BIOLOGY OF *Hemiptarsenus varicornis* (Girault), A PARASITOID ON THE SERPENTINE LEAFMINER, *Liriomyza trifolii* (Burgess) (AGROMYZIDAE: DIPTERA)

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ABSTRACT: Studies were conducted on the biology of *Hemiptarsenus varicornis* (Girault), an indigenous, endo-larval parasitoid of the serpentine leafminer, *Liriomyza trifolii* (Burgess). French bean (*Phaseolus vulgaris* L.) plant grown in small plastic cup and infested by *L. trifolii* at the two leaf stage, was exposed to *H. varicornis* adults in a ventilated plastic jar. Forty eight hours after exposure, the parasitised larvae of *L. trifolii* were observed under a stereo binocular microscope for parasitoid development. The parasitised *L. trifolii* larvae were identified by the presence of pinkish patch towards the posterior end of the host or by the presence of oviposition punctures. Egg stage was not clearly visible. There were four larval instars with a total larval period of 4-5 days. Pupation was seen inside the leaf mine. The pupal period was 5-6 days. The adult was a small, shiny green coloured insect with 7-8 days longevity. Our studies indicated the feasibility of the parasitoid being successfully reared in the laboratory.

Key Words: *Hemiptarsenus varicornis*, parasitoid, *Liriomyza trifolii*

INTRODUCTION

Serpentine leafminer, *Liriomyza trifolii* (Burgess) (Agromyzidae: Diptera), a native of Southern United States and Central America, was accidentally introduced into India along with plant materials during 1991-92. It is a polyphagous pest affecting >79 host plants including fibres, pulses, vegetables, ornamentals, green manures, fodder, narcotics and weeds comprising 16 families (Srinivasan et al., 1995). The infestation is generally severe on cucurbits, a few legumes and tomato. *Liriomyza trifolii* is reported to develop resistance to most insecticides within 8-10 generations. Throughout the world, *L. trifolii* management has been more successful using exotic natural enemies especially parasitoids such as *Diglyphus bengi* (Ashmead). Indigenous parasitoids may play a role in suppression of an introduced pest such as *L. trifolii*. Among the indigenous natural enemies of *L. trifolii*, *Hemiptarsenus varicornis* (Girault) (Eulophidae: Hymenoptera), an endo-larval parasitoid is the most prevalent with 5-15% natural parasitism in South India. Studies on the biology of *H. varicornis* on *L. trifolii* were initiated, as information was lacking.

MATERIALS AND METHODS

In the laboratory a stock culture of *L. trifolii* was maintained on potted French bean
plants at 23-26°C temperature and 60% relative humidity.

**Biology of *H. varicornis***:

A plastic jar (10 cm dia.) with perforated lid was used for exposing *L. trifolii* to its larval parasitoid, *H. varicornis*. French bean seeds (also called string bean), (variety *Arka Komal*), were sown in small plastic cups (8 cm dia.). The bean plant at the two leaf stage, was exposed for one to two days to *L. trifolii* adults for oviposition in a wooden cage (50 x 65 x 35 cm). First instar larvae of *L. trifolii* present in minute, delicate mines on bean leaves (2-3 days after oviposition) were exposed to 15-20 *H. varicornis* adults for 48 h in a plastic jar (10 cm dia.) with a perforated lid. Adults were provisioned with 10% honey as food. After 48 hr, the bean plant was removed from the plastic jar.

The leaves were then collected and the parasitised larvae of *L. trifolii* were teased under a stereo binocular microscope to observe the different stages of the parasitoid. The exposed leaves were observed every 24 hr for 6-7 days to observe the different larval instars and the pupa of *H. varicornis*. The morphological features of the different larval instars and pupa of *H. varicornis* were recorded. Using a precalibrated ocular micrometer, the measurement of the different larval instars and pupa were also recorded.

**RESULTS AND DISCUSSION**

*Hemiptarsenus varicornis* was observed to be an internal parasitoid on *L. trifolii*. There was successful parasitism within 48 hours of exposure. The parasitism of *L. trifolii* was indicated by the presence of a slightly pinkish patch towards the posterior end of the host or by the presence of oviposition punctures on the body of the host. The egg stage was not clearly visible.

There were four larval instars with a total larval period of 4-5 days. The first instar larva was small and hyaline measuring 108 microns. The second instar was relatively longer measuring 230 microns with a yellow longitudinal, dorsal streak in the centre of the body. The third instar was still larger (533 microns), spindle shaped with a brownish yellow streak covering the entire body. However, the anterior and the posterior ends were hyaline. The fourth instar was smaller in size compared to the third instar, measuring 270 microns and it had a thick black streak along the centre of the body.

Pupa of *H. varicornis* was seen inside the leaf mine, often covered with the host larval skin. The pupa was naked and dull black coloured in the early phase but later turned dark black and measured 270 microns. The pupal period was 5-6 days.

The adult was a small, shiny metallic green coloured insect, 1-2 mm in length. The terminal antennal segments were expanded which is a characteristic feature of this genera. Adult longevity was 7-8 days.

**REFERENCES**