PESTS OF MULBERRY

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A destructive insect or other animal that attacks crops, food, livestock, *etc.*

An annoying person or thing; a nuisance

A general term for organisms (rats, insects, etc.) which may cause illness or damage or consume food crops and other materials important to humans.

An organism that is considered a nuisance to man.

Mulberry, like most of the economic plantations and field crops, is also subject to the attack of a vast pest complex belonging to a large number of insect orders, acarids, mollusks, *etc*.,.

The insect pests of mulberry belongs to the following orders:

(a) Lepidoptera
(b) Hemiptera
(c) Coleoptera
(d) Thysanoptera
(e) Orthoptera
(f) Isoptera

- **MAJOR- Bihar Hairy Caterpillar, Leaf Roller, Mealy Bug and Thrips.**

- **MINOR - Girdlers, Termites and Mites.**

Life cycle of *Spilosoma obliqua*

Dark brown; 2 cm
Pupation 12-14 days

Light Brown with brick red abdomen with dark row of spots laterally and dorsally
6-7 days

Female lays 1000-1200 eggs
Incubation 5-7 days

Life Cycle - 48 days
Incidence is severe: August- February

Caterpillars moults 6 times

Fully grown larva measures 4.5-5 cm, 20-22 days

TYPE OF DAMAGE AND SYMPTOMS

These hairy caterpillars scarp the under surface of the leaf when they are in neonate (early) stage.

Later the scrapped patches of the leaves can be easily detected.

Full grown larvae devour the entire foliage, flowers and growing points.

MANAGEMENT/CONTROL

1. Physical/Cultural
2. Chemical
3. Biological

MANAGEMENT/CONTROL

1. Installation of light traps
2. Digging the trenches to prevent the movement of larvae
3. Deep ploughing and flood irrigation.
4. Collection and destruction of egg masses
5. Poison bait
6. Spraying of 0.2 % Dimethoate – safe period
7. 13 days or DDVP – safe period 17 days
8. Using hyperparasotoids

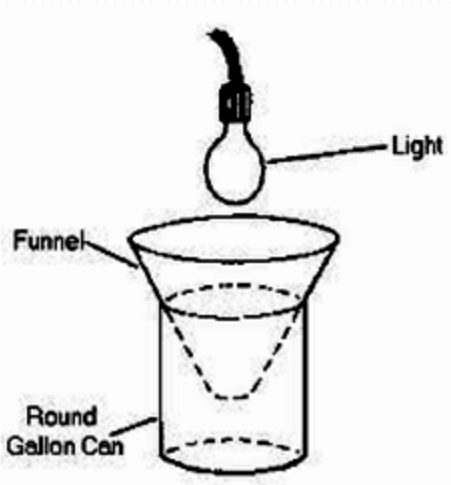
Sl No. 1-5 physical / cultiral methods

Sl No 6-8 Chemical Method

Sl No. 9 is Biological method

MANAGEMENT/CONTROL continued

- **Installation of light traps**



Procedure for Installation

1. **Install the light trap within the field.**
2. **Secure the poles firmly on the ground.**
3. **Place the shallow basin with soapy water or the jute sack underneath the light**
4. **Put the light trap from early evening 6:00 PM to 10:00 PM**
5. **Collect the trapped insects daily and dispose them properly**

No. of traps per acre - 2

MANAGEMENT/CONTROL continued

- Digging the trenches to prevent the movement of larvae
- Deep ploughing and flood irrigation.
- Collection and destruction of egg masses
- Poison bait
- Spraying of 0.2 % Dimethoate – safe period 13 days or DDVP – safe period 17 days
- Using Hyperparasitoids

Bihar hairy caterpillar, *Spilosoma obliqua* Walker (= *Diacrisia obliqua)*

Trichogramma chilonis **is an egg parasitoid of many lepidopteran pests. It is widely used as biocontrol agent of several crop plants.**

Release twice *T. chilonis* at the rate of 5 tricho-cards (20,000 parasitoid eggs in each tricho - card) per acre, at an interval of 3 days. Parasitoid releases have to be undertaken 20 days after pruning or harvesting.

