

# The Biology of the Pepper Top Shoot Borer *Laspeyresia hemidoxa* Meyr. (Eucosmidae: Lepidoptera)\*

A. VISALAKSHI AND K. V. JOSEPH \*\*

Division of Entomology Agricultural College and Research Institute, Vellayani

Received for publication April 10, 1964

Pepper (*Piper nigrum* L) is one of the most ancient and historic crops of India. Its original home is Kerala and the Kanara region of Mysore State. Being a valuable dollar earning commodity, it plays an important role in the economy of India as a whole. Annual pepper exports from India is valued at Rs. 25 crores. Among the insect pests affecting this crop in Kerala the top shoot borer, *Laspeyresia hemidoxa* Meyr. has in recent years been noted to cause serious damage to pepper. Except for some preliminary observations of Fletcher (1917) there is no other information on this insect.

The present paper embodies the results of some studies made on the biology of this insect.

The caterpillars required for the studies were collected from infested pepper plantations and reared in hurricane chimneys closed with muslin or in specimen tubes, on pepper vine cuttings. When the cuttings supplied became unfit the caterpillars were transferred to fresh cuttings.

## Egg

Many ovipositions trials were conducted to observe egg-laying, but no oviposition could be obtained. Egg could not be obtained from fields also.

## Larva

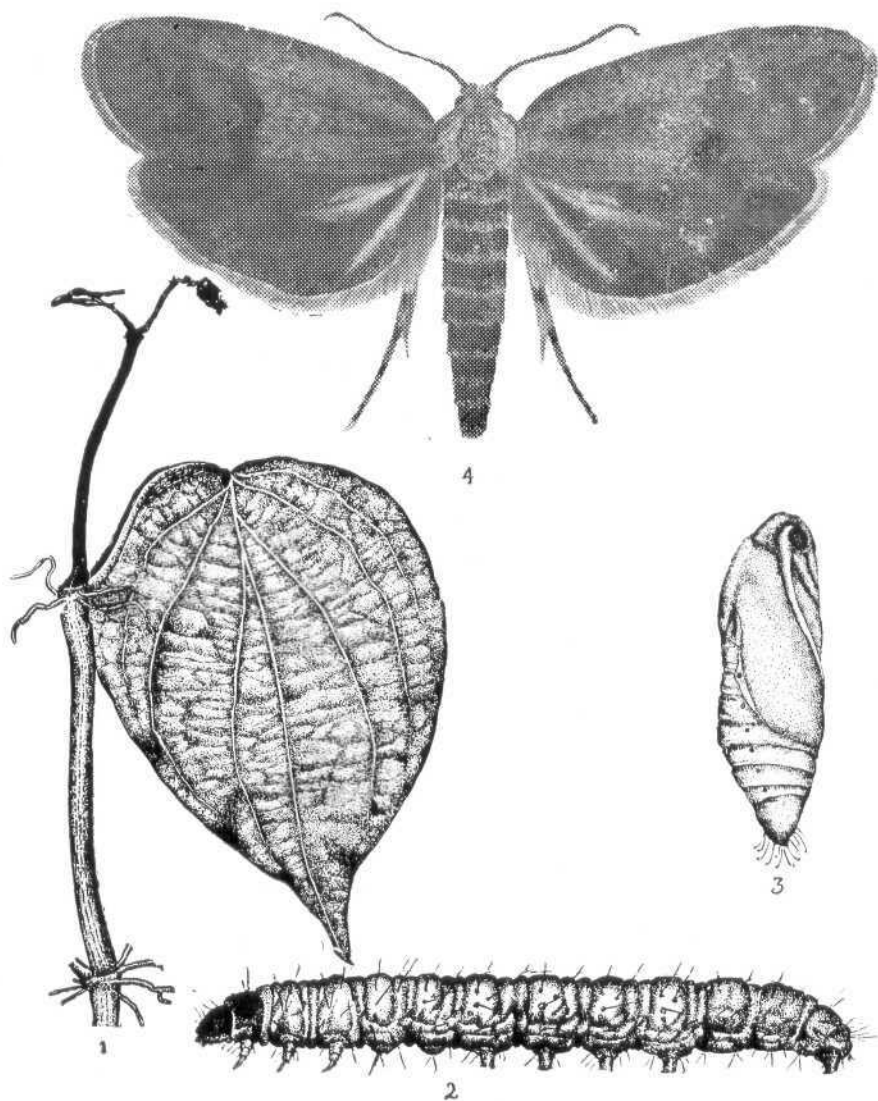
Starting from the smallest caterpillar collected from yield, five instars were observed. Generally the younger instars of the larva live within webbings of silken threads made by them on the surface of plants. The young caterpillar commences feeding by scraping the surface of the plants within the webbings. As the caterpillar grows it leaves the surface webbings and bores into the stem. When it has gained entry into the stem the whole of the internal tissue is eaten up in a short time. The part of the tunnel or larval burrow left behind is usually full with larval excreta and the head shields are seen mixed up with them.

