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Observations on *Xanthopimpla* sp. (Hymenoptera : Ichneumonidae), a Pupal Parasite of *Opisina arenosella* Wlk. on Coconut in Kerala*

G. B. PILLAI and K. R. NAIR
Biocontrol Laboratory, Central Plantation Crops Research Institute,
Regional Station, Kayangulam, Krishnapuram, 690 533

ABSTRACT

A third species of *Xanthopimpla* (*Xanthopimpla* sp.), as a pupal parasite of the coconut caterpillar, *Opisina arenosella* Wlk. was observed in the coastal belt of Quilon district, Kerala. It breeds easily in the laboratory and is a high fecund species capable of producing more female progeny during its long life span. The mating and oviposition behaviour, life cycle, and method of mass rearing are described.

Key words : Behaviour, life cycle, mass rearing. *Xanthopimpla* sp. Biological control *Opisina arenosella*

Five species of ichneumonids *viz.*, *Brachycoryphus* (= *Goryphus*) *nursei* (Cameron), (Nirula *et al.*, 1955), *Eriborus trochanteratus* (Morley) (Dharmaraju, 1962; Perera, 1977; Pillai and Nair, 1986a), *Xanthopimpla punctata* F., *X. nana nana* Schulz. (Pillai and Nair, 1983) and *Xanthopimpla* sp. (Pillai and Nair, 1986 b) are known as the parasites of the coconut leaf eating caterpillar, *Opisina arenosella* Wlk. in India and Sri Lanka. *B. nursei* is an ectoparasite on the prepupal caterpillars and pupae. *E. trochanteratus* develops internally in the caterpillars, while *Xanthopimpla* spp. are internal pupal parasites. All of them are solitary parasites and are amenable to laboratory multiplication.

The existence of a third species of *Xanthopimpla* (*Xanthopimpla* sp.) in the coastal areas of Srayikad, Quilon district, Kerala state was brought out very recently. This parasite mates readily under laboratory conditions and breeds easily. It is a high fecund species capable of producing more female progeny during its long life span. It was, therefore, felt worth-while to rear it in the laboratory and liberate in the field to evaluate its performance in the biological suppression of *O. arenosella*, particularly in areas where it does not occur at present. In this paper brief accounts of the method of rearing in the laboratory, its mating behaviour, life history and description of stages are presented.

MATERIALS AND METHODS

The nucleus stock culture of the parasite was collected from parasitised

*Contribution No. 586 of Central Plantation Crops Research Institute, Kasaragod, 670 124

O. arenosella pupae. The method used by Pillai and Nair (1983) for rearing *X. nana nana* was used for laboratory rearing of *Xanthopimpla* sp. Mating behaviour of the parasite was studied under a stereomicroscope and in laboratory cages. The virgin female was transferred to a clean glass vial (7.5 X 2.5 cm) containing 3 to 4-day old males Biology of the parasite was studied at a range of 22-30° C temperature and 45-80% RH in the laboratory.

RESULTS AND DISCUSSION

Rearing the parasite in the Laboratory

The method used for rearing *X. nana nana* (Pillai and Nair, 1983) can be adopted for the successful laboratory culturing of *Xanthopimpla* sp. Ten mated females and a few males were introduced into glass bottle (18.5 X 8.5 cm) the mouth of which was covered with a piece of fine netting cloth. A piece of snake gourd leaf was placed over the cloth on which the host pupae were kept covered with another piece of muslin and fastened with rubber bands. Undiluted honey was provided to the adult parasites as minute droplets on a piece of wax-coated paper. Pupae of *Anadevidia peponis, Margaronia indica, Sylepta derogata* and *O. arenosella* were used as laboratory hosts. The parasitised pupae showed characteristic black patches and oviposition punctures on them. The host pupae were removed after an exposure period of 2 to 4h and fresh pupae provided for oviposition. The parasitised pupae were transferred to glass bottles or conical flasks of convenient size and covered with cloth. The adult parasites emerged were transferred to fresh containers for further use. The glass bottles containing adult parasites were changed whenever they became dirty.

Mating

The females of *Xanthopimpla* sp. were sexually mature at the time of emergence itself. It was found to be polyandrous and mated immediately on emergence with the earlier emerged males. The males became sexually active one day after emergence and were polygynous. Mating period lasted for 50 sec to 2 min. Male arched its antennae when it perceived the presence of the female. On mounting the female, the male assumed a parallel position and held the ventral side of the female's abdomen firmly with the claws of both the hind legs. Sometimes, the mesothoracic and methoracic legs of one side clasped with the claws of the metathoracic legs of the other side. When one or both the metathoracic legs held the ventral aspect of the abdomen of the female, the prothoracic legs held the wings. In the mean time, the male bent its abdomen, sought out the genital pore of the female and mated. The wings were held partially unfolded. Periodically, it fanned out the wings once and then stopped. This act was repeated till the termination of mating The male waved its antennae during mating, often touching the body of the female. The female terminated mating by virtually removing the male with its hind legs.

