

Anz. Schädlingskde., Pflanzenschutz, Umweltschutz 59, 20—21 (1986)
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 ISSN 0340—7330

Variation in the reproductive performance of *Epiricania melanoleuca* (Fletcher) (Lep., Epipyropidae) in relation to stage and sex of the host *Pyrilla perpusilla* (Walker) (Hem., Lophopidae) during rearing

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With one table

Abstract

Rearing of *Epiricania melanoleuca* (Fletcher) on adult females of *Pyrilla perpusilla* (Walker) augmented the productivity of the former, which is an effective nymphal and adult ectoparasitoid of the latter, in terms of yield of total and viable eggs. The applied value of this finding in field biocontrol programs is highlighted.

1 Introduction

Epiricania melanoleuca (Fletcher) is a potential ectoparasitoid on nymphs and adults of sugarcane leafhopper, *Pyrilla perpusilla* (Walker) in our country (MISRA and PAWAR, 1980) and it has been extensively used for the biocontrol programs against this pest in the recent past (MISRA and PAWAR, 1984). Unlike *Holcocera pulverea* and *Eublemma amabilis*, lepidopteran predators whose larvae prey upon lac insect and devour it completely, the caterpillars of the members of Epipyropidae commence to feed and complete their larval stage on the nymphs/adults of homopterans. They are, therefore, truly parasitic in nature. The hosts do not die instantaneously although they succumb on account of parasitic infection in due course of time.

The newly hatched caterpillars of *E. melanoleuca* move quickly on sugarcane leaves in search of their hosts. As soon as a pyrilla nymph or adult becomes available, the parasitoid catches hold of the tarsi of the host and gradually proceeds to orientate on the dorsal surface of the abdomen of the former from where it continues to feed until maturity. On completion of the larval period (which lasts between 10 and 12 days), the caterpillar leaves the host's body and migrates to the sugarcane leaf surface to spin a white, oval-shaped cocoon inside which pupation occurs. After a pupal period of 4—11 days, moths emerge.

The female moth, upon emergence, remains near the cocoon. However, the male flies to the cocoon to mate with the female. Soon after termination of copulation, the female begins to lay eggs alongside the cocoon. Under favourable conditions, these eggs hatch after 9 days to give rise to a new generation of caterpillars.

Our knowledge concerning reproduction of this parasitoid is limited to the reports published by CHANDRA and TIWARI (1978), MADAN and SINGH (1981) and MISRA and KRISHNA (1982). The information documented by the first two pairs of authors on the total and viable eggs laid by the females relates to counts of eggs obtained from collectively pooled cocoons of the parasitoid, the

caterpillars of which had fed on pyrilla whose stage/sex remained unknown. With a view to fill up this gap in our understanding about the reproduction of *E. melanoleuca*, it was considered essential to examine the relationship between the breeding efficiency of this parasite and its rearing on a specified nymphal stage or sex of the host. The findings obtained from such a study are reported in this communication.

2 Material and Methods

Fourth instar nymphs of *Pyrilla*, collected from a well maintained laboratory culture of this insect on sugarcane plants confined in nylon net cages (200 × 200 × 200 cm), were parasitized by < 1 h old caterpillars of *E. melanoleuca* in glass tubes (2.5 cm diam., 15.0 cm height). These parasitized nymphs were later held in groups of 10 to 15 inside glass jars (12.0 cm diam., 17.5 cm height) on *in situ* sugarcane leaves emerging from potted plants until the completion of larval period of the parasitoids and their cocoon formation on the leaves or on the glass walls of the jars. Such cocoons were gently lifted with the help of a fine needle and each transferred to a separate glass vial (4.0 cm diam., 10.5 cm height). Daily emergence of the moths were monitored. On emergence, fresh males and females were arranged in single pairs for mating and subsequent egg laying in glass tubes whose dimensions have already been stated. The hatchability of eggs deposited by females was also noted.

For the assessment of egg output and viability of eggs in *E. melanoleuca* following its parasitization of an adult male or a female pyrilla, the freshly molted 5th instar nymphs of the latter drawn from the culture cage were first reared individually on *in situ* sugarcane leaves introduced into glass vials of specifications given above. Upon transformation to adults, they were immediately parasitized by < 1 h old caterpillars of *E. melanoleuca* as was done for the nymphs described earlier. The parasitized adult male and female pyrilla were reared separately and the cocoons formed were handled as before. Moths emerging from these cocoons were paired and egg yield and egg viability scores from mated females recorded.

All oviposition trials described here were adequately replicated and the data procured subjected to appropriate statistical analysis (PATERSON, 1939) for proper interpretation.

