



INTEGRATED PEST MANAGEMENT

Dr. Mahesha H B
Professor of Sericulture
Yuvaraja's College
University of Mysore, Mysuru, India

Integrated Pest Management (IPM) is an

‘ecosystem-based strategy that focuses on long-term prevention of pests or their damage through a combination of techniques such as physical, chemical, biological, habitat manipulation, modification of cultural practices, and use of resistant varieties’

or



or

"Integrated Pest Management (IPM) is a sustainable approach to managing pests by combining biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks"

Methods of Pest Control

- 1. Physical Method**
- 2. Chemical Control**
- 3. Use of Resistant Varieties**
- 4. Genetical / Autocidal**
- 5. Biological Methods**

Physical control includes

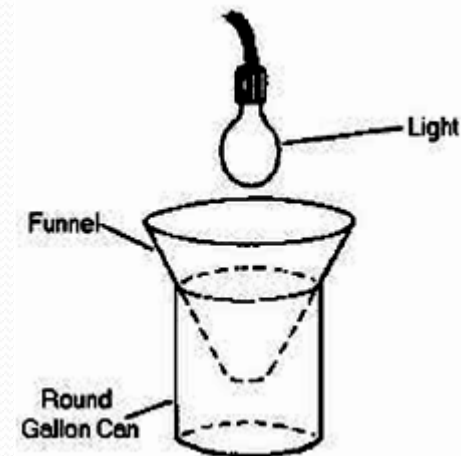
- (a) *Mechanical***
- (b) *Phototropical***
- (c) *Cultural***

(a) Mechanical:

- i. Hand and net collection of egg masses, larvae, pupae, scrapping of the bark etc.**
- ii. The other forms of mechanical destruction through the cutting of the infested shoots and branches and their destruction, preferably by burning.**

(b) *Phototropical:*

Another method of physical control may be through light trapping, taking advantage of the phototrophic nature of certain insects. This has been found to be particularly effective against the Lepidopteran pests forming one of the largest groups of phytophagous insects.



(c) Cultural:

- i. Turning up of the soil, flooding etc., which expose the pests to physical stress. During the process they are killed by exposure to sunlight, water and the predators.**
- ii. Pruning of the plants and burning of the infested twigs may also lead to the control of certain foliar pests.**

All the physical control methods are pollution free but labour intensive.

Chemical Control

They are, no doubt, very quick in action but are cause pollution of the environment and danger to non-target group of insects like many useful insects thereby breaking the agro-eco-system.

Dangerous to silkworms also.

They may affect higher animals also.

Use of Resistant Varieties

One way to avoid the pest infestation is the selection of pest resistant varieties and

“Cheapest Method”

Criteria for screening of pest resistant varieties:

(a) Visual damage rating.

(b) Determination of the number of plants surviving infestation at regular intervals.

(c) Comparison of yield loss between the infested and the non-infested plants.

Genetical / Autocidal:

Pests are controlled by the introduction of sterile or genetically altered individuals into the wild population.

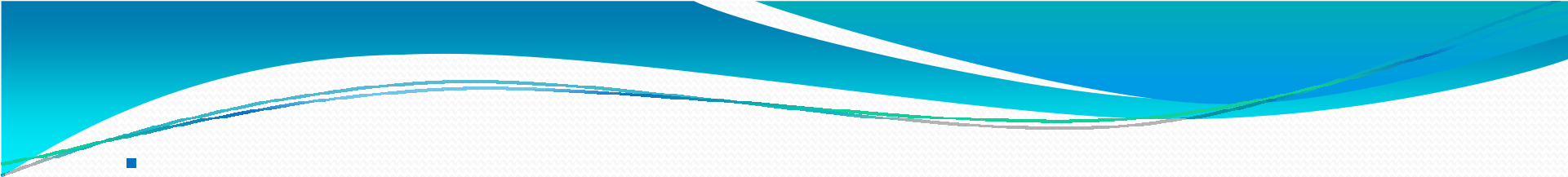
"a method of pest control using area-wide inundative release (involves releasing large numbers of natural enemies for immediate reduction of a damaging or near-damaging pest population) of sterile insects to reduce reproduction in a field population of the same species".

It is therefore a type of “birth control”

Quarantine/Legislative:

Quarantine means to keep materials in isolation to prevent spreading of diseases, pests etc.

