

## ROLE OF PUPAL PARASITIDS IN THE NATURAL SUPPRESSION OF THE COCONUT CATERPILLAR *NEPHANTIS SERINOPA* MEYRICK\*

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### ABSTRACT

Evaluation of the intensity of natural parasitisation of *Nephantis serinopa* pupae in the Quilon and Alleppey districts of Kerala State for two years (1979 and 1980) revealed that more than 50% of natural pest suppression was due to the pupal parasitoids, of which the chalcidids *Brachymeria* spp. were the major ones and among them, *B. nosatoi* was the most dominant species followed by *B. nephantidis*. Activity of *B. nosatoi* was more during the summer season, which is also the peak period of the pest. The intensity of natural parasitisation by *Trichospilus pupivora* (Eulophidae) was meagre, being 1.6% only.

### INTRODUCTION

*Nephantis serinopa* Meyrick, the leaf eating caterpillar pest of the coconut palms in India and Sri Lanka, is subject to parasitisation by more than 20 species of parasitoids (Dharmaraju, 1962; Joseph, Narendran and Joy, 1973). Excepting the tachinid *Spoggosia bezziana* (Baranoff) and the *Eriborus trochanteratus* (Morley), all other species which parasitise *N. serinopa* in its larval and pupal stages, occur in Kerala as well.

According to Joy and Joseph (1977 and 1978) the most important pupal parasitoids of *N. serinopa* are the chalcidids *Brachymeria nosatoi* Habu and *B. nephantidis* Gahan. Although the eulophid parasitoid *T. pupivora* Ferr. was being mass cultured and released in the

field in sizeable numbers for several years now, its extent of natural parasitisation was very meagre in South Kerala (less than 1%, while it was 14% in North Kerala region (Joy and Joseph, 1977).

During a survey for the indigenous parasitoids infesting pupae of *Nephantis serinopa* in coconut gardens around Kayangulam in the Quilon and Alleppey districts of Kerala State, during 1979 and 1980, four species of *Brachymeria* viz., *B. nosatoi*, *B. nephantidis*, *B. hime attevae* Joseph et al. and *B. lasus* (Walker), the eulophid *T. pupivora*, the ichneumonids *Xanthopimpla punctata* F. and *Xanthopimpla* sp., an unidentified chalcidid, a larval-pupal dipteran and a secondary parasitoid of *Brachymeria* were reared and

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their relative intensity of parasitisation during different seasons studied. The results obtained from these studies are presented in this paper.

#### MATERIALS AND METHODS

Collections of *N. serinopa* pupae were made from coconut gardens in the coastal and backwater tracts of Quilon and Alleppey districts at regular intervals, atleast on 15 days each month. The pupae collected were kept in glass vials/conical flasks for observations. In the case of pupae parasitised by *T. pupivora*, the pupal shells were examined for the presence of minute round holes, through which the parasitoids had emerged. Emergence of parasitoids/moths was recorded daily. Percentage of total parasitisation and that by individual species of parasitoids were recorded for every three months periods of January-March, April-June, July-September and October-December of each year.

#### RESULTS AND DISCUSSION

Results of the observations are presented in Table I. They clearly show that more than half of the pest population (51.7%) was suppressed by the pupal parasitoids, of which 46.5% was by the chalcidids *Brachymeria* spp. The unidentified hyperparasite suppressed 3.3% population of *Brachymeria*. Among the different species of *Brachymeria*, *B. nosatoi* dominated the parasite complex of *N. serinopa* providing 29.6% parasitisation, followed by *B. nephantidis* which accounted for 13.9% parasitisation. All other species of parasitoids, except perhaps *Xanthopimpla* sp. were

Table I. Parasitism of pupae of *N. serinopa* by different parasitoids

Locality and year	No. of pupae under observation	Total parasitism %	Percentage of parasitisation									
			<i>B. nosatoi</i>	<i>B. nephantidis</i>	<i>B. hime</i>	<i>B. lasus</i>	<i>X. punctata</i>	<i>Xanthopimpla</i> sp.	<i>T. pupivora</i>	Unidentified chalcid	Hyperparasite	
Kayangulam												
1979	864	47.68 (412)	30.43 (263)	12.96 (112)	0.11 (1)	-	1.04 (9)	-	1.27 (11)	1.15 (10)	0.7 (6)	
1980	754	56.36 (425)	28.64 (216)	14.98 (113)	1.99 (12)	1.32 (10)	1.72 (13)	3.58 (27)	2.00 (15)	-	2.5 (19)	
Total	1618	51.73 (837)	29.60 (479)	13.90 (225)	0.80 (13)	0.62 (10)	1.36 (22)	1.67 (27)	1.60 (26)	0.62 (10)	1.54 (25)	
Thottappally												
1980	465	44.08 (205)	24.30 (113)	13.33 (62)	3.22 (15)	0.22 (1)	-	-	2.15 (10)	-	0.86 (4)	

Figures in parentheses indicate the actual number of parasitised pupae

playing only insignificant roles. *Xanthopimpla* sp. appeared to be localised in distribution, but it could compete and even dominate over *B. nosatoi* in the localities where it existed.

*B. nephantidis* maintained a more or less steady population almost throughout the period of the present study. *B. nosatoi* appeared to favour higher temperatures and low relative humidity of the summer months and fared well even in high humidity conditions during the monsoon period as well. However, its peak period of activity was during the summer season of April-June. The performance of the eulophid *T. pupivora*, the principal parasitoid now being reared under the programme of mass culturing and release of parasites against *N. serinopa*, was quite insignificant with only 1.6% parasitisation.

The aggregate parasitisation of *N. serinopa* pupae at Thottappally (Alleppey district) area was 44.1%, which included 24.3% by *B. nosatoi* and 13.3% by *B. nephantidis*. The population of *B. hime attevae* was fairly higher (3.2%) at Thottappally area than in the areas around Kayangulam (0.8%). Three-fourths of pupae of the last generation of *N. serinopa* at Thottappally area were parasitised by the pupal parasites during September 1980, presumably resulting in population collapse of the pest in the area. The pest was observed to abandon the breeding site and shift its remaining population to

elsewhere, partly due to the pressure exerted by *Brachymeria* spp. and partly due to the unsuitability of leaflets in the outer fronds of the coconut palms for further infestation and population build-up of the pest.

According to Joy and Joseph (1977) the aggregate parasitisation by *B. nosatoi* was 19.3% in south Kerala and 2.2% in north Kerala. Parasitisation by *B. nephantidis* was more in northern Kerala (7.9%) than that in the south (4.1%). *T. pupivora* dominated other species of parasitoids (14%) in north Kerala, but its intensity was quite low (1%) in the southern region. At Kayangulam area, parasitisation by *B. nosatoi* reached its peak (28.1%) in May (Joy and Joseph, 1978). According to them the overall parasitisation of *N. serinopa* pupae in Kayangulam area was 24.8% by *B. nosatoi*, 4.2% by *B. nephantidis* and 0.3% by *T. pupivora*. The present observations thus support the findings of Joy and Joseph (1977 and 1978).

#### CONCLUSIONS

*Brachymeria* spp. accounted for nearly 90% of the total parasitisation of pupae of *N. serinopa*. Among these, *B. nosatoi* was the most abundant giving 57.2% of the parasitism, followed by *B. nephantidis* with 26.9% parasitism. Peak activity of *B. nosatoi* synchronised with that of the host. *T. pupivora* did not appear to be an efficient pupal parasitoid.

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