

## Pests of Mulberry

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**Experiment No. 6:** Identification of mulberry pests. Study of nature of damage and control measures of the Leaf roller, Bihar hairy caterpillar, scale insect, mealy bug, thrips, beetles, jassids and grasshoppers.

1. **Leaf roller:** *Diaphania pulverulentalis*, belongs to the family Pyralidae, order Lepidoptera of the class Insecta.

(a) **Life Cycle:** The female moths lays 50-80 eggs at the rate of 1-2 eggs per epical shoot of mulberry plant and they hatch after 2-3 days. The larvae have 5 instars which last for 8-12 days. The caterpillars feed on leaves and produce silk filaments when they grow which binds the leaf blades together. The mature caterpillar normally turns into pupa in the soil or in dry leaves and lasts for 7-9 days. The total lifecycle completes from 17-24 days.



Larva of leaf roller



(b) **Type of damage and symptoms:** The larvae defoliate on the apical shoot after binding the tender leaves together and inhibit the growth of plants.

(c) **Period of occurrence:** Infestation starts with onset of monsoon, remains up to February, but maximum infestation is observed from September to November.

**(d) Management:**

- (i) Pruning of the infested branches followed by the destruction of the caterpillars by burning or dipping in 0.5% soap solution.
- (ii) Spraying of mulberry with 0.76% per cent DDVP (2, 2 dichlorovinyl dimethylphosphate) (Dichlorvas) with a safe period - 17 days.
- (iii) Release of *Trichogramma chilonis* at the rate of 1 Trocho card / acre for 4 weeks.

[Note: Do not spray any insecticide after release of egg parasitoid]

**2. Bihar hairy caterpillar:** *Spilosoma obliqua*, belongs to the family Arctidae, order Lepidoptera of the class Insecta.

**(a) Life Cycle:** Adults are light brown with brick red abdomen, peppered with dark row of spots laterally and dorsally. 1000-2000 eggs are laid in batches on the lower surface of the leaf. Eggs hatch in 5-7 days. Caterpillars moult six times. Fully grown caterpillar measures 4.5 to 5 cm. Anterior and posterior regions are black in colour and the rest of the body is reddish brown. The pupa is dark brown in colour and measures about 2cm in length. Pupal period lasts for 12-14 days. The life cycle is completed in about 48 days.

**(b) Type of damage and symptoms:** Gregarious young caterpillars feed upon the chlorophyll layer of the leaf exposing the veins. Late instar caterpillars are voracious eater of mulberry leaves.