Legislative or regulatory method is a method mainly employed to prevent the introduction of pests from other countries or to prevent the spread of a pest from one area to another. The method is operated through specific regulations known as plant-quarantine laws.



- **In India some states have special pest acts, by which it becomes obligatory on the part of the cultivators and governmental authorities to take appropriate steps to control a particular pest when it appears in an epidemic form.**

Biological control

Practically every crops **pest has its natural enemies in the form of **parasites, predators and disease causing organisms.****

Methods of Biological Control

- (a) Use of hyperparasitoids to attack the primary parasitoid.**
- (b) Use of attractants and repellants including pheromones to trap and kill the insects.**
- (c) Use of hormones and other physiology impairing chemicals to upset the normal metabolism.**
- (d) Use of sterile male technique.**
- (e) Use of bacterial and fungal insecticides is ruled out as many of them are known to be toxic to the silkworm itself.**



BIOLOGICAL CONTROL OF MULBERRY PESTS

Practically every crops **pest has its natural enemies in the form of **parasites, predators and disease causing organisms.****



The biological control involves a large scale multiplication of and liberation of such agents, or creating conditions under which the naturally occurring agents can act effectively.



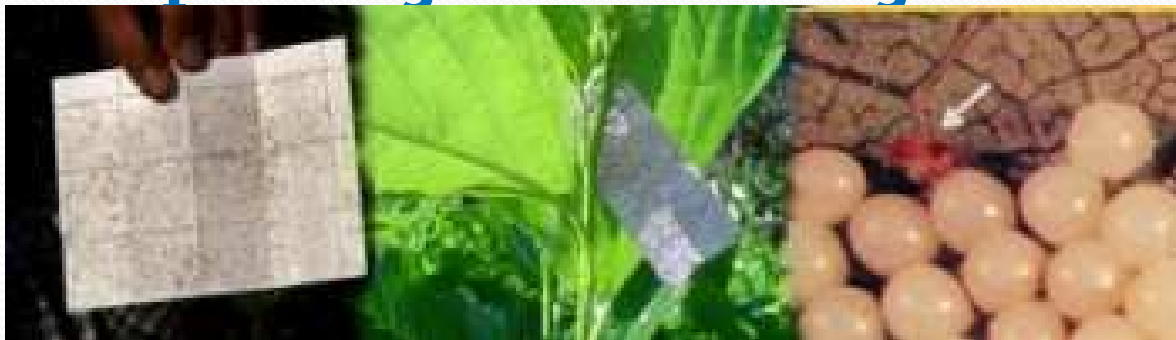
**The following mulberry pests
can be controlled effectively
under this method**

Bihar hairy caterpillar, *Spilosoma obliqua* (*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 trichocards (20,000 parasitised eggs in each trichocard) per acre, at an interval of 3 days.

Parasitoid releases have to be undertaken 20 days after pruning or harvesting.





Trichogramma parasitizing on egg

Leaf-roller- *Diaphania pulverulentalis*

This pest can be biologically controlled with the help of its natural enemies like *Apanteles* spp. and *Diadegma* spp.

Also, *Trichogramma chilonis* can also be used to control this pest as described for Bihar hairy caterpillar.

***Tetrastichus howardii*, is an pupal parasitoid can be used at the rate of 1 lakh adults/acre.**

Two alternate examples are given below to know the mechanism of controlling the pests.



Larvae of *Apanteles* sp. (parasitoid) emerging from *Pieris* sp.



Larva Parasite *Diadegma insularis* ovipositing on Diamondback Moth larva.

Mealy bug: ***Maconellicoccus hirsutus***

Successful biological control of mealy bug can be achieved by employing predatory coccinellid Ladybird beetle like ***Cryptolaemus montrouzieri*** at the rate of **125** adults per acre twice, during **August-September** and **October-November**.

Alternatively, 500 adults of *Scymnus coccivora* per acre are also useful.



***Cryptolaemus montrouzieri* feeds on**
Maconellicoccus hirsutus



Thrips: *Pseudodendrothrips mori*

This pest can be biologically controlled by Ladybird beetles, *Menochilus sexmaculatus* and *Scymnus coccivora* were observed to feed on thrips in the field and laboratory.

Termites:

The use of entomopathogenic fungi and plant extracts for termite control is currently being investigated.



Acknowledgements
to

INTERNET

**FOR
PICTURES AND PHOTOGRAPHS**