

Biology, Ecology and Management of the Bagworm, *Cryptothelea crameri* Westwood (Psychidae : Lepidoptera) in Bangladesh

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Abstract

The bagworm, *Cryptothelea crameri* Westwood (Psychidae : Lepidoptera) is an important pest of many ornamental, horticultural and forest plants in Bangladesh. The larva feeds on young leaves and tender bark by making and living within a portable bag of leaves, twigs, barks, spines, etc. The biology, host range, number of generations, and seasonal abundance of the pest have been dealt with in this paper. *Brachymeria* sp. (Braconidae : Hymenoptera) was found to parasitize its larva. The pest could be collected and destroyed by hand. It could also be controlled by the foliar application of malathion (Malathion 57 EC) at 0.1% concentration.

সারসংক্ষেপ

বাংলাদেশের বিভিন্ন শোভাবর্ধক, ফলজ ও বনজ গাছ আক্রমণকারী থলে পোকা *Cryptothelea crameri* একটি গুরুত্বপূর্ণ পোকা। গাছের পাতা, ডগা, বাকল, কাঁটা প্রভৃতি দিয়ে তৈরি চলন্ত থলেতে অবস্থান করে পোকাকার শুককীট গাছের কাঁচি পাতা ও নরম বাকল খায়। পোকাকার জীবন বৃত্তান্ত, পোষক গাছ, বছরে প্রজন্ম সংখ্যা এবং ঋতুভেদে প্রাচুর্যতা সম্বন্ধে এ প্রবন্ধে আলোকপাত করা হয়েছে। *Brachymeria* নামক এক প্রজাতির বোলতা এ পোকাকার শুককীটের পরজীবী হিসেবে দেখা গিয়েছে। এ পোকা হাত দিয়ে ধরে মেরে ফেলা যায়। ম্যালাথিয়ন ৫৭ ইসি নামক কীটনাশক ০.১% হারে গাছের পাতায় প্রয়োগ করেও এ পোকা দমন করা যায়।

Key words : Bagworm, Bangladesh, *Brachymeria* sp., *Cryptothelea crameri*, ecology, host range, pest management, seasonal abundance

Introduction

The bagworm, *Cryptothelea* (= *Clania*) *crameri* Westwood (Psychidae : Lepidoptera) is a polyphagous pest attacking many ornamental, horticultural and forest plants. It is reported from the western part of the Oriental region and found widespread in India, Pakistan and Sri Lanka (Browne 1968). Occasionally it becomes a serious

pest of some tree species leading to complete defoliation, especially in their sapling stage. However, very little information on this insect is available (Beeson 1941, Browne 1968, Ahmed 1992). The information on this pest from Bangladesh is still more rare (Rahman *et al.* 1997). The present study was, therefore, undertaken to work out the biology, ecology and management of the pest in Bangladesh.

Materials and methods

General observations on the incidence of the bagworm were made during 1996-1999 by periodic visits in various plantations. The bagworms were collected along with the infested leaves of the host plants and reared in the laboratory of the Bangladesh Forest Research Institute, Chittagong at room conditions ($26.0 \pm 5.7^\circ\text{C}$ and $81.2 \pm 3.8\%$ r.h.). The twigs with the leaves were kept in bottles with water to keep the leaves fresh so that the larvae could feed on them. The bottles were kept in rearing chambers. The twigs were changed every 2 to 3 days. Various host plants were recorded in the field, and the twigs of those hosts plants were also offered to the larvae from time to time. The insect was reared throughout the year to assess the number of generations in a year. Since the larvae live inside the bags, it was not possible to determine the number of larval instars. The biology of the insect reported herein is based on larvae reared on *Thuja* sp. The measurement and duration of various developmental stages of the pest were based on observations on 10 individuals in each case. Since insecticides are sometimes required to suppress the pest outbreaks, three insecticides, namely malathion (Malathion 57 EC), cypermethrin (Ripcord 10 EC) and phosphamidon (Dimecron 100 EC), each at 0.1% concentration, were tested in the laboratory by feeding the larvae with leaves treated with the insecticides.

Results and discussion

Nature of damage

The larva feeds on the young leaves and tender bark. The damage is greatly increased by pruning off the twigs, growing shoots, or buds, etc. required in making the bag. The infestation is patchy, possibly due to the flightlessness of the females. When the damage is extensive the leaves dry up and fall off. In extreme cases the tree may be completely leafless. In addition to an unestimated growth loss, it results in either partial

(die back) or complete death of many trees. In a heavy infestation, hundreds of bags can be seen hanging from the infested branch (Fig. 1).



Figure 1. Bagworms with their bags hanging from twigs of *Thuja* sp.

