

Status of Coconut Blackheaded Caterpillar, *Opisina arenosella* Walker and Evaluation of Bio-agents

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ABSTRACT

Regular monitoring of gardens provided a fore warning for timely adoption of control measures and good pest suppression. Release of larval (*Bracon hebetor* *Goniozus nephantidis*) and pupal (*Brachymeria nosatoi*) parasitoids could bring down pest population from 16.73 to 8.73 / palm with 30% parasitisation. *Cardiastethus exiguus* an anthocorid predator also proved effective in pest suppression from 102.3 to 5.4 / palm with 21.5% of population. The release of bio-agents could be employed for successful suppression of blackheaded caterpillar which was safe, economical and perpetual wing of IPM.

Key words: Bio agents, *Opisina arenosella*.

India ranks first in coconut production among the 90 coconut producing countries in the world. The crop is mainly confined to the four southern states, accounting 90% of the area under coconut, among which Andhra Pradesh shares about 1.02 lakhs ha area with a production of 1,092.7 m nuts. One of the major factors that contribute to the loss of production and productivity in coconut is the damage due to *Opisina arenosella* that damages the foliage, depriving the palm of its photosynthetic area and thus, directly affecting the yield. In severe cases, whole plantation presents a burnt up appearance due to the drying of leaves, the attacked leaves droop, bunches buckle and the immature nuts shed heavily (Muthiah, 2007). The survey was carried out to know the incidence of coconut blackheaded caterpillar and estimate natural enemy fauna in districts of Andhra Pradesh specially after 1996 cyclone as during the cyclone period many gardens were uprooted and lot of ecological disturbance occurred. With an objective of finding out the efficacy of improved strains of bio-agents this study was undertaken.

Materials and Methods

A random and roving survey was conducted in four major coconut growing districts of Andhra Pradesh viz., East Godavari, West Godavari, Visakhapatnam and Srikakulam on the incidence and intensity of *O. arenosella*. In each district, major coconut growing mandals were selected, in each mandal, 5 villages and in each village 5 gardens were selected for recording the incidence of black headed caterpillar. In each unit, garden of 2.0 ha area, 20 % of the sample palms were selected for assessing the pest population during April-May and October-November, 2003 to 2006.

Coconut garden infested by coconut black headed caterpillar was selected in Matlapalem village of East Godavari district for studying the efficacy of parasitoids; *B. hebetor*, *G. nephantidis* and *B. nosatoi* of coconut black headed caterpillar and the studies were conducted during the years 2006-2007 in an area of 10 acres. Pre release data was collected from 10 % of sample palms by counting stages of the pest and parasitoids from 15 leaflets from each sample palm. Post release counts

were also made at monthly intervals from 10 % sample palms.

C. exiguus is an indigenous anthochroid predator which can attack eggs and newly hatched larvae of *O. arenosella*. The culture obtained from PDBC, Bangalore was mass multiplied in the laboratory at A.R.S. Ambajipeta. The experiment was implemented in pest infested coconut garden, in Mahadevapatnam village of West Godavari district having 100 palms. Five releases of *C. exiguus* were made @50 adults/nymphs/palm at 5 days interval. Leaflet samples were drawn at 30 days interval and post release data was collected on different stages of pest, predatory population and arrived pest population / palm and % predatory population.

Results and Discussion

The observations from the surveys revealed that, an outbreak of coconut blackheaded caterpillar occurred in 12 villages in East Godavari, 16 villages in West Godavari districts and 4 villages in Srikakulam district (Sujatha *et al.*, 2008). The scenario of caterpillar in these districts found that the pest was occurring repetitively in the same garden over years which could be referred as endemic as well as hot spot areas of the pest. It was observed that generally the pest first appeared in the month of September at different locations in every year (Table 1). Slowly the pest condition

improved under neglected conditions and attained peak situation by December and January months. Pest occurred on coconut palms on fish pond bunds was observed to be in severe condition during hot summer months like April and May also whereas, it was not like that in the coconut gardens. The natural occurrence of bio-agents ranged from 1 to 7 %. Natural enemies often found during the surveys were different species of spiders, carabid beetles, stephylinid beetles, *Brachymeria* spp. *Xanthopimpla* spp., *B. hebetor* and *G. nephantidis* etc. Among the natural enemies pupal parasitoids, *Brachymeria* spp. *Xanthopimpla* spp. and predators like spiders and carabid beetles were dominant. A good recovery of larval parasitoids could be seen where stage specific released were made. Based on the information got through surveys, the farmers were advocated about the timely measures to be adopted to suppressed the pest. The parasitoids of larval and pupal stages were supplied to the farmers in East and West Godavari districts to release in pest infested gardens from parasite breeding station, Ambajipeta on free of cost.