Oviposition

On arranging the host pupae in between the netting cloth and muslin cloth, the glass jar was kept horizontally on the table. As a result of thrusting of ovipositor and its clockwise and anticlockwise rotatory movements, the contents of the host pupae were slightly disorganised. The parasite fed on the host's haemolymph and then oviposited. Wing fanning was an indication of the deposition of egg. Four to seven minutes were required to lay an egg. The female parasite fanned the half-opened wings in slow speed for some time and then stopped and the act was repeated. Feeding on the host's haemolymph was continued every 2 to 3 days throughout the long life span of the female parasite, when *A peponis* pupae were used as hosts. Occasionally, the male parasite also fed on the haemolymph oozing from the punctures on the host made by the female parasite. Antennae were slightly vibrated or kept motionless during oviposition.

Life cycle

In the pupae of *O. arenosella*, *S. derogata* and *M. indica* the life cycle of the parasite was completed in 12 to 16 days while in *A. peponis* it took 13 to 20 days. The details of life cycle observed were:

Pre oviposition period	:	3 days
Egg period	:	28-30 h
Larval period	:	6-13 days
Pupal period	:	5-9 days
Egg to adult	:	12-20 days
Sex ratio (in A. *peponis*)	:	1:3 (Male : Female)
Host parasitising capacity	:	2 to 6 pupae (average 3 pupae day)
Longevity of females	:	1 to 4 months

Description of Life Stages

Egg : White, elongate, curved, chorion smooth, shiny, translucent, shorter than those of *X. nana nana* and *X. punctata*; anterior end broader and posterior end half of the anterior end; anterior end swollen prior to hatching.

Mature larva : Creamy, which subsequently changed into yellwish; anterior end pointed and smaller than the posteior end. Accumulation of fat globules was found towards the middle region; 14 mm long and 4 mm broad.

Prepupa: Yellowish, eyes brown, 13 mm long.

Pupa: Yellowish, head and thorax 3.5 mm long, abdomen 5 mm, ovipositor sheath 1 mm long. Abdominal segment with 5 pairs of punctations and a centrally placed conical marking in the last abdominal segment. Second and sixth segments without punctations. Punctations smaller than those of *X. nana nana*.

Adult *Xanthopimpla* sp. smaller than *X. punctata* and *X. nana nana*. The adults emerged from *O. arenosella* smaller, 7 mm long with 1.4 to 1.5 mm long ovipositor sheath and 7 mm wing expanse, while those reared on *A. peponis* larger, 9 mm long with 1.8 mm long ovipositor sheath and 8.5 mm wing expanse. However, the parasites emerging from *O. arenosella* pupae lived for longer periods.

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Parasites of the Pigeonpea Podfly, *Melanagromyza obtusa* (Malloch), in India*

S. SITHANANTHAM, V. RAMESHWAR RAO and W. REED
Legumes Program, International Crops Research Institute for the Semi-Arid Tropics, Patancheru 502 324

ABSTRACT

In a survey of parasites on the pigeonpea podfly, *Melanagromyza obtusa* (Malloch) (Diptera: Agromyzidae) in India, six genera -*Euderus* (Eulophidae), *Eupelmus* (Eupelmidae), *Eurytoma*, *Plutarchia* (Eurytomidae), *Antistrophoplex* (Torymidae) and *Ormyrus* (Ormyridae) were recorded during 1977-83. Data on monthly overall parasitism revealed peaks during February-March, when the pest populations are also usually high. In a two year (1980-82) study at ICRISAT Center, *Euderus* and *Ormyrus* were found to be the dominant parasites on *M. obtusa*. Difference in extent of parasitism was observed between samples from two pigeonpea cultivars-ICP 1 and HY 3C, which was probably related to host abundance. Surveys revealed that the genera - *Euderus* and *Ormyrus* are also dominant and widely spread in India and these should be conserved. The possibility of augmentation is also mentioned.

Key words: *Melanagromyza*, Parasites, *Eupelmus*, *Eurytoma*, *Antistrophoplex*, *Ormyrus*, influence of Host Plant Variety.

The podfly, *Melanagromyza obtusa* (Malloch) (Diptera : Agromyzidae) is a major pest of pigeonpea in India, particularly in the northern and central areas (Lateef and Reed, 1983). This insect is difficult to control with most insecticides because all the immature stages develop concealed inside the pods. The potential of natural control elements in suppressing this pest has not been assessed adequately. Information on parasites

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