



## Further notes on the life history of *Hellula undalis* fabricius from Punjab, India

Deepinderpal Singh and H.S. Rose

Department of Zoology, Punjabi University, (P.B.) INDIA

Shaheed Udham Singh College of Research and Technology, Tangori (P.B.) INDIA

**ABSTRACT :** During the field survey collected different immature stages viz., eggs, larva, pupa and adult of the species *Hellula undalis* Fabricius in the field from the 4 different localities of Punjab and also reared in the laboratory during September, 2005 to February, 2007. The measurements of different larval instars and the longevity of the adult under the laboratory conditions have been studied. The detailed account on different life history aspects of the species is described during present study.

**Keywords :** *Hellula undalis*, host plant, larva, pupa, Punjab

### INTRODUCTION

The family Crambidae is of great economic importance as it includes a large number of species whose larvae feed on important agricultural crops and in the result cause serious damage to the valuable products. Some species are also associated with forest vegetation and ornamental plants, posing serious damage as defoliators (Atwal and Dhaliwal, 2002). *Hellula undalis* Fabricius is a serious pest of cabbage and other cruciferous crops in Punjab and cause severe damage to the crops during the months of September to February (Allyson, 1981b). Damage is most severe between transplanting and the heading stage of cabbage even though the larvae are present in the field throughout the crop (Sivapragasam and Aziz, 1990). In order to gather more data on the species, under reference, field and laboratory observations have been made during September, 2005 to February, 2007.

### MATERIAL AND METHODS

The study was carried out in the four different localities of Punjab viz., Amargarh, Malerkotla, Patiala, and Ludhiana during September, 2005 to February, 2007. Many collection field surveys were conducted to collect immature stages such as the eggs, larvae and pupae from the field. The mature and fertilized female moths were collected from the light sources as well as by using specific light trap also. The material thus collected, transferred to a transparent container. A cotton ball soaked in water and food plant was placed in the container. The container was then covered with a thin muslin cloth. The egg laying occurs either on the walls of the container or on the food plant clippings. The observations have been made in laboratory conditions to study various life history aspects such as egg laying, larval coloration, larval behaviour, larval duration, pupal formation, pupal duration and adult longevity.

### REARING

The eggs masses and different larval instars were placed in petridishes as well as in transparent containers of different sizes depending upon the size of the larvae. The containers containing fully mature larvae were then shifted to bigger ones provided with a bed of water-dipped bed of cotton covered with a layer of filter paper for purpose of pupation. The freshly emerged adults then shifted to insect rearing cages, which were provided with 10% sucrose solution to record their longevity.

### RESULTS AND DISCUSSION

The following observations were made during study period as :

**Eggs.** The length of the egg is  $0.41 \pm 0.02$ mm and width is  $0.84 \pm 0.01$ mm. The eggs are ovoid in shape. They are pinkish in colour and slight flattened from the surface of deposit. When laid eggs are pearly white in colour and then turn pinkish and then turn brownish-red with the dark head of the larvae visible at one end just before hatching (Harakly, 1968). Eggs are laid singly, or in clusters of 4 or 5 on the lower surface of leaves of cabbage near the bud. The total incubation period of the egg is  $3.25 \pm 0.65$  days at room temperature and relative humidity about 60-70%. Egg laying begins within 24 hours of adult emergence and continues for 3 to 10 days. Each female lays an average of 27 eggs per day and 175 eggs during her life time (Sivapragasam and Aziz, 1990). The eggs may be scale like in different species of the families Pyralidae, Tortricidae and Gelechiidae or may be cylindrical as in the family Geometridae.

**Larvae.** Caterpillars of this pest are grayish yellow in colour and five longitudinal stripes are present on dorsal surface, which are purplish and reddish brown in colour.

