Mechanical and Physical Methods of Control
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Mechanical Methods of Pest Control - by means of manual devices or labour

1. Hand picking and collection with hand nets

- Handpicking is most ancient which can prove fairly effective under certain conditions
- Egg masses, larvae or nymphs and sluggish adults can be handpicked and destroyed

Eg. - Egg masses of paddy stem borer (Scirpophaga incertulas) and groundnut hairy caterpillar

Early stages of Spodoptera litura and hairy caterpillars

The moringa caterpillars, which collect at tree trunks in the mornings can be burnt
• Most of the insects can be collected with **hand nets** and destroyed

• Collection and destruction of **fallen fruits** - against fruit flies and fruit borers.

• Manual collection and destruction of **pink bollworm attacked rosette flowers**

• **withered and drooped terminals** infested by spotted bollworm
2. Provision of preventive barriers

- Digging of 30 - 60 cm wide and 60 cm deep trenches
- Erecting 30 cm height tin sheets barriers around the fields against pests like hairy caterpillars
- Bagging of pomegranate and mango fruits in paper bags against pomegranate butterfly Virachola isocrates and mango fruit fly Bactrocera dorsalis
- Tin bands are fixed over coconut palms to prevent damage by rats
Other mechanical methods

1. Extraction of adult Rhinoceros beetle from crown of coconut trees by an **arrow headed rod/hook**

2. Construction of **rat proof godowns**

3. Use of an **alkathene band** around the tree trunks of **mango** to check the migration of first instar nymphs of **mealy bugs and red ants**
1. **Yellow Sticky Traps** for small sized insects

2. **Sticky bands** around tree trunks against red tree ant (*Oecophylla samaragdina*)

3. **Systematic shaking** of root grub adults harbored trees during evening hours to dislodge and destroy by dumping in fire

4. **Shaking of redgram plants** to collect and destroy later instars of *Helicoverpa armigera*

5. **Sieving and winnowing** against stored grain pests

6. Using **mosquito nets**, **fly proof cages** etc.
Physical Methods of Pest Control - Use of certain physical forces to

1. A material called drie-die
   - consist of highly porous, finely divided silica gel
   - abrades the insect cuticle thus encouraging loss of moisture resulting in death
   - Used against stored product pests

2. Kaolinic clay
   - Activated with acid and heat
   - mixed with stored grain
   - Absorb the lipoid layer of the insect cuticle
   - Insects lose their body moisture and die due to desiccation
3. Artificial heating and cooling of stored products
   • Usually high temperatures are more effective than low temperatures
   • Stored products can be exposed to **55°C for 3 hours**

4. Steam sterilization of soil kills soil insects

5. Vapour Heat Treatment (VHT): Heated air is saturated with water (>RH 90%) for specified period of 6 to 8 hours for raising pulp temperature to 43-44.5°C in case of mango against fruit flies

6. **Oxygen stress and carbon dioxide concentration:** In air tight containers, the available oxygen is quickly utilized by insects and raise concentration of CO₂

7. Sterile Insect Technique- by gamma radiation or by using chemicals
   • Sterile males compete with normal males in copulation
   • Reproductive capacity of the population are reduced
   • Pupae of *screwworm, livestock pest* (*Cochliomyia hominivorax*) with radiations, sterile males were obtained and released
     @ 400/sq mile for 7 weeks
   • Total eradication was achieved in
     **South East parts of America and in the Curacao islands**
8. **Light traps** - attracts the insects
   - Trapped by keeping **water or oil in a container or a killing bottle** below the light trap
   - Light traps are useful for **monitoring the population** of important insect pests in an area
     Eg: Most of the moths and beetles

9. **Flame thrower** - compressed air sprayer with kerosene oil for producing flames
   - There is a **lance**, which is **fitted with a burner**
   - When the burner is heated, the kerosene oil is released and it turns into flames
   - Used for **burning locust populations, congregation of caterpillars, patches of weed etc**