

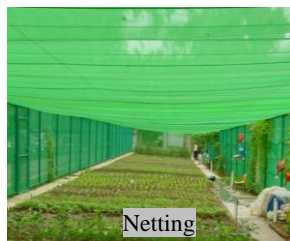
**Integrated Pest Management (IPM)** is a systematic approach to solve pest problems by applying environmentally sustainable means to manage pests from reaching unacceptable levels.

It involves the integration of cultural, physical, biological, and chemical control practices to grow plants with minimal use of pesticides

## KEY STEPS IN IPM

### I. PREVENTION: How to prevent the pest from affecting the plant?

- ✓ Use disease free plants and planting media.
- ✓ Physical structures like netting over the crops can prevent the pests' physical access.
- ✓ Raised beds with good drainage prevents fungal rots & damping off
- ✓ Grow trap plants to which the pests are more attracted to along the borders to divert the pests.
- ✓ Avoid monoculture. Grow a variety of plant types to prevent build up of a specific pest type.
- ✓ Avoid watering plants late in the day to prevent foliar diseases.
- ✓ Avoid over-fertilizing because lush growth can encourage plant pathogens.
- ✓ Proper disposal of diseased plant materials and plant debris.
- ✓ Proper spacing (avoid overcrowding) and pruning of plants for better air circulation prevents foliar diseases.
- ✓ Maintain a clean garden. Plants in healthy growing conditions usually resist pest and diseases incursions better.



## II: MONITORING: Is the pest a problem?

- ✓ Monitoring pest populations on a regular basis to detect and identify pests and potential problems as early as possible.
- ✓ Regular visual inspection of plants for the early symptoms.
- ✓ Use sticky traps to trap pests like thrips, leaf miner flies and whiteflies.
- ✓ Monitoring trap plants for pest and diseases as this indicates an early pest/disease population.
- ✓ Identify the problem properly. Whether the problem is due to an insect pest, disease or nutrient deficiency/toxicity for the appropriate control measures.



## III. CONTROL: How to stop it from spreading?

- ✓ Hand removal of caterpillars and egg masses if pest is detected at early stages.
- ✓ Remove the infected or infested plant before it spreads.
- ✓ Sticky traps and pheromone lures are useful in lowering pest populations
- ✓ Encourage beneficial insects like ladybird beetles and lace wings to control garden pests.
- ✓ Mineral oils and insecticidal soaps can be used to control pests but they need to be in direct contact with the insects to be effective



### III. CONTROL (contd.): How to stop it from spreading?

- ✓ Use of biopesticides like *Bacillus thuringiensis* (Bt) to control caterpillars and bagworms.
  - ✓ If a pest population reaches threshold levels despite other controls, chemical pesticides may be used as the last resort.
  - ✓ The effectiveness of chemical pesticides can be increased by:
    - Correct choice of pesticides.
      - Fungicides for fungal diseases.
      - Insecticides for insect pests.
    - Proper application dosage and procedure.
- Pesticide usage should be according to manufacturer's label instructions & safety precautions.



## IPM GOALS

- ◆ *An Alternative Healthier & Safer Choice*
  - ◆ *Protect our environment*
  - ◆ *Economical*



### Animal and Plant Health Centre

No.6, Perahu Road, Singapore 718827

Tel: (65) 63165168, Fax: (65) 63161090

Email: [AVA\\_Planthealth@ava.gov.sg](mailto:AVA_Planthealth@ava.gov.sg)

Website: [www.ava.gov.sg](http://www.ava.gov.sg)

# ***INTEGRATED PEST MANAGEMENT***



**PLANT HEALTH LABORATORY**