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OVIPOSITION BEHAVIOUR IN *CAMPOLETIS CHLORIDEAE* UCHIDA, A PARASITOID OF *HELICOVERPA ARMIGERA* (HUBN.)

T.M. CHOUGALE AND T.V. SATHE
DEPARTMENT OF ZOOLOGY,
SHIVAJI UNIVERSITY, KOLHAPUR-416 004, INDIA.
(e-mail : drtvsathe@rediffmail.com)

Campoletis chlorideae Uchida (Parasitic Hymenoptera : Ichneumonidae) is a potential biocontrol agent of gram pod borer *Helicoverpa armigera* (Hubn.). Therefore, oviposition behaviour was studied in the parasitoid. Oviposition consisted following chain of behaviours *viz.* attraction of host, recognition, antennal examination of larva, up and down movements of abdomen, ovipositor thrusting, ovipositor insertion and actual oviposition towards its host. The female parasitoid after locating the host, tapped its antenna and determined the suitable host, searching of suitable host was continued, after discrimination she thrusted her ovipositor in any of the first three abdominal segments for a second or two. Female oviposited once or twice in a host larva and discriminated larva parasitized or non parasitized. Oviposition lasted 2-3 seconds after 20-25 minutes of copulation.

Key words : Hymenopteran parsitoid, *Campoletis chlorideae* Uchida, ovipositional behaviour, *Helicoverpa armigera* (Hubn.).

INTRODUCTION

In Hymenopterous parasitoids oviposition and host selection criteria are complicated processes and number of factors are responsible for oviposition (Vinson & Lewis, 1965; Arther, 1967; Sathe & Santhakumar, 1989). The oviposition behaviour in parasitioids have been determined by distinct patterns *viz.* habitat selection, acceptance (or rejection) of the discovered host and ability (or inhability) of the parasitoid to grow satisfactorily on the host tissues (Herrebout, 1967; Smilowitz & Iwantsch, 1975). In past, several workers (Ayar & Narayananswami, 1940; Nishida, 1956; Oatman *et.al.*. 1961; Loan, 1964; Broodryk, 1969; Cardona & Oatman, 1971, Hays & Vinson, 1971; Leong & Oatman, 1972; Odebiyi & Oatman, 1972; Schmidt, 1974, Quednau & Guevremont, 1975; Stinner, 1976; Waage, 1978; Sathe & Nikam, 1983, 1984; Sathe & Santhakumar 1989) have worked on the oviposition behaviour in parasitic Hymenoptera. The present study was aimed to find out the oviposition behaviour of the *Campoletis chlorideae* a parasitoid of *Helicoverpa armigera* (Hubn.). The data will serve as basis for mass rearing of the parasitoid.

MATERIALS AND METHODS

The parasitoids and hosts used in the experiment were reared under laboratory conditions (25 $\pm 1^0$C, 60 ± 6% R.H., 12 hr photoperiod. The post oviposition behaviour was studied by exposing 2nd instar larvae to mated females until the death. The observations were made with newly mated 20 females. 3-4 day old caterpillars of *H. armigera* were exposed to the females of *C. chlorideae* in glass cage, size 30 x 26 x 26 mm alongwith host larvae; small branches of gram were also exposed to record preoviposition, oviposition and postoviposition behaviours.

