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## Integrated Pest Management (IPM)

- Is an ecosystem-based strategy.
- Focuses on long-term prevention of pests or their damage.
- Uses a combination of techniques: cultural, biological, physical, and chemical.

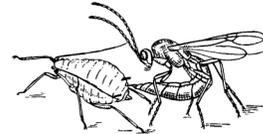
### What Is a Pest?

- Any organism — plant, insect, disease pathogen, or vertebrate animal — that causes damage or loss of crop value.
- Many organisms occur on farms; only a small proportion are pests.
- Many organisms are beneficial: e.g., decomposing organic matter, pollinating crops, killing pests, etc.

## Five Basic Principles of IPM

### 1. Prevent Pest Problems:

- a. Appropriate site selection for crop
- b. Use resistant cultivars and certified nursery stock
- c. Proper soil preparation before planting
- d. Use weed- and disease-free amendments
- e. Time cultural activities to discourage pest development
- f. Keep plants healthy with best management practices
  - Nitrogen use
  - Organic matter: cover crops, compost, or mulch
  - Irrigation management
  - Pruning, trellising



### 2. Pest identification: Know who your enemies are

- a. Distinguish between pests, beneficial organisms, and incidental or innocuous organisms
- b. Identify damage and possible culprits
- c. Know when (season, plant life cycle) damage is likely to occur

### 3. Monitoring

- a. Pest monitoring: e.g., sampling, trapping
- b. Assess damage levels and potential for control by natural enemies
- c. Natural enemy monitoring: signs of natural enemy presence, monitor parasitism
- d. Weather monitoring: influence on pest population dynamics
- e. Maturity of crop and vulnerable stages
- f. Written records

### 4. Economic Threshold/Action Guidelines

- a. Help you decide whether action is needed
- b. For insects and mites, often a numerical threshold
- c. Decide how much damage you can tolerate
- d. A treatment threshold specifies pest density at which control measures need to be applied to prevent loss of crop value — requires careful monitoring.

## 5. Integrate management methods and use all the tools available

### a. Biological Controls

- Encourage natural enemies by planting insectary plants
- Release natural enemies: wasps, predatory nematodes, etc.
- Use biological pesticides, diseases of pests: e.g., Bt

### b. Cultural Controls: Modify normal practices to reduce pest establishment, reproduction, dispersal, and survival.

- Remove cover or habitat: e.g., squash bugs
- Timing of planting
- Trap crops
- Rotation
- Sanitation
- Irrigation management
- Pruning to reduce hospitable environment
- Altering soil conditions: e.g., control potato scab by reducing Ca:P ratio, keep pH as close to 5.5 as possible, and maintain soil moisture

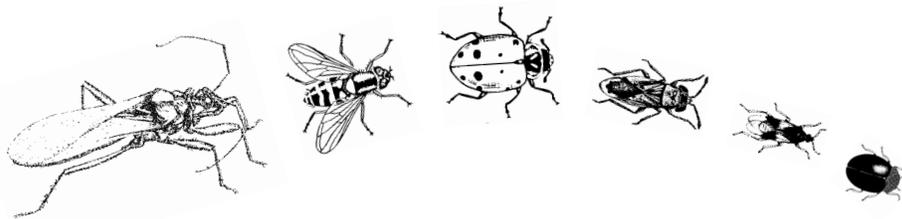
### c. Mechanical/Physical Controls

- Barriers such as Tanglefoot for ants; trunk banding for codling moth
- Soil solarization for diseases & weed seed
- Cultivation to bring weed seeds or beetle grubs to surface
- Traps: insects and rodents
- Vacuums for true bugs

### d. Chemical Controls: Pesticides

- Base use on field monitoring and/or trapping
- Target sprays to specific pest, vulnerable crops, hot spots
- Time sprays and use effectively — use weather data (e.g., Degree Days)
- Choose reduced risk materials

*More tools and information at <http://www.ipm.ucdavis.edu/>*



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