

THE ADVANTAGES, DISADVANTAGES AND THE POSSIBILITIES  
OF THE UTILIZATION OF *BRACHYMERIA* PARASITES FOR THE  
BIOLOGICAL CONTROL OF *NEPHANTISSERINOPA*, THE  
BLACK-HEADED CATERPILLAR PEST OF COCONUT

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Joy and Joseph (1973) observed *Brachymeria* (*Neobrachymeria*)*nosatoi* Habu and *B. nephantidis* Gahan to be important pupal parasites of *N. serinopa* Meyrick, the black-headed caterpillar pest of coconut in Kerala. Since then detailed studies were undertaken to find out the merits and demerits of utilizing *Brachymeria* parasites for the biological control of *N. serinopa*.

Breeding trials were conducted in the laboratory to rear the parasites on various easily-available host materials. It has been noticed that *B. nephantidis* successfully parasitised *Plusia peponis*, *Sylepta derogata*, *Diaphania* (*Margaronia*)*indica*, *Corcyra cephalonica* etc. But the breeding of *B. nosatoi* has been found to be extremely difficult. Under laboratory conditions it rejected all host pupae including *N. serinopa*. But it occasionally accepted *N. serinopa* pupa when given intact on the coconut leaves. However unlike *B. nephantidis*, it is capable of thrusting its ovipositor across the coconut leaf into the *Nephantis* pupa. Hence *B. nosatoi* is capable of ovipositing on all pupae of *N. serinopa* irrespective of its location and the thickness of the pupal covering whereas *B. nephantidis* often failed to oviposit in a well-protected host pupa.

Some of the conspicuous advantages of using *Brachymeria* parasites for the biological control work of *N. serinopa* are the following:

1. *Ecological adaptation*: *Brachymeria* parasites are adapted to hot summer climate. This makes it more suitable than some other parasites of *N. serinopa* for biological control work in Kerala.

2. *Life span*: The life span of *Brachymeria* parasites is considerably longer (1 to 3 months) than many other parasites of *N. serinopa* utilized at present in the biological control campaign against the pest. It means that the parasite once released in the field will be active for a considerable period. The long life will also be helpful to the parasite to skip over unfavourable periods like the temporary absence of proper host stage in the field.

3. *Number of host pupae attacked for oviposition*: One female *Brachymeria* may attack 4 to 8 pupae in a day for oviposition. Thus it is possible that a single parasite during its long life-span is responsible for the destruction of a large number of host pupae.

4. *Long ovipositor*: The long ovipositor possessed by *Brachymeria* parasite enables it to attack even the well protected host pupa. *Trichospilus pupivora*, the only pupal parasite now employed in the biological control of the pest, has only a very short ovipositor with which it may be difficult to reach the host pupae; especially those provided with thick pupal covering.

5. *Development period*: The development of the parasite inside the host is completed within a short period of about 2 weeks. Hence a short duration will be sufficient to build up the parasite population.

6. *Natural enemies*: Though reports of hyperparasitism on *Brachymeria* parasites of *N. serinopa* have been received, during the present investigation no incidence of any natural enemies on the parasites was met with. The adult parasites are also found to be free from fungal, bacterial or virus attack.

7. *Host defences*: Host defences like violent wriggling, protective covering, hard cuticle, encapsulation of the parasite, etc., are known to have a strong bearing in the biological control of a particular host (pest) species. In the case of *N. serinopa*, the wriggling movements during oviposition are not often violent enough to dislodge the parasite most probably because of the peculiar structure of its hind leg with well developed femora provided with teeth and the long and arched tibiae. The host pupa is usually protected well inside the cocoon. But *Brachymeria* parasites often successfully tackle them due to reasons given earlier. The host cuticle is not hard enough to prevent oviposition. Again, no instances of an encapsulation of the parasite egg or larval stages have been observed, and the phenomenon appears to be absent in *N. serinopa* against *B. nephantidis*.

*Brachymeria* parasites have certain disadvantages too as agents in the biological control work. They are:

1. Only one *B. nephantidis* is obtained from a host pupa and only 4-8 eggs are laid by a parasite a day. This means that the building up of a large population of the parents for biological control work will involve a considerable time, labour and expenses. The position is more critical in the case of *B. nosatoi* in which successful oviposition itself is difficult. Hence the mass breeding of these parasites seem impracticable.

2. During sultry weather these parasites are quite inactive and during these periods oviposition and mating are rare.

3. Under laboratory conditions *B. nephantidis* is incapable of distinguishing parasitised and non-parasitised pupae especially within 3-4 days of oviposition. Thus a certain percentage of the parasite's reproductive potential is wasted when superparasitism occurs.

4. It may be noted that *B. nephantidis* and *B. nosatoi* are already present in the field as natural parasites of *N. serinopa*. In spite of the presence of *B. nephantidis*, outbreak of *N. serinopa* occurred in many parts of Kerala and hence the efficacy of *B. nephantidis* can be fully ascertained only after thorough field studies. However, with the available information, *B. nephantidis* does not seem to be very promising for the control of *N. serinopa*. But the picture is different in the case of *B. nosatoi*. Absence of *B. nosatoi* in the natural parasite population is noted in all localities of heavy incidence of *N. serinopa*. Hence its role in the control of *N. serinopa* needs thorough investigation. Theoretically the introduction of *B. nosatoi* in areas of heavy incidence of *N. serinopa* should lead to its control, but problems of mass breeding, multiplication and unsteady oviposition habits of this parasite remain to be solved.

**Summary**

This paper deals with the advantages and disadvantages of utilizing *Brachymeria (Neobrachymeria) nosatoi* and *B. nephantidis* as agents for the biological control of *Nephantis serinopa*.

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