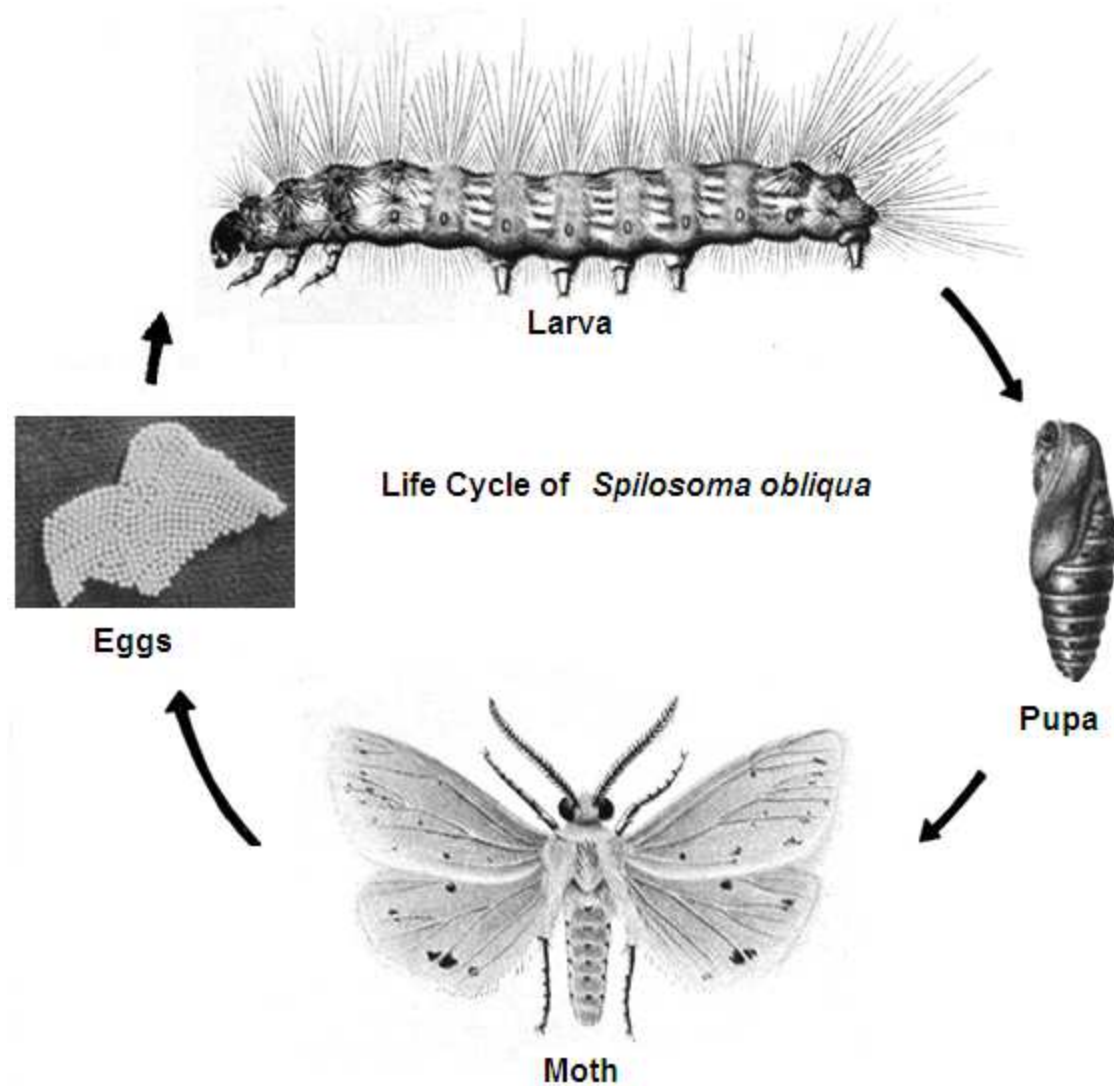
**(c) Period of occurrence:** Incidence is frequent from August to February.

**(d) Management/Control:**

- (i) Installation of light traps to attract adults.
- (ii) Collection and destruction of egg masses and gregarious young instars caterpillar.
- (iii) Deep ploughing and flood irrigation for exposing and killing the pupae.
- (iv) Spraying of 0.2 per cent Dimethoate (safe period -13 days) or DDVP (safe period-17 days) on mulberry plants to kill the caterpillars.