Lifecycle of leaf roller *Diaphania pulverulentalis*

Pupal period 7-9 days

Adults Grayish white with black brown strips on fore wings, Measures 10 mm length

Lays 50-80 gelatinous eggs on young leaves near terminal bud. Incubation is about 2-3 days

Infestation from onset of monsoon to February
But severe during September to November
Total Life Cycle: 17-24 days

Fully grown larva measures 20 mm

Young larva with rolled leaves

Larval duration 8-12 days

Type of damage

- **The caterpillar feeds on mulberry leaves**
- **It rolls the leaves**
- **Reduces the yield**
- **Multilobed varieties are more prone to attack.**

Control

- **Pruning of infested braches**
- **0.1 % BHC - 11 days safe period**
- **0.076% DDVP (Dichlorovas) 76% EC(1ml/litre of water) 15 days after pruning – 17 days safe period**
- **Biological control by natural enemies– *Apanteles* spp. /*Diadegma* spp.**

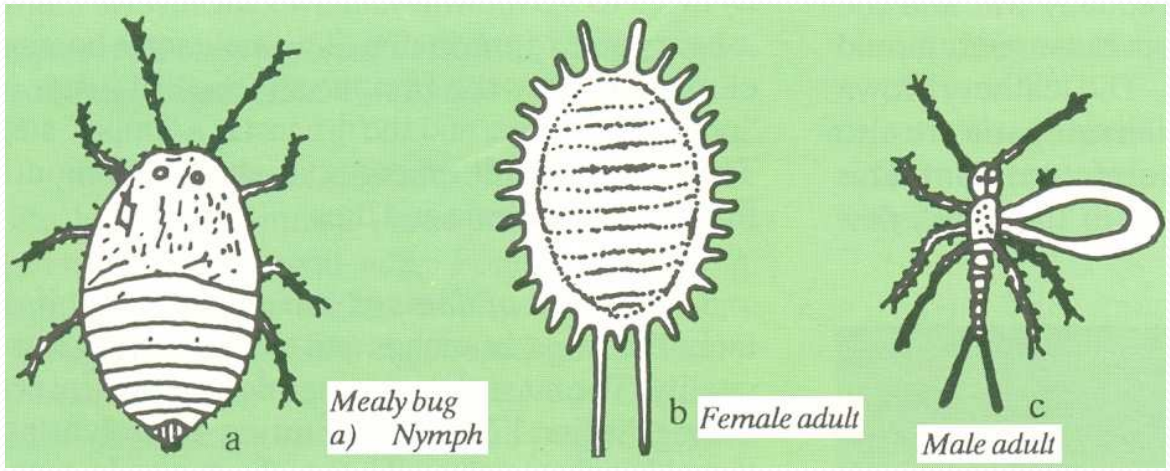
Mealy Bug

Plant-eating homopterous insect coated with a powdery waxy secretion Popularly known as Hard to Kill pest Commonly called as pink mealy bug

- **Reported from Bangladesh, India & Indonesia**
- ***Meconellicoccus* spp. / *hirsutus***
- **Occurrence in summer months**
- **Quality & quantity (4500kg/h/y) reduced.**
- **Affected apical shoot show retarded growth**
- **Leaves are thick, wrinkled & dark green**

- **Adults lays 300-350 eggs laid in a weeks of time in a loose cottony terminal ovisac**
- **Eggs are elongated, orange & hatches in 5-10 days**
- **Nymphs are orange covered with white mealy substance.**
- **Female moults thrice, males four times in 25-26 days**
- **Adults reproduce parthenogenetically & adults do not feed**

