breadth of pupa was 7.29 ± 0.32 and 1.26 ± 0.29 mm. Adults were stout and medium in size. The colour varied from light reddish brown to dark reddish brown. The females lived slightly longer than the males. The present findings are in also agreement with the results of Choudhary *et al.* (2017) [4] who studied that the total life cycle of *A. catalaunalis* varied from 21 to 39 days with an average of 28.1 days. The incubation period varied from 47- 73 hours with an average of 60.6 hours. The larva passed through five instars on sesame leaves under laboratory conditions.

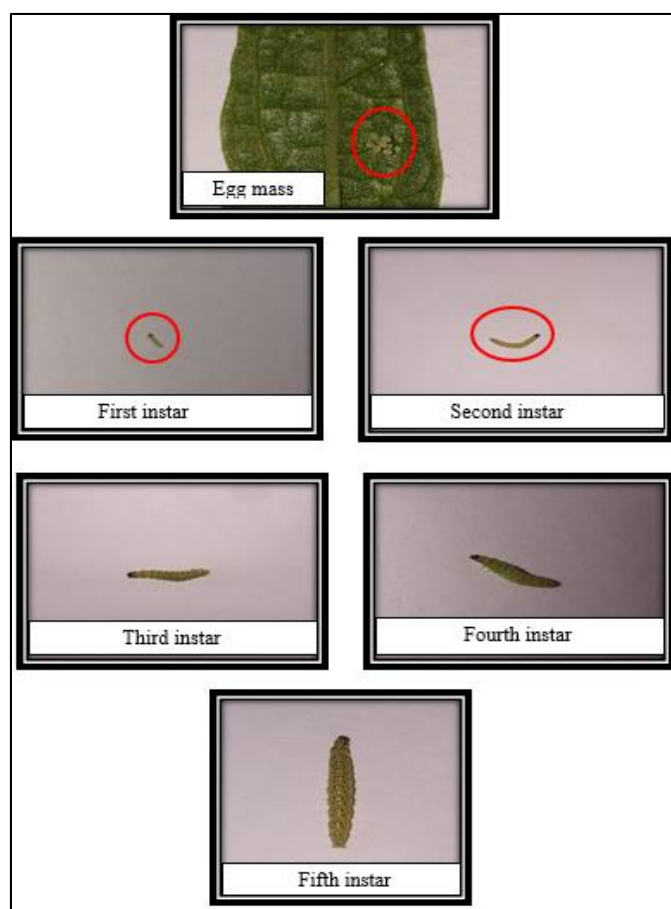


Fig 1: Egg mass and different larval instars of *Antigastra catalaunalis*.

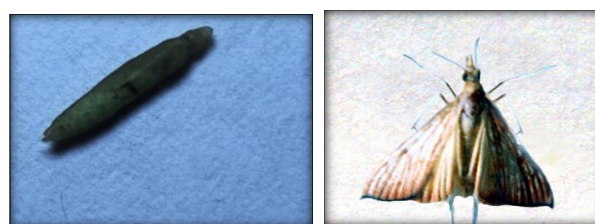


Fig 2: Pupa and adult of *Antigastra catalaunalis*

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