**Fully Grown Larva**

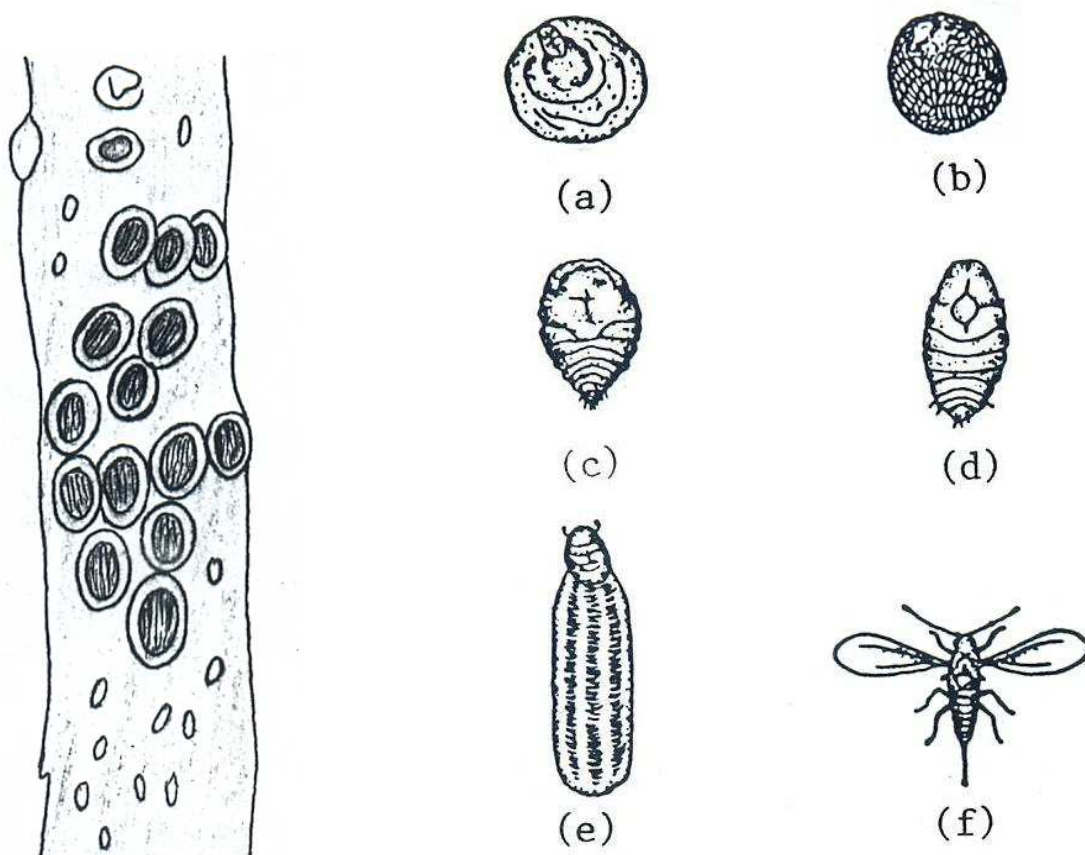


**3. Scale insect:** *Saissetia nigra*, belongs to the family Coccidae, order Hemiptera of the class Insecta.

**(a) Life Cycle:**

Adult female lays 300-600 eggs which are minute, white, elongated and hatches in about 6 days. Within a few hours the nymphs crawl and select the place of feeding on the stem. It secretes a fibrous waxy material which hardens to form scale. Female moults three times and male twice. In the process of moulting, they loose the appendages and become sedentary. Reproduction takes place parthenogenetically.

**(b) Type of damage and symptoms:** They suck the sap of the plants and affected shoots start dying from the distal end. The affected shoot is studded with thousands of dark brown or black scales. Yellowish or mottled appearance of the leaf blade can also be noticed



### Mulberry plant infested by scale insect

- |                                               |               |
|-----------------------------------------------|---------------|
| a. Female Scale                               | d. male       |
| b. Female Scale and mass of eggs inside scale | e. Male Scale |
| c. Female                                     | f. Male adult |

(c) **Period of occurrence:** Generally during summer months.

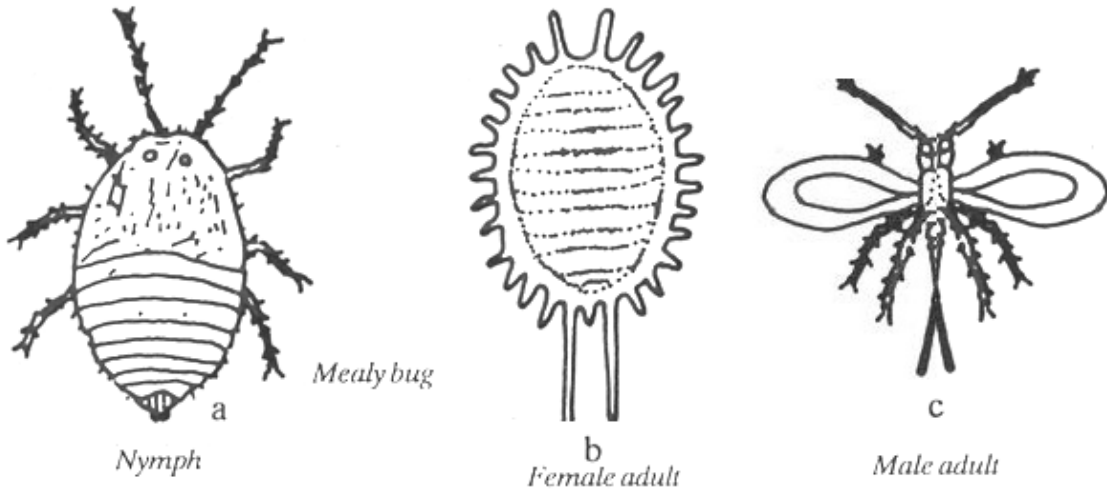
#### (d) **Management:**

- (i) Swabbing of diesel and soap emulsion (1:3 ratio) dislodges the scale insect.
- (ii) Scrapping with a blunt edge wooden plate also dislodges these insects.
- (iii) Swabbing of Lime-Sulphur mixture on stem is also effective.
- (iv) Spraying 0.05% malathion with 10 days of safe period controls the insect attack.