Life Cycle of MEALY BUG



Mealy bug

Mealy bug on mulberry plant

Plant showing Tukra Symptoms

Control

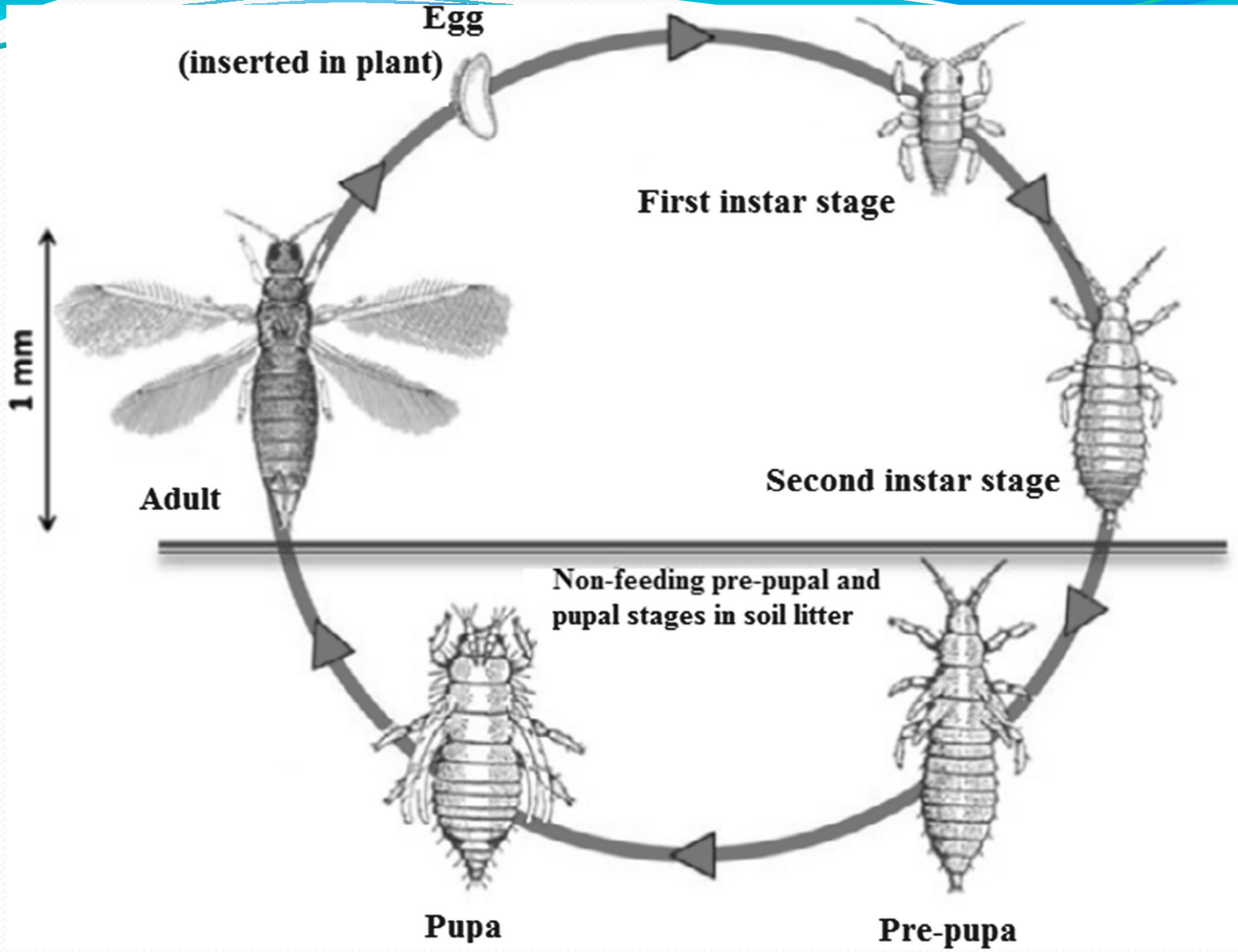
- **Removal & burning of infested branches**
- **0.01% parathion – 13 days safe period**
- **Soil application of PHORATE, 4kg/h/y in 3 split doses- safe period 45 days from 1st application; 15 days from 3rd application**
- **Biological predator *Cryptolaemus montrouzieri*.**

