

PARASITISM, DEVELOPMENT OF PROGENY AND SEX-RATIO OF *Parasierola nephantidis* Mues. (BETHYLIDAE) ON DIFFERENT INSTARS OF *Opisina arenosella* Wlk. (*Nephantis serinopa* Meyr.)*

G. B. PILLAI and S. KESHAVA BHAT¹

C.P.C.R.I., Regional Station, Kayangulam, Krishnapuram - 690 533, Kerala.

INTRODUCTION

The coconut leaf eating caterpillar, *Opisina arenosella* Wlk. (*Nephantis serinopa* Meyr.) is subject to the natural suppression by a large number of parasitoids and predators. Of these, the bethylid *Parasierola nephantidis* Mues. is an important larval parasitoid, which exerts considerable check on Pest population in the field. Rao and Cherian (1928) were the pioneers to record the natural incidence of *Parasierola* sp. as an important larval parasitoid of the coconut leaf eating caterpillar. Muesebeck (1934) identified this parasitoid as *Parasierola nephantidis*. This parasitoid is widely distributed in the coastal

and backwater tracts of the east and west coasts of India (Kurian and Antony, 1959), interior parts of Tamil Nadu (Rao and Cherian, 1928), East Godavari district of the erstwhile composite Madras state (Andhra Pradesh) (Dharmaraju, 1952) and Sri Lanka (Jayaratnam, 1942). *P. nephantidis* is considered to be an efficient larval parasitoid of the Pest (Dharmaraju 1952).

This parasitoid usually prefers the fully grown caterpillars of *O. arenosella* for successful parasitism (Kurian and Antony, 1959). The impact of parasitism by *P. nephantidis* on different instars of *O. arenosella*, particularly on factors such as acceptance of the

host by the parasitoid, time taken for egg laying, number of eggs laid, progeny developed and the proportion of males in the brood was studied in the laboratory. The data collected are discussed in this short paper.

MATERIALS AND METHOD

Different instars (third, fourth, fifth, early sixth and late sixth) of *O. arenosella* caterpillars collected from the field/reared in the laboratory were sorted out and kept individually in glass vials of size 8 × 2.5cm. Six-day-old females of *P. nephantidis* were released, one each to each vial simultaneously and the vials were plugged with cotton wool rolls covered

* Contribution No. 486, Central Plantation, Crops Research Institute, Kasaragod - 670 124, Kerala.

¹ Present address: CPCRI, Kasaragod - 670 124, Kerala.

with mull cloth. The time taken for acceptance of the host by the parasitoid and for egg laying, number of eggs laid on each host caterpillar, number of progeny developed and the percentage of males in each brood were recorded. This trial was replicated twenty times and the results were statistically analysed.

RESULTS AND DISCUSSION

All the four factors studied showed significant variations in different stages of the host caterpillars (Table 1). Except for the sex ratio all other characters showed a negative correlation with the size of the host larvae used. There was no significant difference in the sex ratio of progeny on the fifth and sixth instar host caterpillars. However, the fifth instar *O. arenosella* caterpillars are more readily accepted by the parasitoid and are ideal for the development of a good number of progeny. The time taken for parasitism was also significantly less than that on the sixth instar host caterpillars. As

such, the fifth instar and early sixth instar *Opisina* caterpillars can be used as hosts for the large scale multiplication of *P. nephantidis* in the parasite breeding laboratories. Late sixth instar caterpillars will attain pre-pupal phase and start spinning cocoons for pupation immediately.

The parasitoid took only less time for subduing the host in the case of the third and fourth instar caterpillars. The time taken for parasitism was also less. But, major handicap with these was that nearly 10% of the fourth instar and 35% of the third instar host caterpillars died up even before the parasitoid eggs laid on them hatched. This study clearly reveals that the stage of the host larva used was critical in determining the acceptance by the parasitoid, number of eggs laid, number of offsprings and the percentage of males in the brood. Another important result emerged from this study is that *P. nephantidis* is capable of suppressing a good number of *Opisina* caterpillars by stinging in addition to

parasitising the ideal stages of the host.

SUMMARY

Studies on the intensity of successful parasitism and development of progeny of *P. nephantidis* reared on different instars of *O. arenosella* caterpillars revealed that the stage of the host larvae used was critical in determining the acceptance by the parasitoid, number of eggs laid, number of offsprings developed and the proportion of males in the brood. Fifth and early sixth instar caterpillars of *O. arenosella* were ideal stages of the host for large scale multiplication of *P. nephantidis* in the laboratory. The parasitoid was found to be capable of suppressing the early instar caterpillars of the pest by stinging, even though they were not ideal stages for the development of a good number of parasitoids.

ACKNOWLEDGEMENT

The authors are grateful to Shri. Jose Abraham, Scientist-S1 (Agricultural Statistics) for the statistical analysis of the data.

REFERENCES

- Antony, J. and Kurian, C. 1959. Studies on the habits and life history of *Perisierola nephantidis* Muesebeck. *Indian Cocon. J.* 13: 145-153.
- Dharmaraju, E. 1952. The biological control of the black headed caterpillar of coconut (*Nephantis serinopa* M.) in the East Godavari district of Madras State. *Indian Cocon. J.* 5: 171-176.
- Jayarathnam, T. J. 1942. The bethylid parasite (*Perisierola nephantidis* M.) of the coconut caterpillar (*Nephantis serinopa* Meyr.). *Trop. Agri* 97: 115-125.
- Kurian, C. and Antony, J. 1961. Systematic position, host preference and distribution of *Perisierola nephantidis* Muesebeck (Superfamily: Bethyloidea; Family: Bethyloidea) a larval parasite of *Nephantis serinopa* Meyr. and its allied species. *Indian Cocon. J.* 14: 123-126.

Muesebeck, C. F. W. 1934. Seven new species of Indian Bethyloidea. *Rec. Indian Mus.* 36: 225-227.

Rao, Y. R. and Cherian, M. C. 1928. Notes on the life history and habits of *Perisierola* sp. the bethylid parasite of *Nephantis serinopa*. *Madras Agric. Dept. Year Book-1927*: 11-22.

TABLE - 1

DEVELOPMENT OF PROGENY OF *Parasierola nephantidis* ON DIFFERENT INSTARS OF *Opisina arenosella*

Host/ Instar	Size of the host caterpillar (mm)	Days taken for egg laying	Number of eggs laid	No. of progeny developed and emerged	Percentage of males in the brood
Late Sixth	24.35 ±0.49	3.55 ±1.19	15.90 ±3.25	14.75 ±3.73	10.64 ±4.88
Early Sixth	21.35 ±0.49	3.10 ±0.91	11.65 ±2.83	11.32 ±3.13	14.64 ±6.27
Fifth	18.32 ±0.48	2.47 ±0.84	8.68 ±2.33	8.17 ±2.30	11.87 ±5.51
Fourth	15.40 ±0.40	1.70 ±0.80	6.10 ±2.05	4.94 ±2.55	15.42 ±12.14
Third	12.38 ±0.50	1.56 ±0.63	3.06 ±0.85	2.54 ±0.93	40.91 ±24.85
General Mean	—	2.51	9.34	9.00	16.65
S. E.	—	0.90	2.49	2.90	11.31
C. D.	—	0.61	1.68	1.92	8.61