**4. Mealy bug:** *Maconellicoccus hirsutus*, belongs to the family Psedococcidae, order Hemiptera of the class Insecta. This is commonly known as mealy bug and is associated with mulberry plants showing symptoms popularly known as Tukra.

(a) **Life Cycle:** Each adult female deposits 350-500 eggs in a loose cottony terminal ovisac during a week's time. Eggs are elongated in shape and orange in colour. Hatching takes place in about 5-10 days, depending upon the climatic conditions. The crawlers are

also orange in colour. Nymphs are covered with mealy substances. The females have three while males have four nymphal instars, which are passed in about 25 and 26 days respectively. Adults reproduce parthenogenetically. They mate but do not feed and die in 2-3 days.



**Mealy Bug Mealy**



**Bug on Mulberry Plant**



**Tukra Symptoms**

**(b) Type of damage and symptoms:** The leaf yield is tremendously reduced and is depleted in nutritive values.

**(c) Period of occurrence:** Mostly in summer months.

**(d) Management:**

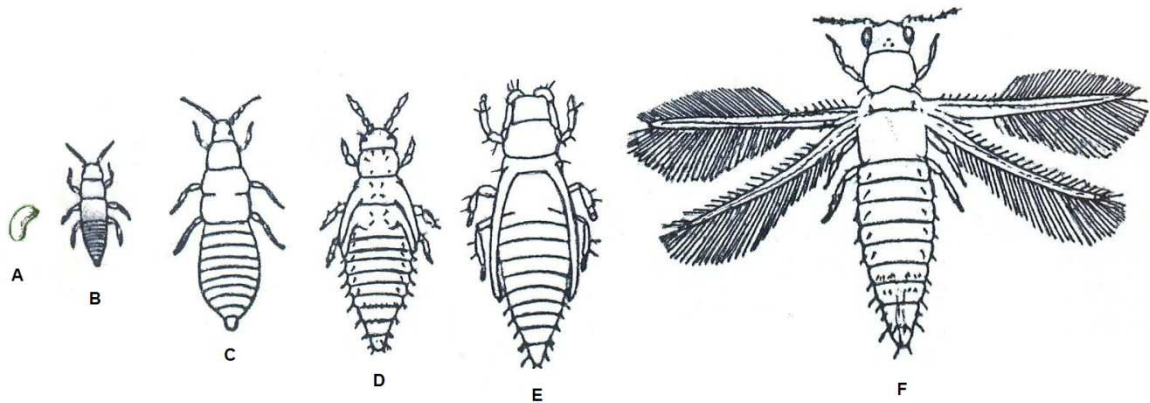
(i) Removal of the affected shoot and burning.

(ii) Spraying of 0.01 percent parathion is useful in controlling the pest. Safe period - 13 days.

**5. Thrips:** *Pseudodendrothrips mori*, belongs to the family Thripidae, order Thysanoptera of the class Insecta.



**(a) life Cycle:** Adult males of *P. mori* is brownish yellow whereas female is dark brown in colour. Females are larger than males. On an average an adult measures 0.9 mm in body length. 30- 50 bean shaped yellow coloured eggs are laid by a single adult female of *P. mori* on the ventral side of the leaf. Nymphs hatch from these eggs in 6-8 days. The nymphs are pale yellow coloured. They moult four times in 15-18 days. Adults are with fringed wings.