THRIPS

- **Thysonopterans – THRIPS**
- ***Psuedodendrothrips* spp. from Bangladesh**
- ***Psuedodendrothrips mori* from INDIA, Japan, Srilanka, Viet Nam.**

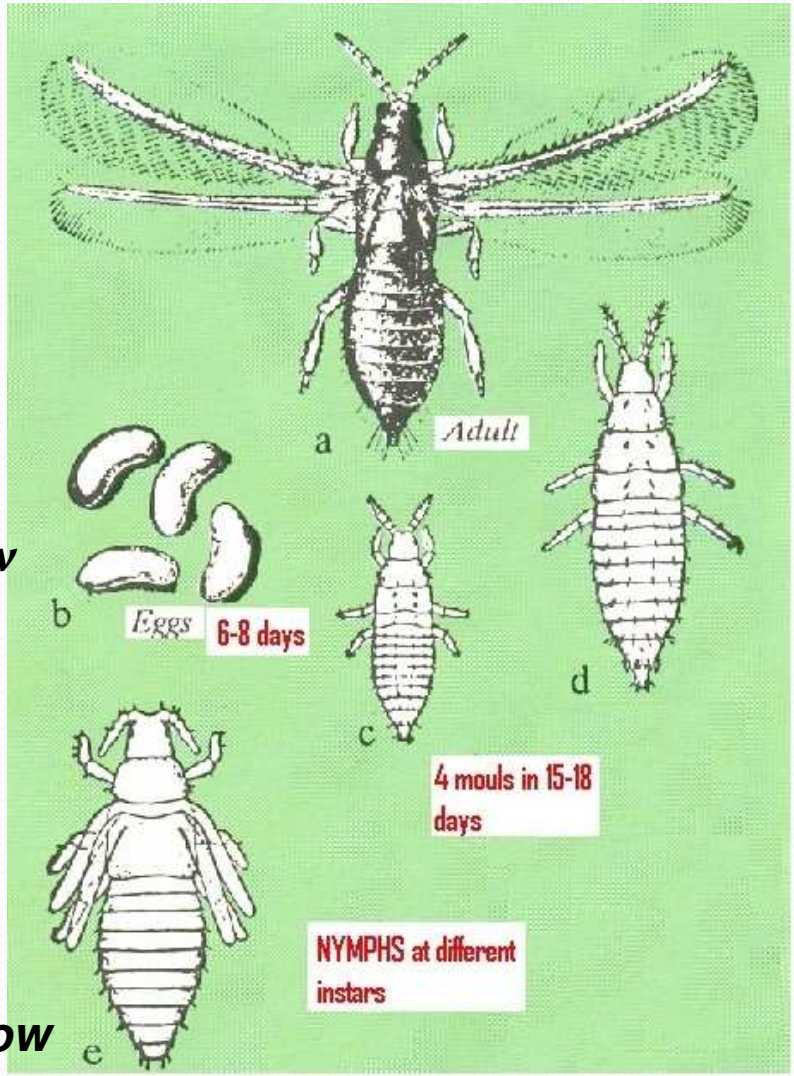
THRIPS

- **Occurrence-Throughout the year, high in summer.**
- **Type of Damage: Sap sucker, depletes moisture, crude protein, total sugar.**
- **Affected leaves show streaks, blotches, yellowish brown.**


Egg
(inserted in plant)
First instar stage
1 mm
Adult
Second instar stage
Non-feeding pre-pupal and
pupal stages in soil litter
Pupa
Pre-pupa