A coconut garden infested by coconut black headed caterpillar was selected, after removal and destruction of severely infested leaves, release of two larval parasites *viz.*, *Bracon hebetor* and *Goniozus nephantidis* and pupal parasite *Brachymeria nosatoi* was made. Prior to release of parasitoids an average pest population of 16.73 no./

Table 1. Incidence of coconut black headed caterpillar observed in coconut growing districts of Andhra Pradesh.

Name of the Districts	No. of villages	Intensity	Incidence of bio-agents (%)	
			Parasitoids	Predators
East Godavari	245	Severe in 12 villages	1 - 2	2 - 7
West Godavari	94	Severe in 16 villages	1 - 2	1 - 6
Visakhapatnam	55	-	-	-
Srikakulam	27	Severe in 4 villages	-	-
Krishna	2	-	-	-
Total villages:	423			

palm and the percentage of natural parasitism by larval parasites up to 6.7 % was recorded. After the periodical releases of parasitoids, the pest population came down to 8.7 % and the % parasitisation was increased from 6.7 to 30.1 % (Table 2) within the 9 months period. Venkatesan *et al.* (2004) evaluated the larval parasite *Goniozus nephantidis*, the pre pupal parasitoid, *Elasmus nephantidis* and the pupal parasitoid, *Brachymeria nosatoi* and found significant reduction in the population of the pest.

With an objective of evaluation of improved strain of predator, *Cardiastethus exiguus* in the field against *O. arenosella*, the study was executed in the year 2007 in pest infested coconut garden. The estimated pest population of 102.3/palm and predatory population of (*C. exiguus*) 3.6 % was recorded prior to the releasing of predator. Post release counts were recorded at monthly intervals on pest and predatory population in the garden. Post treatment counts revealed that a gradual decrease in pest count/palm from 102.03 to 40.0 and increasing predatory population from 3.6 to 21.5 % in a period of 4 months (Table 2). The minimum levels of pest population could be recorded along with predator in the month of March *i.e.*, pest population-5.4 /palm and 9.2% predatory population which indicated synchronization of predatory population with pest population. Later slowly the pest decreased in the garden.

Similarly, Kumar *et al.* (2008) observed high synchronization of predatory population with that of the pest and proved the effectiveness of *C. exiguus* as a predator of *O. arenosella* under field conditions because of certain desirable characters of predator like voracity of prey, rate of reproduction and synchronization of predator and prey populations.

From the studies, it can be concluded that the parasitoids of coconut blackheaded caterpillar (two larval, *Bracon habitor*, *Goniozus nephantidis* and one pupal, *Brachymeria nosatoi*) when released at appropriate stage could effectively bring down the pest population. *C. exiguus* was an another efficient

predator of *O. arenosella* and could suppress the pest population. This could be a new component added to the list of bio-agents; that can be mass multiplied in the laboratory and released to combat the early instar stages of the pest under east coast conditions. The findings at different locations under different climatic conditions also corroborates with the present finding. Chandrababu *et al.* (1997) attributed predation to temperature and R.H. Even though there was a controversy about the cannibalism of *C. exiguus* under field conditions could suppress the pest with in a short period of 4 months.

Besides these bio-agents, the other natural indigenous mortality factors such as carabid predator *Parena laticincta* Bates and several species of predators *viz.*, (Spiders) *Chiracanthium melanostoma* Thorell, *Olios lamarcki* Latreille, *Heteropoda laprosa* Simon and *Marpisa calcutaensis* Tikader take a heavy toll of different stages of this pest in the field and exert an

Table2. Pre and post treatment status of pest and natural enemy population.

Periods	Pest Status % (<i>O. arenosella</i>)		Status of natural enemies (%)	
	Pre	Post	Pre-treatment	Post-treatment
August'06	16.7/ palm	-	6.7 (Parasiti- sation)	-
April'07	-	8.7/palm	-	30.1
Nov'07	102.3	-	3.6 (Predator)	-
Dec'07	-	73.2	-	10 (Predator)
Jan'08	-	37.5	-	18.6 (Predator)
Feb'08	-	40.0	-	21.5 (Predator)
Mar'08	-	5.4	-	9.2 (Predator)

appreciable effect on pest population. These predators were seen in abundance and active even in hot months when the parasitoids activity was least. Hence, regular monitoring of coconut gardens for pest incidence, attending for suitable control measures specially release of bio-agents when the pest was at lower intensity saved the crop from severe yield losses.

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