The head and the prothoracic shield are black in colour containing black patches on it. The caterpillars are feed in the heart of the cabbage. There are four larval instars. The duration of the first instar larvae is  $3.50 \pm 0.45$  days, second instar is  $2.75 \pm 0.3$  days, third instar is  $2.45 \pm 0.04$  days and the fourth instar is  $4.92 \pm 0.98$  days. The width of the head of the fourth instar is  $0.58 \pm 0.05$  mm, length of the larval body is  $7.50 \pm 0.25$ mm and the larval body width is  $1.16 \pm 0.15$ mm. The average total larval duration is  $15.63 \pm 1.82$  days but on cauliflower it may require only 10-13 days. The duration's of the first, second, third and fourth larval instars are 3 days, 2 days, 3 days and 2 days respectively (Kessing and Mau, 2007).

**Pupae.** The pupal length is  $5.70 \pm 0.30$ mm (and width is  $2.00 \pm 0.2$  mm. The full grown caterpillars stops feeding and become sluggish and spin cocoon between leaves and at the entrance of the feeding tunnel whereas the other fully mature larvae hide itself in the soil and pupate their. Then it changes itself in to brown colored pupa. The segmentations of different body parts are seen clearly. The pupal duration is  $6.50 \pm 0.50$  days. The total generation time is  $23.37 \pm 2.97$  days.

**Adult.** Grey and brown suffused with fuscous, forewing with pale dentate sub basal line, a pale apical spot and series of pale and dark marginal specks, hind wing pale with slight fuscous suffusion on apical area (Hampson, 1896). The longevity of the adult is  $6.15 \pm 0.25$  days. Emergence of the adult moth generally occurs in the evening and rarely during the day time. Adults looks for mate 3 to 4 hours after emergence. Like other moths, the adults are primarily active at night. They fly readily, but are more or less obscure in their habits, and are not often seen in cabbage fields (Fullaway & Krauss, 1945).

**Host plants.** The larvae attacks cabbage (*Brassica oleracea*), cauliflower (*Brassica oleracea* var. *botrytis*), radish (*Raphanus sativus*), knol-knol (*Brassica oleracea* var. *caulorapa*), beet root (*Beta vulgaris*) and the weed,

*Gynadropsis pentaphylla* (Capparidaceae) (Atwal and Dhaliwal, 2002).

## ACKNOWLEDGEMENTS

The authors are thankful to Ministry of Environment and Forests, GOI, New Delhi for funding the project on moths.

## REFERENCES

- Allyson, S. (1981). Description of the last instar larvae of the cabbage webworm *Hellula rogatalis* (Lepidoptera: Pyralidae), with a key to larvae of North American species of *Hellula* Guenée. *Can. Ent.* **113**: 361-364.
- Atwal, A.S. and Dhaliwal, G.S. (2002). *A text book on Agricultural Pests of South East Asia and their Management*. Kalyani Publishers, Ludhiana, pp.177-434.
- Fullaway, D.T. and Krauss, N.L.H. (1945). *Hellula undalis* (Fabricius.). In: *Common Insects of Hawaii*. Tongg Publishing Company, Honolulu, Hawaii. 228 pages.
- Hampson, G.F. (1896). *Fauna of British India including Ceylon and Burma, Moths.* **4**: Taylor and Francis Ltd., London. 594pp.
- Harakly, F.A. (1968). Biological Studies on the Cabbage Web-Worm, *Hellula undalis* Fabr. *Bull. Soc. Ent. Egypte.* **52**: 191-211.
- Kessing, J.F.L. and Mau, R.F.L. (2007). A Study of the Identity, Larval Stages, and Natural Enemies of *Hellula undalis* (Fabricius) (Lepidoptera: Pyralididae) in Hawaii. *Bull. Soc. Ent. Egypte.* **52**: 191-211.
- Sivapragasam, A. and Aziz, A.M.A. (1990). Cabbage Webworm on Crucifers in Malaysia. Chapter 8, In: *Diamondback Moth and Other Crucifer Pests*. pp. 75-80.