A. Egg

B-E. Nymphs of first, second, third and final instars

F. Adult



**Infested Plant**

**(b) Type of damage and symptoms:** Thrips sucks the sap.

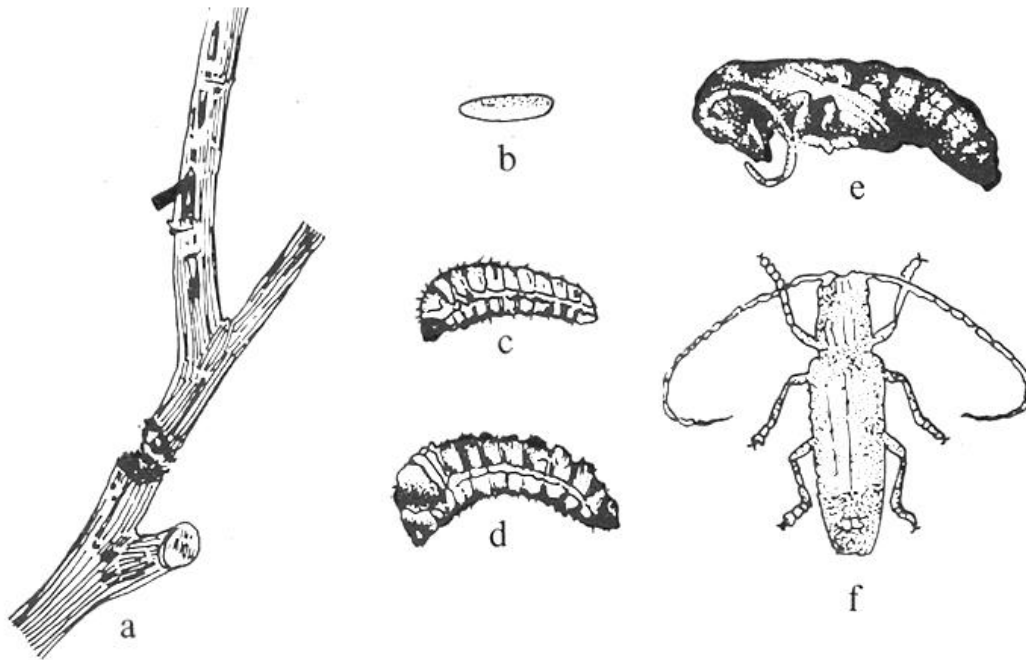
**(c) Period of occurrence:** Throughout the year and very high in summer months.

**(d) Management:**

(i) Sprinkler irrigation disperses the nymphs and adults.

(ii) Spraying of 0.02 percent DDVP twice at weekly intervals to kill the nymphal and adult stages. Safe period - 7 days.

**6. Stem girdler beetle:** *Sthenias grisator*, belongs to the family Cerambycidae, order Coleoptera of the class Insecta.



(a) **Life Cycle:** Adult insect is a stout built longicorn beetle with strongly developed mouth parts. Female deposits eggs underneath the bark of the girdled branch at night. The incubation period is about 8 days. The grub tunnels into the wilting branches and feeds. Grubs turn into pre-pupa and pupa inside the tunnel. The whole life cycle lasts for 7 to 8 months.

(b) **Type of damage and symptoms:** This beetle has a peculiar habit of ringing the stems, the bark and wood are neatly cut around the main stem or branch leaving a clear girdle. The portion above the girdle gradually wilts and dies. Girdled branches of the plant or wilting plants are observed in the garden.

(c) **Period of occurrence:** Throughout the year.

