INFLUENCE OF PARASITISM BY *EUCELATORIA BRYANI* [DIP. : TACHINIDAE] ON THE CONSUMPTION AND UTILISATION OF CHICKPEA FLOUR DIET BY *HELIOTHIS ARMIGERA* [LEP. : NOCTUIDAE]

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Fourth and 5th instar larvae of *Heliothis armigera* (Hübner) parasitised by *Eucelatoria bryani* Sabrosky consumed significantly less chickpea flour diet than unparasitised larvae of the same age in the laboratory. Significant reduction in diet consumption, larval weight gain and frass produced at 24 and 48 h following parasitisation was observed in 5th instar host larvae. Parasitised larvae retained a greater percentage of food ingested (AD) than did the unparasitised ones. Unparasitised 5th instar larvae of *H. armigera* were more efficient in converting the ingested food (ECI) and digested food (ECD) into body substance than larvae of similar age parasitised by *E. bryani*.

The influence of parasitism on food consumption of a pest may be a direct one on the present generation of the pest resulting in reduced feeding, or an indirect one on the next generation resulting in reduced number of progeny. Reduction in food consumption of the host following parasitisation has been reported by earlier workers like Tower (1916), Guillot & Vinson (1973), Smilowitz & Iwantsch (1973) and Brewer & King (1978). However, Rahman (1970), Parker & Pinnel (1973) and Hunter & Stoner (1975) reported that some hosts consumed more food following parasitisation. The tachinid *Eucelatoria bryani* Sabrosky was imported from U.S.A. for trials against *Heliothis armigera* (Hubner) in India (Sankaran & Nagaraja, 1979). This parasite was recovered by the authors from *H. armigera* infesting tomato fruits around Bangalore following releases. The present study was carried out to determine the effect of this promising, newly introduced parasite on the food consumption of *H. armigera* in the laboratory.

MATERIALS AND METHODS

The tachinid *E. bryani* was reared as described by Sankaran & Nagaraja (1979), and *H. armigera* was cultured on chickpea flour diet developed by Nagarkatti & Satyaparakash (1974). All the tests were conducted at 27 ± 1°C, and the relative

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humidity during the period ranged from 30 to 40%.

*E. bryani* is a gregarious parasite. The female generally injects 4-5 maggots into the *H. armigera* larva with its larviposition at a single insertion. After the body contents are consumed by the maggots, they emerge and form puparia. Since this tachinid prefers 4th and early 5th instar larvae for larviposition, these 2 stages were used to determine the food consumption and utilisation. All weighing was done with a single pan balance to get a precision up to 4th decimal place of a gram.

**FOOD CONSUMPTION**

Twenty-five each of 4th and 5th instar *H. armigera* larvae of known weight were exposed individually to mated females of *E. bryani* individually. After parasitisation, the larvae were placed individually on pre-weighed diet in glass vials (7.5 × 2.5 cm) with cotton plugs. A comparable group of 25 larvae of similar age was kept under observation as control. Final weight of the diet was determined when the larvae stopped feeding. Food consumed by unparasitised larvae in the “control” was determined as being the total amount consumed from the time of parasite attack in the treated batch to the time of pupation of “control” larvae. The amount of diet consumed by the host was calculated on wet weight basis after Hopkins (1912), Waldbaucer (1968) and Premkumar et al. (1977). The fresh weight of the consumed food is generally taken as a measure of behavioural response of insects towards food (Waldbaucer, 1964). Corrections for water evaporation were made by holding the vials under identical laboratory conditions.

**FOOD UTILISATION**

Three indices were calculated to measure the efficiency of the utilisation of diet by *H. armigera* as outlined by Waldbaucer (1968). (1) Approximate digestibility (AD), (2) Efficiency of conversion of ingested food to body substance (ECI), and (3) Efficiency of conversion of digested food to body weight (ECD). Fifth instar larvae were used to determine each index. Food consumed, frass produced, and the larval weight gained were observed for unparasitised and parasitised larvae at 24 and 48 h after parasitisation. The above indices were calculated on dry weight basis. Dry weight of the diet and frass were determined by using the mean percentage of dry matter of similar diet and frass by drying them at 80°C to a constant weight. Dry weight of the larvae was estimated similarly except that the larvae were killed by freezing before drying, as done by Premkumar et al., (1977).

“F” test was used to test the differences in food consumption, larval weight gain and food utilisation between unparasitised and parasitised larvae. Coefficients of larval weight and food consumption reduction were also worked out and expressed in percentage.

**RESULTS AND DISCUSSION**

The mean fresh weight of the diet consumed by parasitised larvae was significantly less than that of comparable unparasitised larvae in both the 4th and 5th instars (table 1). Percent reduction in food consumption due to parasitism was 83.80 and 61.46 in 4th and 5th instar larvae respectively. Similar reduction in food consumption of *Trichoplusia ni* (Hübner), parasitised by the tachinid *Voria ruralis* (Fallen) and *Diatraea saccharalis* (F.), parasitised by *Lixophaga diatraeae* (Towns), were reported by Soohoo & Seay (1972) and Brewer & King (1978), respectively.