3 Results and Discussion

A significantly higher egg deposition ($P < 0.05$) containing greater number of viable eggs ($P < 0.01$) occurred in *E. melanoleuca* when the parasitoid was reared on female instead of male pyrilla adult (table 1). It is quite likely that pyrilla females, in view of their basically sluggish nature, did not disturb the parasitoids and dislocate them from their orientation sites by frequent jolts

Table 1. Number of total and viable eggs laid by *Epipyrops melanoleuca* females reared on 4th instar nymphs or on adult male or female individuals of *Pyrilla perpusilla* (data pooled from 5 females per treatment)¹

Rearing regimen of <i>E. melanoleuca</i>	Mean number of total eggs laid	Mean number of fertile eggs laid
<i>P. perpusilla</i>		
Adult female	1021.8 a	953.2 a
Nymph (4th instar)	766.2 ab	688.8 ab
Adult male	555.6 b	485.8 b
Mean	781.2	709.3
LSD (1 %)	519.8	452.8
(5 %)	370.7	322.9

¹ Any two means followed by the same letter do not differ significantly at the 1 % or 5 % level by the Least Significant Difference (LSD) test.

during jumping, unlike males. Such a favorable lodging on the host body would evidently provide the parasitoid opportunity to ingest adequate quantity of food uninterrupted from pyrilla females. This, in turn, may be responsible for enhanced egg yield and egg viability in *E. melanoleuca*. This feature can be gainfully exploited to build up the parasitoid population in laboratory cultures for subsequent use in field biocontrol programs.

Pyrilla 4th instar nymphs serving as hosts for *E. melanoleuca* also favored a slight, though statistically non-significant ($P > 0.05$), increment in the number of total and fertile eggs laid by the parasitoid female over values obtained from counterpart individuals raised on pyrilla males. Presumably a greater proportion of these nymphs from which the caterpillars of these moths derived nourishment were females.

Acknowledgements

The senior author expresses his grateful thanks to Dr. S. N. BANERJEE, Plant Protection Adviser to the Government of India (Retired) and to Dr. A. D. PAWAR, Assistant Director (Biological Control), Directorate of Plant Protection, Quarantine and Storage, N. H. IV, Faridabad for their encouragement and for

permitting him to pursue this research work in addition to his official engagements.

Zusammenfassung

Unterschiede in der Reproduktionsleistung des Ektoparasitoiden *Epiricania melanoleuca* (Fletcher) (Lepid., Epipyropidae) in Beziehung zum Stadium und Geschlecht des Wirtes *Pyrilla perpusilla* (Walker) (Hemipt., Lophopidae) während der Zucht.

Wurden die ektoparasitischen Raupen von *Epiricania melanoleuca* auf adulten Weibchen der Zuckerrohr-Zikade, *Pyrilla perpusilla* aufgezogen, vergrößerte sich die Zahl und Lebensfähigkeit der Eier, die von den daraus resultierenden Faltern abgelegt wurden. Das Ergebnis wird im Hinblick auf einen Einsatz des Parasitoiden zur biologischen Bekämpfung des Schädlingserörtert.

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Anz. Schädlingskde., Pflanzenschutz, Umweltschutz 59, 21—22 (1986)
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ISSN 0340—7330

Rundschau

Ultraschallbekämpfung von Nagetieren lohnt nicht

Vom Kauf eines Ultraschallgerätes zur Nagetierabwehr ist abzuraten. Zu diesem Ergebnis kamen Wissenschaftler der Biologischen Bundesanstalt für Land- und Forstwirtschaft. Ein Versuch mit Schermäusen zeigte, daß diese Nager sich nicht aus einem einmal angelegten Gangsystem vertreiben ließen. Sie siedelten sich sogar in einem „beschallten“ Raum neu an, obgleich Ausweichmöglichkeiten bestanden. Wie die physikalische Überprüfung des Testgerätes ergab, werden die Schallwellen im Boden praktisch nicht weitergeleitet. Von den Ultraschallgeräten, die in den letzten Jahren für den Bereich des

Vorratsschutzes entwickelt wurden, konnte nach Feststellung der Wissenschaftler bisher keines einer fachlichen Prüfung standhalten.

AID-Informationen, Pressedienst, Jg. 34, 7/1985

Orientierende Untersuchungen zur Bestimmung des Säuregrades der Luft

Im Zusammenhang mit dem Fragenkomplex Saurer Regen und Waldsterben haben die Wissenschaftler Dr. O. KLAUSING und U. WAGNER eine Methode sowie erste orientierende Unter-