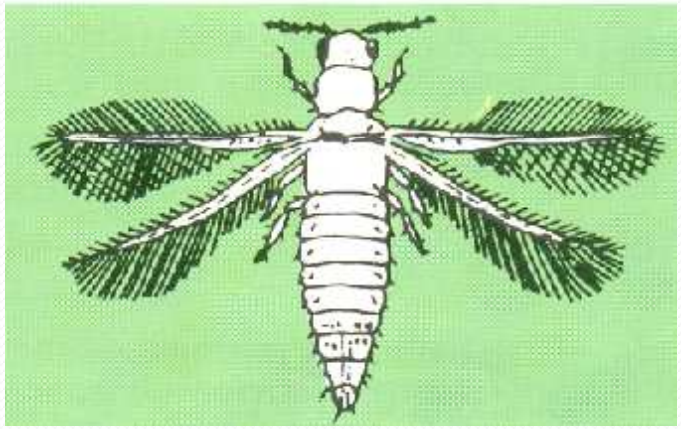
Life cycle of Thrips - *Pseudodendrothrips mori*

Fecundity is 30-50 & Yellow



Pale yellow

Life cycle of Thrips - *Pseudodendrothrips mori*



Male is brownish yellow, Female dark brown
Measures 0.9 mm

Infested plant

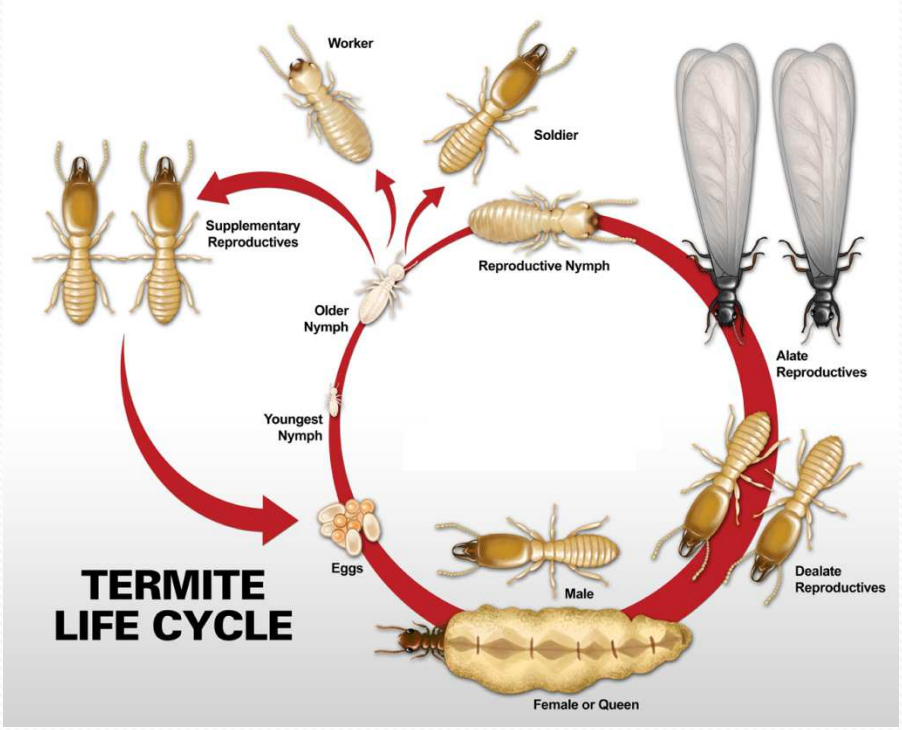
Control

- **Sprinkler Irrigation**
- **0.02 % DDVP twice with one week interval – safe period 7 days.**

TERMITES

- **Isoptera – "White Ants"**
- **Occurrence – From October onwards till the onset of monsoon**
- **Type of Damage: Feeds on roots & Bark, results in mortality.**

Life cycle of Termites



White Ants

White Ant infested mulberry bush

Life Cycle:

- **Since several species of termites are associated with mulberry and many of them have not been identified, general features are presented here.**
- **Wings are present only in the sexually mature males and females. During the warm season wings of these sexually mature members are broken of following a short flight.**
- **The individuals separate in pairs & form new colony.**
- **Mature queen lays several thousand eggs/day.**
- **Incubation period varies from 24-90 days.**
- **Workers of colony cause the main damage.**

Type of damage and symptoms:

Termite attack is found in all types of soil but more frequent in the sandy and red loamy soil.