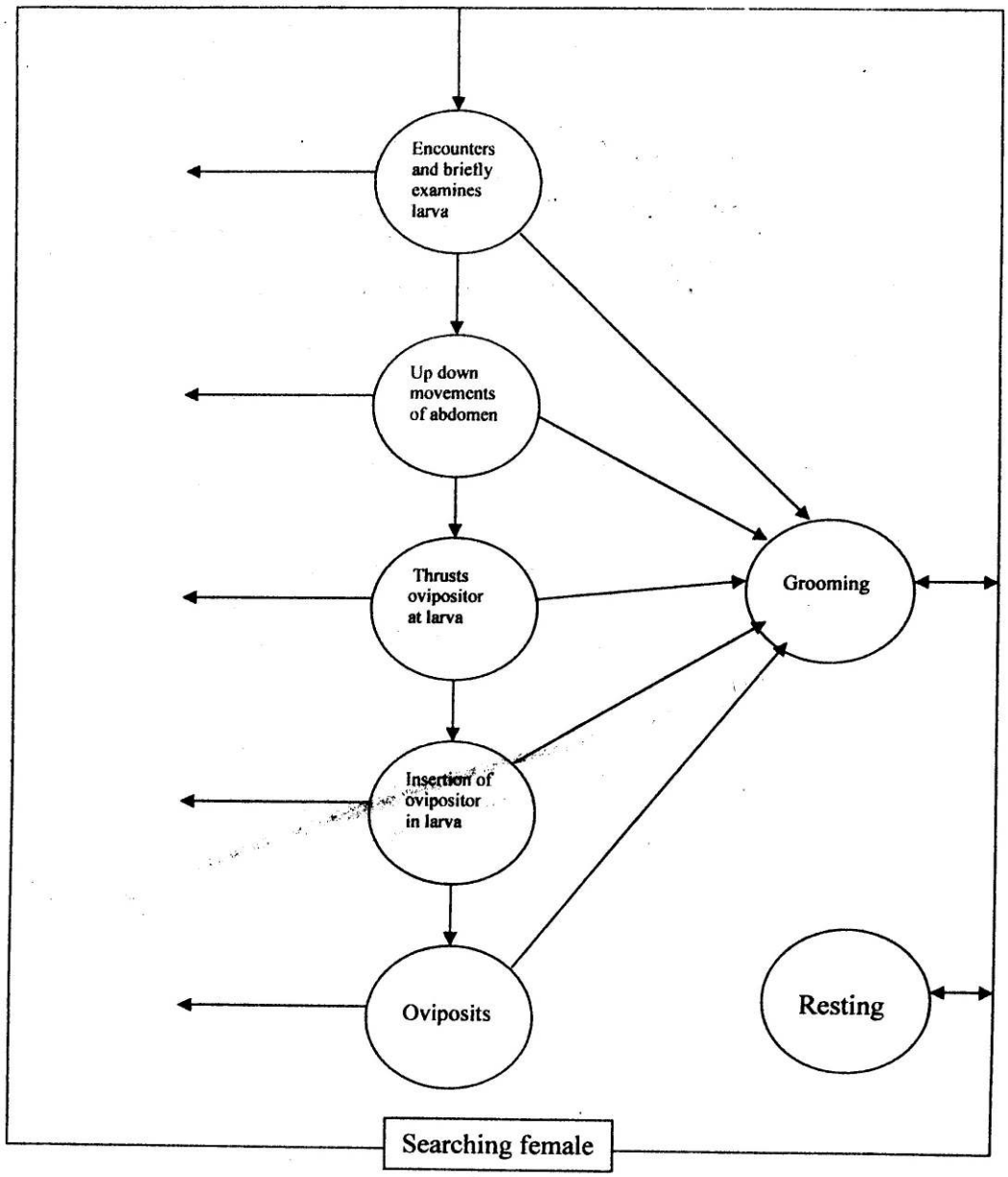

Fig. 1 : Schematic representation of oviposition behaviour in female parasitoid.

RESULTS AND DISCUSSION

The oviposition behaviours of *C. chlorideae* are recorded in Fig. 1.

Preoviposition : Preoviposition period averaged 25 min. Females were attracted towards the food, *i.e.* 50% honey, during this period they did not respond to the host larvae.

Oviposition : After finding a host larva in nearby distance the female walked for few millimeters by tapping the surface of damaged leaf with her antennae by contacting the host larvae female became excited and performed intensive searching movement and thrusted ovipositor into host's body by bending the abdomen. Oviposition lasted for 3-4 sec. It was observed that females fed on the host haemolymph that emerged out from the wound formed during the oviposition. The oviposition period of females average 10.9 days. Females were attracted towards food after oviposition.

Postoviposition : When a host larva was exposed to a female of *C. chlorideae* she touched the larva with antennae and then moved away. During this period female did not performed any excitement related to oviposition behaviour. Postoviposition period averaged 2 days.

The doryctine, *Spathius vulnificus* undergoes a preoviposition period which averaged 13.5 days (Ayyar & Narayanaswami, 1940). In *Opius fletcheri* Silvestri (Braconidae) an endoparasitoid of melon fruit fly, *Dacus cucurbitae* Coquillet preoviposition period was 3 days (Nishida, 1955). The females of *Orgilus lepidus* Muesebeck (Braconidae), a solitary, primary and larval endoparasitoid of the potato tuber worm, *Phthoramaea operculella* Zellar began to search shortly after copulation for host material in which to oviposit (Oatman *et al.*, 1969). In *Apanteles* (*Pseudapanteles*) *dignus* Muesebeck (Braconidae), a solitary, endolarval parasitoid of *Keiferia lycopersicella* (Walsingham) the preoviposition period was 80' (Cardona & Oatman, 1971). In the present larval endoparasitoid the preoviposition period was 25'. The same observation was noted in *O. lepidus*, a parasitoid of the same host *viz. P. operculella.* In present study the females have also performed intensive searching movements on damaged pods. The females after locating entrance of pod tunnel moved circularly around it. Further, they started inserting their abdominal region inside the tunnel in order to bring a contact between ovipositor and respective host larva.

Leong & Oatman (1968) reported the longest, 21 days and the shortest, 1 day postovipositon period in *Campoplex haywardi* Blanchard. In *Apanteles dignus,* postoviposition period averaged 3 days and many females have not showed any postoviposition period. In *Chelonus curvimaculatus* it was maximum, 28 days at 15.5^{0}C and nil at 25^{0}C (Broodryk, 1969) while, in the present study, the postoviposition period was 2 days. As like *Diadegma trichoptilus* (Cameron) and *Cotesia orientalis* Chalikwar & Nikam (Sathe & Nikam, 1983, 1984) five successive phases of oviposition behavior were displayed by the parasitoid *C. chlorideae.*

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