

LABORATORY REARING OF TEAK DEFOLIATOR (*Hyblaea puera*)

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ABSTRACT

Teak defoliator, (*Hyblaea puera*) the most serious pest of teak in Sri Lanka, causes severe seasonal defoliation. Teak plants may sustain considerable growth loss due to the loss of foliage and reduced vigour. Rearing this insect in the laboratory is essential for conducting studies on control strategies. The experience gained by maintaining cultures in the laboratory for several generations of the insect has been used to produce some guidelines for successfully maintaining a laboratory culture. Methods of field collection, rearing in the laboratory, implements, tools, the problems arising when long-term culturing and possible solutions are discussed.

INTRODUCTION

Teak defoliator (*Hyblaea puera*) is an important pest of teak in Sri Lanka. It is the larval (*caterpillar*) stage of a moth of the family Noctuidae. The caterpillar feeds mainly on teak leaves but it lives on several other plant species (Beeson 1941, Bhatiya 1941). In Sri Lanka it reaches epidemic levels twice a year and causes defoliation ranging from 10 to 100 percent in teak (Tilakaratna 1993). The loss of foliage reduces the vigour and retards the growth of the trees. Studies have found up to 44 percent growth loss or 80 percent gain in additional increment when trees are protected from defoliation (Anon 1985). Attempts to develop bio-control strategies for this pest are in progress (Ahmad 1990). A laboratory culture is an important requirement for conducting such studies. The experience gained in rearing several generations of this insect in laboratory conditions is presented here.

METHOD

Field collection

It is most convenient to collect caterpillars and pupal stages. Adult and egg stages are difficult to find and collect in the field. During epidemics, caterpillars and pupae are available in abundance in teak plantations. Pupae can be found in folded leaf edges on teak leaves as well as on leaves of ground cover and litter. They can be collected by tearing off the portion of leaf and transporting to the laboratory using a wide mouthed container. The caterpillars are mostly active during the early hours of

the morning and in the late afternoon. These are the best times for collection. They can be detected easily as they often stay inside a folded leaf edge - they jump out from the leaf when disturbed. Therefore, a collecting jar or box should be held below the leaf. They can be pushed into the container using a soft haired paint brush. The container should have a few freshly picked tender teak leaves on the bottom and be closed with a piece of mosquito netting or muslin cloth using a rubber band. Caterpillars can be kept for 6 to 8 hours in this way.

Rearing in the laboratory

As soon as caterpillars are brought to the laboratory they should be transferred to a larger container. Generally, 45 x 30 x 10 cm wooden boxes (Figure 1) are suitable for this purpose. The lid should consist of mosquito netting fitted to a wooden frame. Fresh tender teak leaves should be provided. The withering of leaves can be delayed by wrapping leaf stalks with moistened cotton wool. Every morning, caterpillars in rearing boxes need to be transferred to new rearing box containing fresh tender leaves.

The used boxes should be thoroughly washed and sun dried before re-using. It is not necessary to provide water for the caterpillars as moisture obtained from leaf tissue is sufficient for their growth. After 11 to 16 days of feeding, caterpillars start pupating. They spin a pupal chamber attached to a folded leaf or on the edge of the box. These pupating caterpillars should not be disturbed. Pupation is completed in 24 hours. Once the pupation is complete, pupae are removed and put into a cage. Adults will emerge after 3 to 4 days. They should be fed with a strong sugar solution.

For this, a vial containing sugar solution with a cottonwool cap is hung from the roof of the cage (Figure 2).

Field collected pupae can be directly put into a cage for emerging. The dimensions and the shape of the cage is shown in the diagram (Figure 2). The top half of one side should be covered with nylon mosquito netting to provide better light and easy viewing. The lower half of the same side should be fitted with an opening with a collar for handling the insects in the cage.

Egg laying starts after 2-3 days. It is mostly done between 3 to 6 pm. Eggs can be obtained by placing a potted teak plant into the cage containing adults. Plants should be checked for ants and spiders before putting them in the cage.

Eggs can also be obtained by attaching a piece of muslin cloth to the mosquito netting inside the cage. The moths lay eggs on this cloth which can be removed and placed on teak leaves in a rearing box. When the eggs have been laid on a teak plant (eggs can be seen as off-white dots) it should be removed from the cage and placed in a rearing box (Figure 3).