Host range

The recorded hosts of the pest in Bangladesh are *Acacia catechu*, *A. nilotica*, *Albizia* spp., *Bischofia javanica*, *Bombax ceiba*, *Casuarina equisetifolia*, *Delonix regia*, *Ficus religiosa*, *Hevea brasiliensis*, *Lagerstroemia speciosa*, *Lawsonia inermis*, *Litchi chinensis*, *Punica granatum*, *Psidium guajava*, *Syzygium* spp., *Tamarindus indica*, *Terminalia chebula* and *Thuja* sp. It is also recorded on cacao and tea (Beeson 1941, Brown 1968).

Biology

Egg : Each female lays, on an average, 150 ± 50 eggs. The eggs develop inside the bag. The incubation period is 22 ± 3 days. The sex ratio is male-biased, the proportion of male to female being 7:1.

Larva : The newly hatched larva is 1.3 ± 0.2 mm long, whereas the mature larva is 15 ± 2 mm (Fig. 2) and the bag may be up to 5 cm long. As the

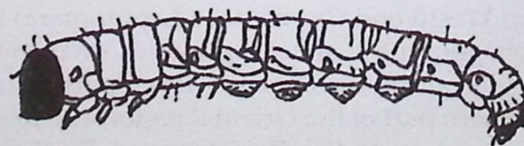


Figure 2. Mature larva of *C. crameri*.

larva emerges from the mother's bag, it disperses quickly with silken threads and within few hours makes a protective bag around its body. The larva inhabits within this portable bag of more or less parallel pieces of leaves, twigs, barks, spines and other extraneous materials spun together with silk (Fig. 1). The bag resembles the background so that it is difficult to recognize. The anterior and posterior ends of the bag are open. The larva carries this bag as it moves. The young larva carries its bag upright. But in later instars the bag is carried in a pendant position. When it moves only the head and thorax come out of the bag. The larva adheres to the food plant by sharp claws of its legs, and its abdominal prolegs help it to remain attached to the bag. When at rest it attaches the rim of the bag to a twig by means of silk thread so that it hangs suspended. The larva retires inside the bag and draws together the mouth entirely closing it. The bag becomes larger and heavier as the larva grows. The larval period is variable, usually 50 ± 10 days, depending primarily on the temperature, which is longer in winter and shorter in warm months.

Pupa : When feeding is completed the larva undergoes pupation inside the bag hung from a twig of the host plant by a silken thread. The pupal period lasts for 17 ± 3 days.

Adult : There is a great sexual dimorphism in the adult stage. The male with bipectinate antennae is a normal winged moth (Fig. 3), whereas the female is creamy yellow, wingless and without appendages. The male moth has a wing span of 6.5 ± 0.5 mm. The wings are reddish brown streaked with black, with the middle of the forewings translucent. The male takes rest for some time, walks and then eventually flies. The wingless female moth cannot fly and never leaves her bag. Mating is facilitated by the male flying on the hanging bag bearing the female and inserting its protrusible abdomen through the posterior opening of the bag. On the first day of emergence the male attempts to mate. Both the adults have a short longevity, about 2.5 ± 0.5 days. During this

time they do not take any food. After laying eggs the female forces herself out of the bag and falls to the ground and dies.

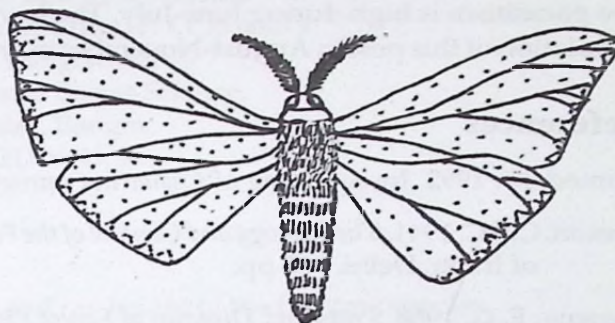


Figure 3. Adult male moth of *C. crameri*.

Number of generations

The life cycle is usually completed in 2.2 ± 0.2 months. There are four generations in a year. The first generation starts in April, the second in July, the third in October and the fourth in December. The adult moths appear respectively in June, September, December and March. They overwinter in the larval stage.

Seasonal abundance

The abundance of the bagworm is maximum in April-July and minimum in September-March. However, this varies from host to host, as the larvae prefer to feed on the young leaves. They migrate from one host to another as the leaves become old in a host. Observation suggests that the bagworm outbreak is dependent on the host stress caused by adverse site or environmental factors. However, this aspect needs further study.

Management

Physical : At the initial stage, the population of the bagworm could be suppressed by collecting and killing them by hand.

Biological : The wasp, *Brachymeria* sp. (Braconidae : Hymenoptera) was found to parasitize its larva. After getting parasitized the host larva stops feeding and becomes inert, though it pupates normally but never develops to adult. The parasitism is high during June-July. The low population of this pest in August-November may

be attributed to the parasitism or to the incidence of pathogenic diseases. Assessment to their impact on the pest population requires further study.

Chemical : Out of the three insecticides tested, malathion at 0.1% concentration was found most effective.

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