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RESEARCH NOTES

Biology of *Elasmus zehntneri* Ferriere, an Ecto Larval Parasitoid of the sugarcane top borer, *Scirpophaga excerptalis* walker.

R.K.TANWAR
Division of Entomology, Indian Institute of Sugarcane Research
Lucknow - 226 002

Elasmus zehntneri Ferriere a larval parasitoid of the sugarcane top borer, *Scirpophaga excerptalis* Walker has been reported from different states of the Indian Union. Gupta (1954) reported its parasitisation to range between 5 to 6 per cent from January to May in Uttar Pradesh, Bihar and Punjab and 10 to 15 per cent from July to September in Bengal and Maharashtra (Erstwhile Bombay) states.

A perusal of the literature revealed that in spite of its wide spread occurrence, its biology and laboratory rearing techniques have not been studied precisely. The present paper deals with studies on some of these aspects undertaken at IISR Biological Control Centre, Sardar Nagar, Gorakhpur.

Nucleus culture of the parasite, *E. zehntneri* was established and maintained, as part of the research programme, from the field collected parasitised *S. excerptalis* larvae in laboratory. Emerging adults were sexed and kept in glass tubes (10 x 3 cm), open end covered with muslin cloth. The adults were fed with 1:1 honey + water solution. For oviposition, a special device, similar to the natural exit hole, was made in a drinking straw pipe. A hole was made in the middle of straw pipe by scooping a portion of the straw pipe. A mature larva of *S. excerptalis* was inserted and in this straw pipe, the hole was allowed to be plugged with salivary gland secretion of the top borer larva, as it does in the host plant. Such straw pipes, with naturally plugged holes were used for all experimental purposes. In each straw pipe, a mature larva, head directed to the hole was then inserted, and pushed near the plugged hole. Both the open ends of the straw pipe were closed with cotton. Such straw pipes were used for subsequent laboratory rearing.

For biological studies, straw pipes kept as above were inserted in glass tubes (30 x 3 cm) along with a parasite adult in each tube and the mouth of the tube covered with a muslin cloth. After 24 h, the straw pipe alongwith top borer larva was replaced by another straw pipe with a top borer larva till the female died. Total number of larvae parasitised by each female during its total life period and the eggs laid on these larvae were recorded. The average of 21 adults (3 pairs in seven replications) were taken into account for calculating mean fecundity and host larvae parasitised by the female parasite. For recording observations on per cent emergence, sex ratio and development period from egg to adult stages, 30 adults (3 pairs in 10 replicates) of *E. zehntneri* were taken into account. Total number of eggs laid on one larva and the number of adults emerged and the sex ratio of the emerging adult from each host larva were recorded. The development of the parasite from egg stage to adult was observed under a binocular microscope (10 x 2 X). Per cent emergence of adult was calculated by dividing the total number of adults emerged by total number of eggs laid and multiplied by one hundred. All the observations were recorded during December,88 to February,90 under the laboratory conditions. The temperature and mean relative humidities during the course of studies ranged between 23°C to 27°C and 60-70%, respectively.

Table 1. Duration of different stages of *E. zehntneri* on *S. excerptalis*

Parameters	Duration (hrs/days)	
	Range	Mean
Egg period	21-28 h	24.0 ± 2.0 h
Egg + larval period	5-8 days	7.12± 0.83 days
Pupal period	6-16 "	11.30± 2.12 "
Total development period (egg to adult)		
Male	15-23 "	18.39± 2.37 "
Female	15-24 "	18.43± 2.35 "
Longevity of adults		
Male	10-16 "	13.75± 2.59 "
Female	14-20 "	17.0 ± 2.13 "
Pre-oviposition period	2-10 "	4.0 ± 2.87 "

Observations on oviposition behaviour revealed that when mated female adult of *E. zehntneri* was exposed to the larva in situ, it thrust its ovipositor through the plugged slit and oviposited near the head of the host larva. Eggs were laid one by one in the form of a chain. In case of mass rearing, many females laid eggs simultaneously on one larva and on an average 49.3 eggs were laid on each host larva. A single female laid on an average 69.37 eggs. Cherian and Israel (1937) reported an average of 53 eggs/female. The higher number of eggs /female in present studies indicated the efficiency of the rearing technique.

The egg period, egg + larval period, pupal period and total development period of male and female of the parasite were 24h, 7.12, 11.30, 18.39 and 18.43 days, respectively. Average longevity of male and female of *E. zehntneri* was observed to be 13.75 and 17.0 days (Table 1), respectively and sex ratio was observed to be 1:3. Emergence of female to an extent of double that of the male was also reported by Cherian and Israel (1937).

By the above methodology, *E. zehntneri* can be reared in straw pipes on host larva upto pupal stage. Individual pupa remained attached to the inner surface of the straw pipe with the help of prominent thread like structure secreted by the larva and adults emerged through one end of the straw pipe which was earlier plugged with the larval secretion. On an average 3.87 larvae were parasitised by each female during the total life period. Percentage emergence of adults from total eggs laid was 66.1 (Table 2). Eight successive generations of *E. zehntneri* could be reared successfully by this method without any detrimental effect. The production of adult was 32.50 adults/host larva with this technique while Cherian and Israel (1937) have recorded 75 adults/host in field collected larvae.

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Table 2. Efficiency of laboratory rearing of *E. zehntneri*

Parameters	Range	Mean value
No. of hosts parasitised/adult	1-6	3.87 ± 0.51
No. of eggs laid/adult	46-107	69.37 ± 10.23
No. of adults developed/host	5-157	32.5 ± 13.17
Percent emergence of adults	48-80	66.1 ± 8.34

Key Words : *Elasmus zehntneri*, biology, rearing technique, *Scirpophaga excerptalis*

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