J. Biol. Control, 20(1): 33-36, 2006

Field evaluation of *Goniozus nephantidis* (Muesebeck) against coconut black-headed caterpillar in Kerala using different release techniques

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ABSTRACT: **Many entomophagous insects attack the black-headed caterpillar of coconut, *Opisina arenosella* Walker during its developmental stages. *Goniozus nephantidis* (Muesebeck) is a gregarious larval parasitoid of *O. arenosella*. During summer months of 2003-04 and 2004-05 the parasitoid was evaluated in the field in Kerala by following two methods - trunk and crown release that were compared with control. There was significant reduction in the population of *O. arenosella* after third to sixth releases in treated palms, when compared to control palms. There was no significant difference between the two methods of release of *G. nephantidis* in reducing the population of *O. arenosella*. Hence farmers could easily and effectively adopt the trunk release method.**

KEYWORDS: Evaluation, *Goniozus nephantidis*, methods of release, *Opisina arenosella*

INTRODUCTION

The black-headed caterpillar, *Opisina arenosella* Walker is attacked by many entomophagous insects during its developmental stages. *Goniozus nephantidis* (Muesebeck) is a gregarious larval parasitoid of *O. arenosella*. The details of behaviour and life history have been published by Remadevi *et al.* (1978).

The per cent parasitism by *G. nephantidis* on *O. arenosella* varies from place to place. It has been reported 3.7 to 47.6 in Kerala (Sathiamma *et al.*, 1996) and 48.00 in Karnataka (Natarajan and Channabasavanna, 1980). Sathiamma *et al.* (1987) standardized the dosage of release of the parasitoid in Kerala and Venkatesan *et al.* (2003) standardized the method of release from Karnataka. They found that 90-100 per cent of the parasitoids released on the trunk (1.2m height from the ground level) reached the crown of the palm irrespective of the height of the tree. The mean time taken by each batch of the parasitoid varied from 13 to 22 minutes.

In Kerala, coconut climbing is very expensive, due to non-availability of climbers and the farmers are very reluctant to adopt the pest management

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Table 1. Reduction in *O. arenosella* population after release of *G. nephantidis* (2003-04)

Treatment	Percentage reduction in *Opisina* population					
	After I release	After II release	After III release	After IV release	After V release	After VI release
T1- Release of 10 females at 1.2-1.5m height of palm	73.7[a]	80.5[a]	82.0[b]	79.0[b]	96.0[b]	96.0[b]
T2- Release of 10 females at the crown	62.2[a]	98.0[a]	56.7[b]	61.7[b]	86.7[b]	90.0[b]
T3- Control	62.5[a]	75.8[a]	- 77.8[a]	- 82.0[a]	- 34.7[a]	- 56.5[a]
CV (%)	2.5	2.1	17.8	5.2	3.6	5.9

practices in the crown area due to this difficulty. *G. nephantidis* is a recommended larval parasitoid for *O. arenosella* management. In order to find out a suitable, easy and economical release method the two known methods were evaluated in Kerala condition.

MATERIALS AND METHODS

The field experiments were laid out during the months of October to March 2003-04 and 2004-05. The treatments were: release of 10 females/trunk at 1.2-1.5 meter height, release of 10 females/crown and a control. Ten uniformly infested trees were selected randomly as replications for each treatment. Pre-release sampling was done for each tree by collecting and examining 20 leaflets. Counted larvae, pupae and adult stages of the pest from each leaflet to arrive at the number of *O. arenosella* per leaflet. Six releases of the parasitoid were made at 15 days interval. Releases were made in the morning hours using cotton and camel hairbrush. Leaflet samples were drawn at 15 days interval. During 2003-04 the experiment was carried out in the coconut plantation of Bishop Palace, Thrissur and during 2004-05 at Vatanapilly beach area.

The percentage reduction in the pest population after each release in relation to pre count was computed. The data were subjected to square root transformation and analysis of variance.