They feed upon the roots and bark of young and old plants.

Attack of termite results in mortality of the plant.

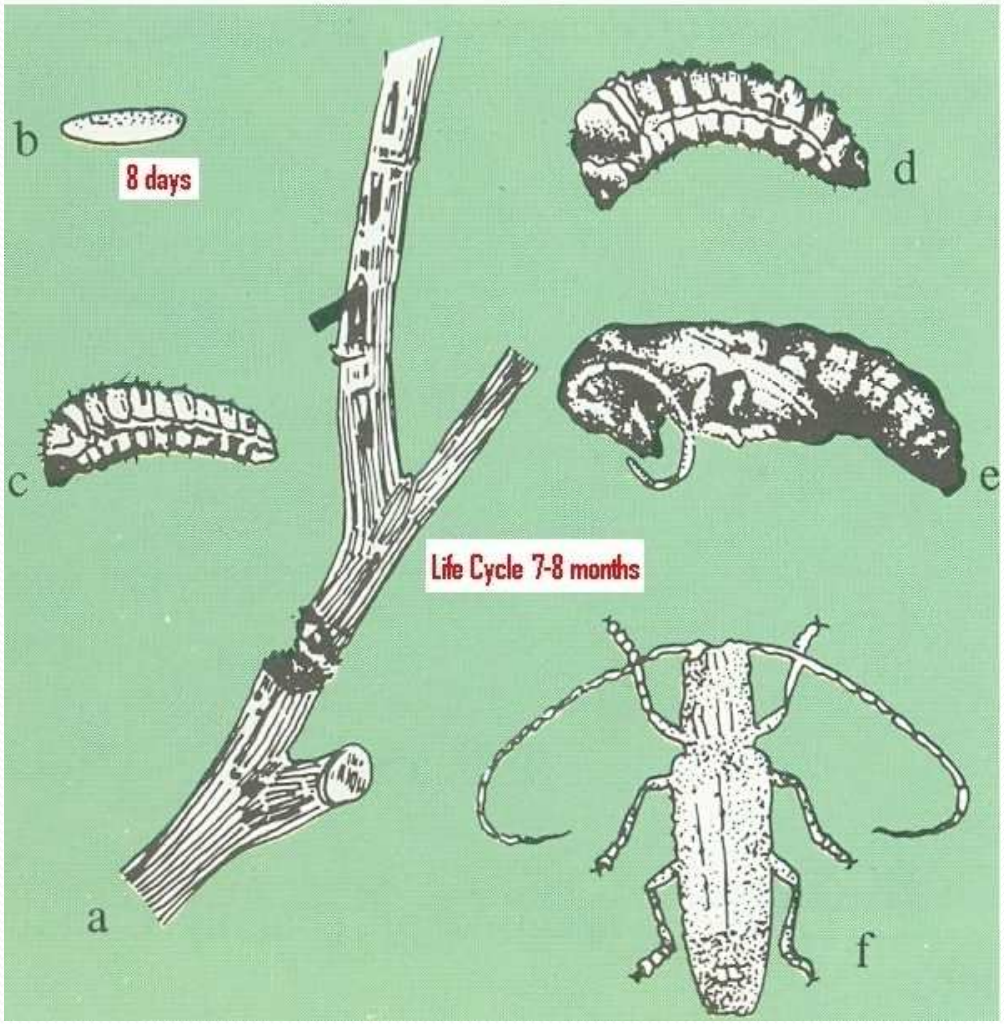
Control

- **Location & destruction of colony by removing Queen.**
- **Treatment of Mounds with PHOTARE 50 gm/ 50 ml Chlordane**
- **Swabbing/drenching of established plants 1% Chlordane- safe 25 days**