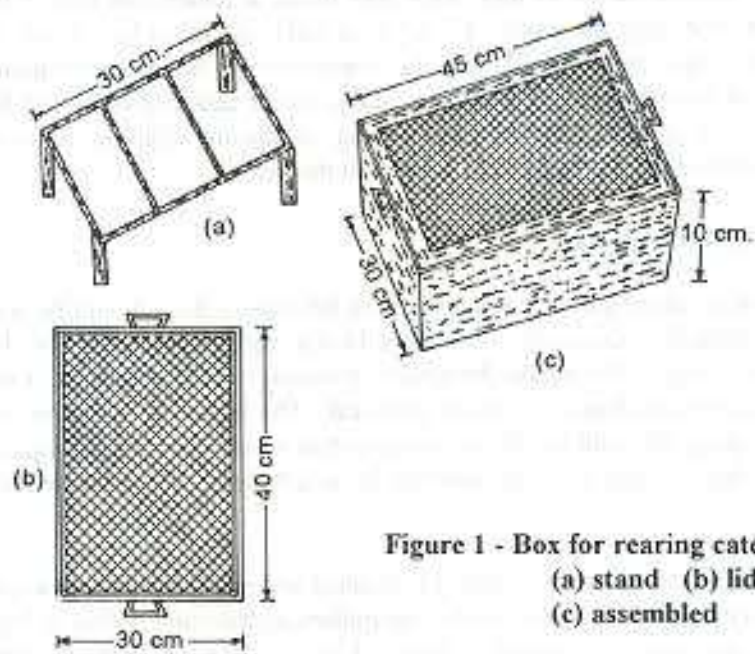


Figure 1 - Box for rearing caterpillars
(a) stand (b) lid
(c) assembled

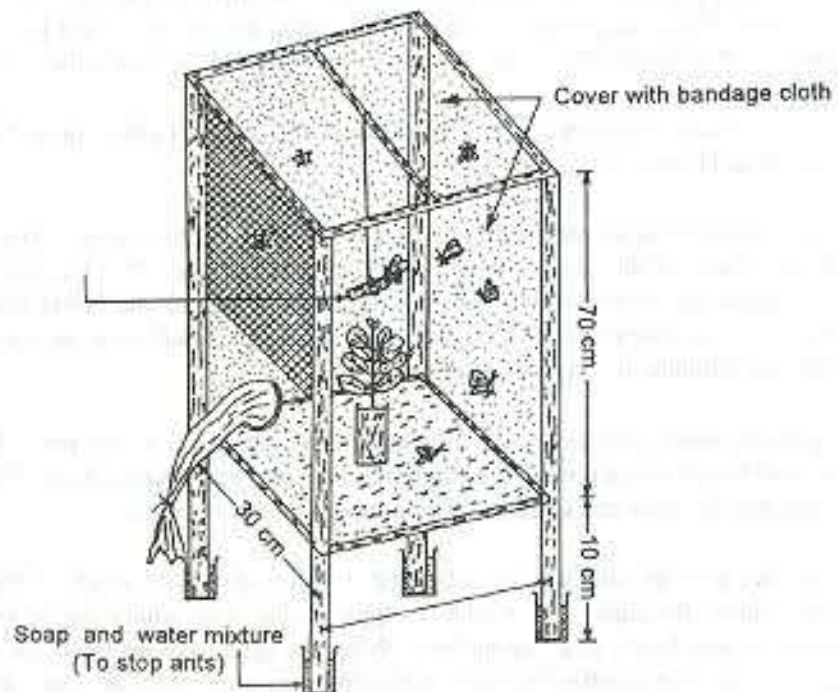


Figure 2 - Cage for rearing adults (moth)

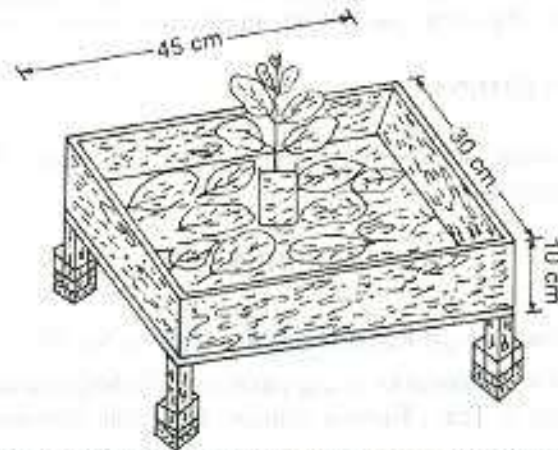


Figure 3 - Teak plant with eggs kept in a rearing box containing tender teak leaves

Eggs start to hatch after 2 days. Minute caterpillars appear and start to nibble the leaves. They start to descend from the plant using a silky thread. Fresh tender teak leaves should be put on the floor of the cage. These caterpillars should be transferred to rearing boxes. The providing of teak leaves and the changing of boxes should be done as previously described until pupation.

This process can be repeated for each generation and the culture can be continued for any period. The culture should be protected from predators such as geckos, spiders and ants. Precautions should be taken to prevent in-breeding depression in the insect population as a result of repeated breeding within a limited population. This will reduce the vigour and make insects susceptible for diseases. This can be achieved by the periodic addition of fresh samples (collected in the field) to the laboratory culture. During the off-seasons, exchange of insects between different laboratory cultures helps overcome this problem.

It is important to note that throughout the entire process, the culture equipment and the laboratory conditions must be clean and hygienically maintained.

CONCLUSIONS

Important considerations for successfully maintaining a culture in the laboratory are:

- 1) Collect healthy looking insects. Avoid damaged, diseased or weak insects.
- 2) Transport immediately to the laboratory.
- 3) Provide sufficient ventilation and do not subject insects to heat during transport.
- 4) Always use well cleaned and dried containers and equipment.
- 5) Protect from ants, spiders and other possible predators.
- 6) Provide fresh tender teak leaves. Replace withered leaves without delay.
- 7) Handle insects carefully.
- 8) Remove dead or diseased insects from the culture immediately

- 9) Periodically add a few insects from an external source to reduce inbreeding.

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