Usually tissues within one internodal region of pepper vine is sufficient for one

---

\* Part of the Thesis submitted to the University of Kerala by the senior author in partial fulfilment of the requirements for the M. Sc. (Agri) degree, 1963

\*\* Research Assistant and Professor of Entomology (retired) respectively



Figs 1—4. 1. Nature of damage caused by *Laspeyresia hemidoxa* Meyr.  
 2. Full-grown caterpillar 3. Pupa 4. Adult

caterpillar to complete its development. The maximum larval period observed during September-October was 14 days. The full-grown caterpillar (Fig. 2) is slender, cylindrical, greyish green in colour with head, prothoracic shield, anal plate and leg brownish black. It measures 12 to 14 mm long and 1 - 1.5 mm broad across the thorax and is scarcely covered with small setae.

#### *Pupa* (Fig. 3)

When full-fed the larva stops feeding, makes an exit hole near the node and constructs a cocoon within the larval tunnel, with excrement, plant debris and silk. The cocoon is oval, elongated and almost black in colour with an outer tough surface and a smooth interior. It measures about 1.8 mm in length and 1 mm in width. Cocoon is oriented with the cephalic and close to the exit opening. The caterpillar then becomes shrunken and paler in colour and remains in the prepupal case for about 2 days.

At times pupation takes place outside the stem and even on the surface of the stand-ard close to the attacked stems. In the laboratory when reared in specimen tubes, pupation takes place on the sides of the tube or on the cotton plugs. The pre-pupa gets transformed into pupa after 2 days of resting. Pupa is elongate, subfusiform with rounded cephalic end and pointed anal end and deep brown in colour, the abdomen being a shade lighter than the rest of the body. During the months of September, October and November pupal period ranges from 8-10 days, the average being 9.16 days.

#### *Adult* (Fig. 4)

The adult emerges from within the stem by pushing its way through the exit hole.

Just before emergence the pupa itself wriggles out of the cocoon and remains projecting out of the exit hole. Then the pupal shell breaks and the moth comes out. The adult moth has been described by Meyrick (1931)

#### *Longevity of the adults*

Longevity studies under laboratory conditions showed that when starved the male moth survives to an average period of 3.5 days and female for 3.2 days and when fed, for 6.3 and 5.2 days respectively. The maximum longevity for a male was found to be 8 days in September under fed conditions and 4 days when starved, while for female it was 7 days and 4 days respectively.

#### *Sex ratio*

A preponderance of females was observed in the field population of the pest the proportion of males to females being on an average 1: 2. 13.

#### *Seasonal occurrence*

From collections of different stages of the pest regularly made from pepper plantations during the period August, 1962, to April, 1963, it was seen that during the month August-December the pest is abundant in the field. These months are cooler forming part of the monsoon season and this is the period when fresh succulent shoots are available. From January onwards there is a decline in the field population of the pest and this period is characterised by high temperature and lack of succulent shoots.

#### *Nature and extent of damage*

The caterpillar damages by feeding on the tender leaves and by boring into the tender stems. The damage to leaves is relatively small, compared to the damage

caused to the tender vines. As a result of the caterpillar boring into the terminal shoots, the growing point gets dried up and may remain attached to the support or may fall off. (Fig 1) During rainy season the attacked portion gets decayed. Consequent on the death of the growing point, the growth of the vine is arrested. As new shoots grow out from axillary buds, they may also get attacked by the caterpillars. Repeated attack of the top shoots may result in the whole vine getting stunted and stoppage of growth. This condition is more serious especially in the case of young plants. In older vines, however, the terminal shoots which are close to the standard are attacked, more than those of the hanging side shoots. The shoots of the vines creeping on the ground are seldom attacked.

#### *Status as a pest*

*L. hemidoxa* M. appears to be a persistent pest, its attack often causing serious damage to young growing vines and suppression of normal vigorous growth in older vines. In Kerala, this pest occurs throughout the State. In the Malabar area, on several occasions, drastic chemical measures had to be adopted to control the pest. In view of the destructive nature of the pest, its persistence throughout the year and its widespread occurrence in Kerala, *L. hemidoxa*

Meyr. can be ranked as a major pest of pepper.

#### *Natural enemies*

Three species of Hymenopterous parasites were obtained from larvae collected from the field and reared in the laboratory. They are *Apanteles* sp. (Braconidae) and *Euderus* sp. (Eulophidae) both solitary endoparasites parasitising later stages of the larvae and *Goniozus* sp. (Bethyilidae) an ectoparasite attacking early stage caterpillars.

#### **Acknowledgement**

Thanks are due to Dr. C. K. N. Nair, Principal and Additional Director of Agriculture (Research), Agricultural College and Research Institute, Vellayani, for the facilities provided for the work and to Dr. M. R. G. K. Nair, Professor of Entomology, for his keen interest and helpful suggestions in carrying out this work.

#### **References**

1. Fletcher, T. B. (1917) Insect pests of Crops. *Rept. Proc. 2nd. Ento. Meeting, Pusa.* 36.
2. Meyrick, E. (1931) Exotic Microlepidoptera. *Marl borough. Wilt.* 4: 161-192.