

4.4 - Integrated Pest Management

- _____ (*IPM*) is a pest management strategy that uses a combination of best management practices (BMP) to reduce pest damage with the least disruption to the environment.
- _____ (*BMPs*) are those practices that combine scientific research with practical knowledge to optimize production and increase crop quality while maintaining environmental integrity.
- The key to a successful IPM program is _____, which involves regularly monitoring pest populations and crop conditions.
- A scout collects data about _____ are causing damage, what stage of life each pest is in, and whether the pest population is _____.
- Knowing how to _____ key pests and their biological characteristics is important.
- The benefits of IPM to the horticulture industry:
 - There are _____ in addition to fewer pesticides used with IPM.
 - Application costs are reduced due to time, and the cost of labor for pesticide application is reduced.
 - _____ develops within populations of insects, weeds, and diseases.
- IPM also benefits the _____, which is made more sustainable and friendly to people.
- Benefits of IPM to the environment:
 - Reduced _____ of the environment occurs through the use of IPM.
 - Pesticide residues do not _____ in soil, water, and other natural resources.
 - Cancer-causing residues are present in _____ or are not on food at all.
 - Less pesticide residue on food products means a decreased chance of people _____ pesticides.
- Healthy greenhouse crops are essential to a successful greenhouse business.
 - _____ refers to the condition of plants.
 - Healthy plants are free of _____.
 - They have _____ foliage and flowers, along with a good rate of growth.

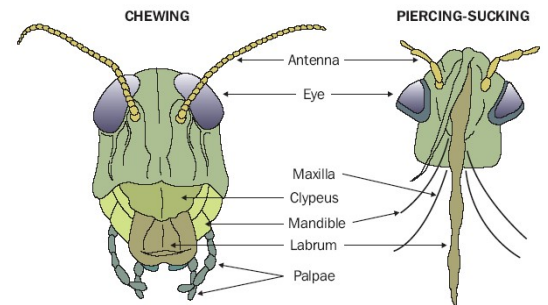
- It is important that plants be healthy while they are _____.
 - It is also important that their health be _____ after they are sold.
 - Healthy plants have a greater capacity to _____ against plant pests than plants under some type of stress.
 - Plant stress is usually associated with _____ conditions.
 - Improper _____ weakens a plant's ability to fight off infectious diseases, including root rots.
 - High _____ in greenhouses is ideal for many fungal diseases.
 - Growers have control over many environmental factors that can help keep plants healthy.
 - provide a growing medium with the desired _____.
 - Plants can be planted at the proper _____.
 - Optimum _____ can be maintained with fertilizers.
 - One of the most important factors is to follow recommended _____.
 - _____ can be adjusted to meet the needs of specific crop.
 - No matter how well crops are grown, pests and diseases will become problems from time to time.
 - The very _____ crop production leads to some disease problems.
 - In most cases, crops are of the same species, variety, or cultivar.
 - Being of _____ makeup, they are _____ to infectious disease that can easily spread from one plant to another.
 - Greenhouses also tend to be _____, which is ideal for many fungal diseases.
 - The IPM program for greenhouse crops must be _____.
 - IPM control measures for a specific crop (e.g., poinsettias) should begin _____.
 - Four broad areas of control include _____.
- An understanding of the major pest groups and their biology is required to ensure success in reducing crop losses due to pests.



- A _____ is a living organism that can cause injury or loss to a plant.
- Pests include _____

- _____ are a group of animals with an exoskeleton and _____ body parts.
- Most insects have _____ legs and _____ wings.
- More than _____ kinds of insects have been identified.
- Insects are capable of producing _____ numbers of offspring in a _____ time and can cause economical loss by feeding on horticultural crops.
- Insects have either _____ or _____ mouthparts.

MOUTHPARTS OF CHEWING AND PIERCING-SUCKING INSECTS



- Damage symptoms caused by chewing insects are leaf defoliation, leaf mining, stem boring, and root feeding.
- Insects with sucking mouthparts produce distorted plant growth, leaf stippling, and leaf burn.

- As an insect grows from an egg to an adult, it passes through several growth stages, which is called _____.

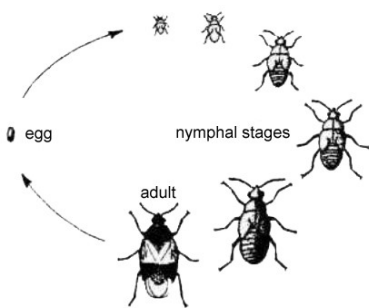
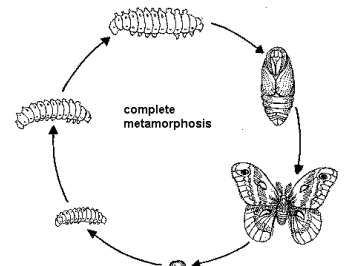
- Two types of metamorphosis exist: _____.

○ *Incomplete metamorphosis* consists of three life stages:

- As a nymph, the insect grows and passes through several _____ between molts.
- Each time the insect _____ its exoskeleton, it passes into the next instar.

○ *Complete metamorphosis* consists of four life stages:

- The _____ stage is the period when the insect _____.
- The _____ is a resting period where a dramatic morphological change from larva to adult occurs.



- _____ are pear-shaped, soft-bodied, usually wingless insects.
- They are often _____ in color.



Aphids

- Aphids have the ability to reproduce very rapidly.
- They give birth to _____

• Aphids use their mouthparts to _____ the plant & suck out juices.

• Aphids attack a _____ of greenhouse plants.

- _____ are long-legged, winged, gray-black insects less than 1/8 inch long.

- The larvae of fungus gnats _____ on root hairs & _____ into plant stems.
- They prefer a growing medium that is constantly _____.



- Many types of _____ insects infest greenhouse plants.
 - Typically, they have _____, often brown bodies.
 - They may or may not be covered with armored _____.
 - Scale insects pierce plant leaves, stems and suck juices.



- _____ are small dark brown insects with two pairs of fringed wings.
 - They have rasping mouthparts that _____ plant tissue.
 - The damage they cause to many kinds of plants often appears as whitish discoloration.

- _____ are small white insects.
 - They generally camp out on the _____ of leaves, where they pierce the tissues and suck juices.
 - Their flat, scale-like larvae feed on the undersides of leaves.



Whitefly