RESULTS AND DISCUSSION

The results of first trial showed that there was no significant difference in the population of *O. arenosella* in different treatments after first and second releases of *G. nephantidis*. But after third, fourth, fifth and sixth releases of the parasitoid, the pest population came down and it was significantly low in the parasitoid released palms. However, there was no significant difference between the two methods of releases of *G. nephantidis* in reducing the population of the pest (Table 1).

The results of the second trial showed that there was no significant difference in the population of pest in different treatments after first release of *G. nephantidis*. But after second, third, fourth, fifth and sixth releases of the parasitoid, the population of *Opisina* came down and it was significantly low in the parasitoid released palms when compared to the control palms. There was no significant difference between the two methods of releases of *G. nephantidis* in reducing the population of *O. arenosella* (Table 2).

From the two years results, it can be concluded that after third release of the parasitoid, the pest population came down and it was significantly low in the parasitoid released palms when compared to control palms. The two methods of release were equally effective in the management of *O. arenosella*.

The reduction in pest population after the release of the parasitoid shows the efficiency of the parasitoid. Crown release is a time consuming and cumbersome process. It is expensive, especially in Kerala where it is difficult to get

Table 2. Reduction in *O. arenosella* population after release of *G. nephantidis* (2004-05)

Treatment	Percentage reduction in *Opisina* population after					
	I release	II release	III release	IV release	V release	VI release
T1-Release of 10 females at 1.2-1.5m height of palm	33.0[a]	61.8[b]	69.0[b]	75.2[b]	74.7[b]	89.6[b]
T2-Release of 10 females at the crown	13.5[a]	51.4[b]	61.7[b]	56.0[b]	61.4[b]	90.0[b]
T3-Control	24.7[a]	- 10.8[a]	- 2.2[a]	- 22.5[a]	- 10.7[a]	- 13.3[a]
CV(%)	28.3	10.6	9.0	9.4	9.5	10.7

climbers. This study corroborates the results of Venkatesan *et al.* (2003). They found that 90-100 per cent of the parasitoids released on the trunk reached the crown of the palm and reduced the pest population. The new method of trunk release at a height of 1.2-1.5 m from the ground level can be easily and effectively practised for the management of *O. arenosella*.

ACKNOWLEDGEMENT

The authors are grateful to the Project Directorate of Biological Control, Bangalore for the financial support and also for the supply of the biocontrol agent.

REFERENCES

Natarajan, L. and Channabasavanna, G. P. 1980. Population dynamics of coconut black headed caterpillar, *Nephantis serinopa* (Lepidoptera: Cryptophasidae) and its parasites. *Mysore Journal of Agricultural Sciences*, **14**: 533-541.

Remadevi, O. K., Mohamed, U. V. K., Abdurahiman, U. C. and Narendran, T. C. 1978. Oviposition behaviour of *Perisierola nephantidis* Muesebeck (Bethylidae, Hymenoptera) a larval parasite of *Nephantis serinopa* Meyrick (Xyloryctidae, Lepidoptera). *ENTOMON*, **3**: 303-305.

Sathiamma, B., Babu, A. S. and Pillai, G. B. 1996. Field evaluation of the promising species of indigenous parasitoids in the biological suppression of *Opisina arenosella* Walker, the coconut leaf-eating caterpillar. *Journal of Plantation Crops*, **24**: 9-15.

Sathiamma, B., Pillai, G. B., Abraham, J., Bhat, K. S., Jayapal, S. P. and Nair, K. R. 1987. Norms for field release of larval, prepupal and pupal parasitoids of *Opisina arenosella* Walker, the leaf-eating caterpillar of coconut palm. *Journal of Plantation Crops*, **15**: 113-115.

Venkatesan, T., Jalali, S. K., Murthy, S., Rabindra, R. J. and Rao, N. S. 2003. A novel method of field release of *Goniozus nephantidis* (Muesebeck), an important primary parasitoid of *Opisina arenosella* Walker on coconut. *Journal of Biological Control*, **17**: 79-80.