(d) **Management:**

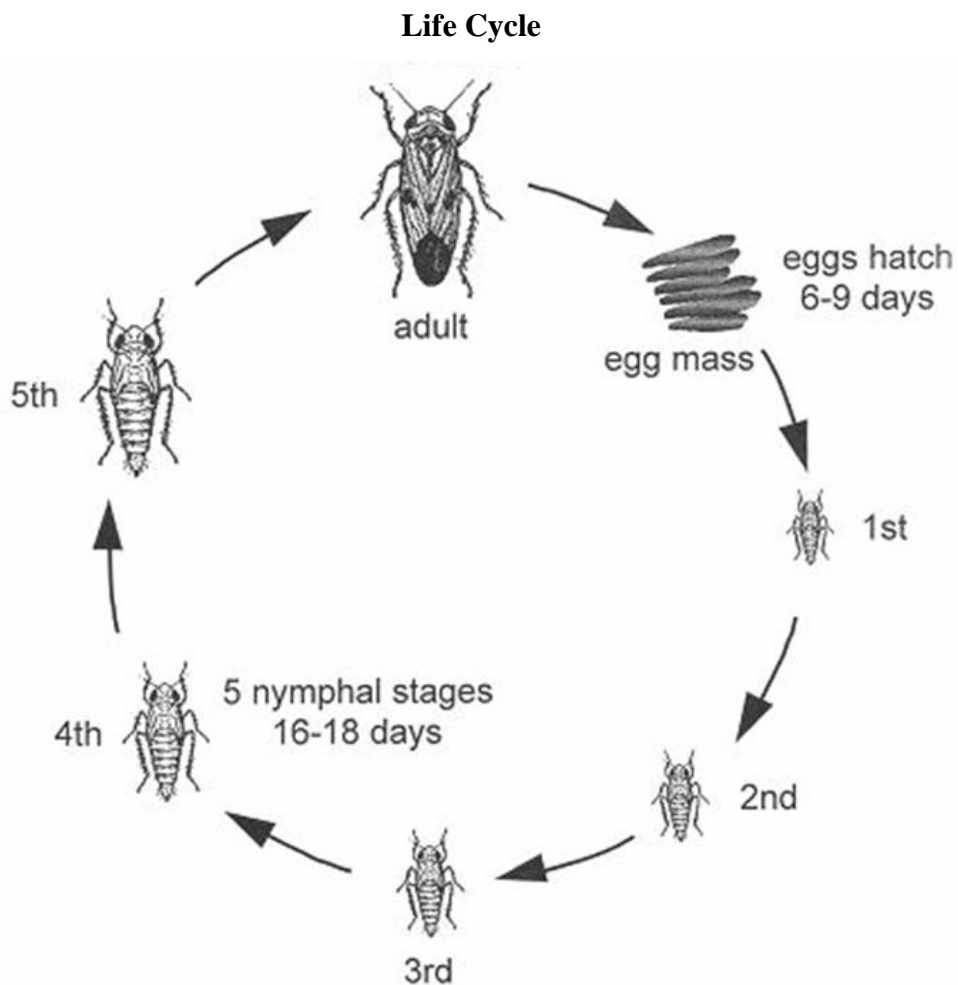
- (i) Cutting and burning of the branches and stems showing the symptom of beetle attack.
- (ii) Swabbing of the base of main stem or branches with 0.1 percent BHC (Benzene Hexachloride) solution (Safe period - 11 days) or 0.1 per cent malathion emulsion (safe period-13 days)

**7. Jassids:** *Empoasca flavescence*, belongs to the family Cicadellidae, order Lepidoptera of the class Insecta. This insect is commonly called as leaf hopper or plant hopper.

(a) **Life Cycle:** Adults are pale green in colour. They measure 2.5 to 4 mm in body length. Adults and nymphs move sideways. Eggs which are pale yellow, and laid on the lower

surface of leaf below the epidermis. Eggs hatch in 4-9 days. Nymphs moult four times and are pale green in colour. Pupation takes place on leaf itself.

**(b) Type of damage and Symptoms:** The adults and nymphs attack the mulberry leaves from lower side of the margin of the veins. The characteristic symptoms of jassid attack are known as hopper burn. In this, a triangular dark brown spot appears at the tip followed by such patches along the margin of veins. It starts from periphery and extends towards the midrib of the leaf. In the final stage of attack the leaf becomes cup shaped and withers easily from the plant.



**(c) Period of occurrence:** Usually during summer months.

**(d) Management:**

- (i) Setting light traps for attracting and trapping adults.
- (ii) Spraying 0.1% Dimethoate (Rogar) or 0.05% DDVP (Nuvan) is effective with a safe period of 11 days.

**8. Grasshopper:** *Neoorthocris acuticeps nilgriensis*, belongs to the family Acrididae, order Orthoptera of the class Insecta. This is commonly called as wingless grasshopper.



**(a) Life Cycle:** Adults are greenish in colour. Female lays average 6-8 egg pods, each having 11-18 eggs. Egg pods are deposited in the loose soil at a depth of 2-3 cm. Eggs hatch in about 28-31 days and nymphs undergo six moults. Early instar nymphs are light brown in colour whereas late instar nymphs are green in colour. It completes its life cycle in 5-6 months.



**Egg**

**Nymphal Instars**

**Adult**

**(b) Type of damage and Symptoms:** Nymphs and adults of this pest voraciously feed upon the mulberry leaves and leaf yield is reduced considerably. Branches of plants without leaves are observed in the mulberry garden.

**(c) Period of occurrence:** The attack is recorded during July-August.

**(d) Management:**

- (i) Exposing egg masses by deep ploughing for destruction by natural enemies.
- (ii) Spraying 0.5% BHC with a safe period of 15 days is useful in controlling the pest.

#### REFERENCES

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3. Rangaswamy, G., Narasimhanna, M.N., Kasiviswanathan, K., Sastry, C.R. and Jolly, M.S. 1976, Sericulture Manual, Vol. 1, Mulberry Cultivation, FAO, United Nations, Rome.

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