GIRDLER

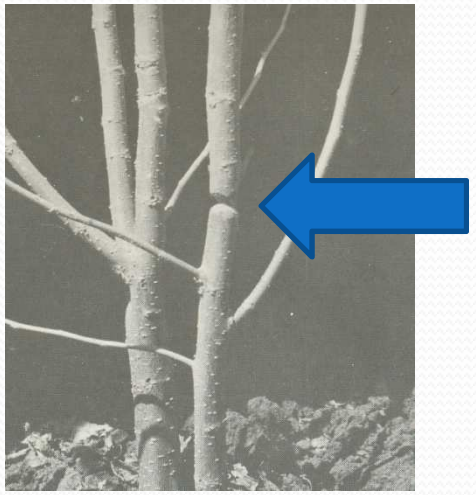
- **Coleoptera- beetles & weevils.**
- **Stem girdler- *Sthenias grisator*.**
- ***Occurrence – Throughout the Year.***
- ***Type of Damage- Ringing the Stem.***

Life cycle of Girdler



Stem Girdler

a. Affected stem
b. Egg
c. & d. Grubs
e. Pupa
f. Adult



Girdled branch of mulberry

Life Cycle:

- **Adult insect is a stout built longicorn beetle with strongly developed mount 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.**

Control

- **Cutting & Burning of branches.**
- **Swabbing the base stem/branches with 0.1 % BHC safe period 11 days.**

0.1 % Melathion emulsion – safe period 13 days.

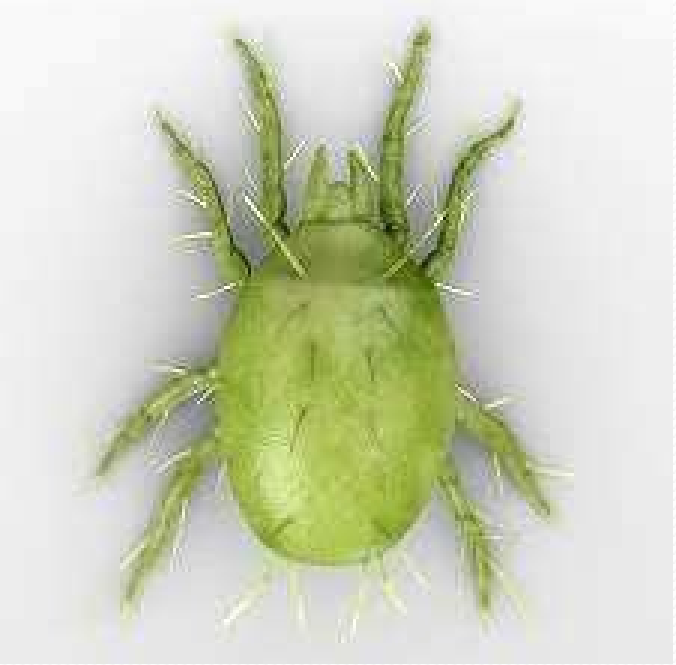
MITES

Tetranychus spp.

Period of occurrence: **Through out the year, maximum in summer months.**

Type of damage and symptoms:

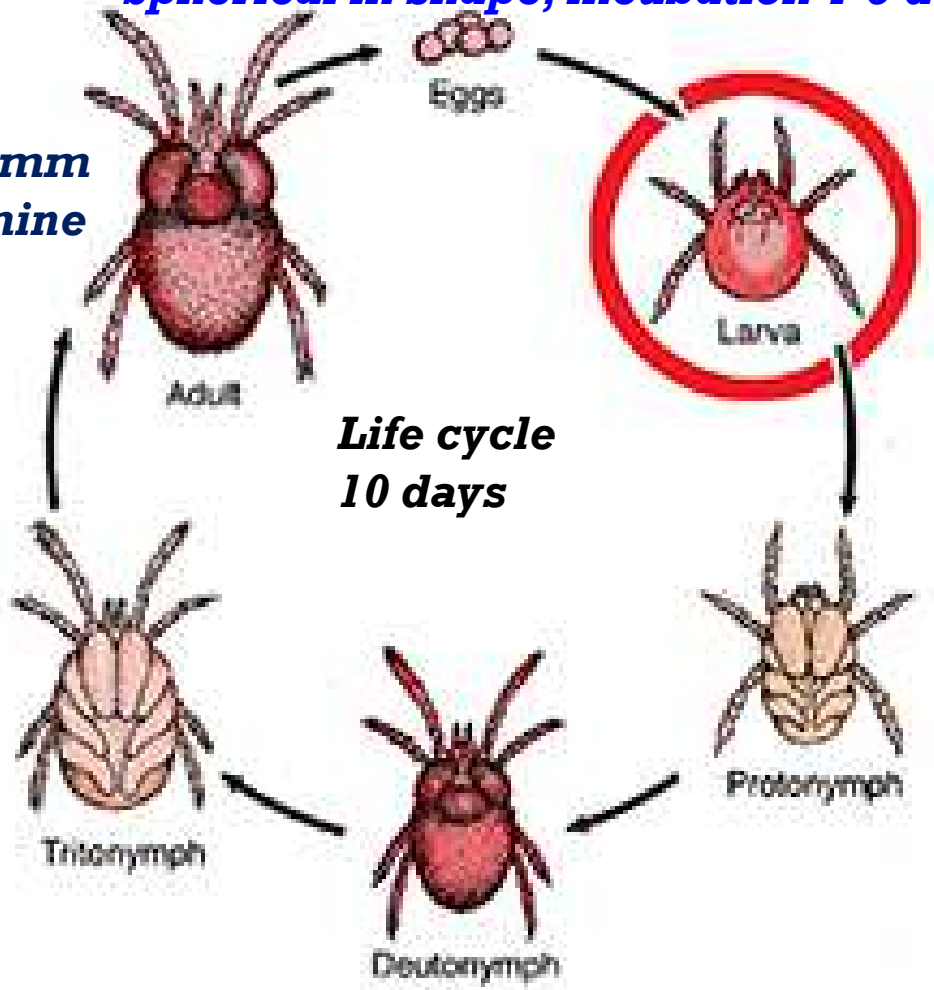
Mites suck plant sap. In severe case of infestation, the leaves lose their green healthy colour, appears rusty in colour, gradually dry and fall - off resulting in the reduction in leaf yield.



Tetranychus telarius

First few aggs are brown later
Become trasnlucent white
Spherical in shape, incubation 4-5 days

Adult 0.34 – 0.44 mm
Brick red to carmine
Lays @75 eggs



Life cycle
10 days

The newly emerged larva is spherical in outline and creamy white in colour with 2 prominent red spots on the sides of dorsal, propodosomal region. Generally measures 176.5 μ in length.

The larval period occupies about two days. Later, they moult into protonymph, deutonymph and finally to adults.

Life cycle T. ludeni

- **Adult female lays @ 75 spherical eggs.**
- **The incubation period is 4-5 days.**
- **The newly emerged larva is spherical , creamy with 2 prominent red spots.**
- **The larval period two days & moult into protonymph, deutonymph and finally to adults. The total time for a life cycle is about 10 days.**

Control

- **(i) Sprinkler irrigation.**
- **(ii) Spraying of Zolone 0.05 per cent and Thiodon 0.05 per cent. Safe period - 9 days.**

Acknowledgements

to

I. INTERNET

II. HAND BOOK ON PEST AND DISEASE CONTROL OF MULBERRY AND SILKWORM