3.01 Understand nursery structures, growing environments and maintenance.

A. Nursery structures and growing environments.

1. Consider climate, soil and topography, available water source, type of plant material, and production method when selecting a nursery structure or growing environment.

2. Shade houses (cold frames).

1. Advantages.

1) Constructed of wood, PVC or galvanized steel.

2) No artificial heat source, heated by solar radiation.

3) Used for hardening off plants and hot weather holding.

4) Protects plants from adverse weather conditions.

5) Cover with white plastic during the winter to reduce overwintering injury to woody ornamentals as well as reduce temperature fluctuations during the overwintering period.

6) A variety of plant material can be grown in a shade house structure.

7) Provides good air circulation.

8) Provides filtered light when covered by shade cloth.

9) Inexpensive growing structures.

1. Disadvantages.

1) Some plants cannot be grown year round.

2) No heat source other than the sun.

3) No heat or cooling

3. Advantages.

1) Constructed of wood or galvanized steel, glass and/or plastic.

2) Solar heated, electric cables, steam or heated by natural materials such as hay, manure.

3) Used for starting plants earlier than in a cold frame.

4) Inexpensive growing structure.

1. Disadvantages.

1) Can be expensive to heat.

2) Hay or manure needs to be replaced when the temperature in the hotbed drops below 50 degrees.

4. Container.

1. Advantages.

1) Plants are easy to move and transport.

2) Grown to sellable size in the container.

3) Less shock to plants.

4) Retailers can keep plants longer before selling.

5) Uniform soilless media.

6) Insects, diseases, fertility and pH are easier to control.

7) Monitoring of water intake is easily controlled.

1. Disadvantages.

1) Requires more water.

2) More labor intensive.

3) May become pot bound.

4) May require winter protection.

5) May have a higher start-up cost pots, potting media.

6) Plants may have to be moved to a larger container.

7) May be expensive to ship.

5. Field grown (pot-in-pot, PNP) PNP uses a slightly larger pots (socket pots) buried in rows in the ground and the potted plants (production pots) are placed inside).

1. Advantages.

1) No staking.

2) No blown over containers.

3) Cooler roots in the summer.

4) Well insulated root system in the winter.

5) Easy to move and transport.

6) Is becoming a more viable option to the traditional field grown.

7) Combines the benefits of field production with the marketing flexibility of container production.

b. Disadvantages

1) Startup cost is expensive largely due to field preparation and purchasing two containers for every plant as opposed to one. 15-25 gallon pots are more commonly used.

2) Labor costs.

6. Field grown (traditional).

1. Advantages.

1) Plants are grown directly in native soil.

2) Bare root plants are easy to handle and plant.

1. Disadvantages.

1) Requires equipment to be harvested.

2) Plants may go into shock when moved or transplanted.

3) Harder to control insects, diseases, fertility and pH.

4) Soil must be well drained.

5) Limited time to harvest.

6) Supply cost, liners, supplies burlap, wire baskets, twine, and pinning nails.

7) Expensive to ship. B. Maintenance of Structures.

1. Shade houses (cold frames).

1. Need painting or replacing over time.
2. Plastic covering will need to be replaced on a regular basis.
3. Replacement of gravel and weed block.
4. Debris removal.

2. Hotbeds.

1. Change out heat source (straw, hay, manure).
2. Pest control.
3. Cover replacement.
4. Debris removal.

3. Container.

1. Pest control.
2. Replace weed block.
3. Replace gravel on roads and under containers.

4. Field grown (PNP).

1. Replacement of damaged pots.
2. Pest control.
3. Replace gravel on roads.

5. Field grown (traditional).

1. Erosion control.
2. Pest control.
3. Replace gravel on roads.

C. Maintenance of plants.

1. Fertilizer- needs to be replaced regularly in order for the plants to continue to grow and remain strong.

2. Irrigation- sprinkler or drip is determined by crop requirement and container arrangement.

3. Shading- on newly established plants or plants that will grow in shady areas.

4. Pruning.

1. Shape plant material.
2. Make plants more compact.
3. Train growth to form into a mature plant (central leader or many stems).
4. Remove dead or diseased parts.
5. Espalier- a plant that is trained to grow flat against a wall, railing or trellis.

5. Pest control Methods/Program.

1. IPM- is a process used to solve pest problems while minimizing risks to people and the environment.
2. Chemical control- uses chemicals to eliminate plant pests.
3. Biological control- uses living organisms such as predators, parasites and pathogens to control the populations of pests.
4. Mechanical- manages pests by physical means such as the use of a barrier, screens, row covers, trapping, weeding or removal of the pest by hand.

6. Pest problems.

1. Insect.

1) Identify insect- aphids, spider mites, whitefly, scale, etc.

2) Determine type of control- chemical, biological or mechanical.

3) Treat based on method recommendations.

1. Weeds.

1) Identify weeds- henbit, chickweed, grasses, etc.

2) Dig or pull weeds.

3) Treat based on method recommendations. c. Disease.

1) Identify disease- blights, fungi, rusts, etc.

2) Treat based on method recommendations.

d. Rodents.

1) Identify the rodent- voles, moles, mice, squirrels, etc.

2) Trap or treat based on method recommendations. e. Mollusks.

1) Identify mollusks- snails, slugs, etc.

2) Treat based on method recommendations.

7. Winter protection.

1. Frost blanket.

1) Traps and collects heat during the day and releases it at night to keep your plants warm and growing.

2) In the spring it gives you a jump-start on plants and wards off pests.

3) In fall, use it to extend your growing season.

4) Float or drape the lightweight fabric over your plants.

1. Water (bud protection).

1) Spray water on buds before a freeze.

2) Often used on fruit trees and strawberries. c. White plastic.

1) Reduce overwintering injury to woody ornamentals.

2) Protects young plants in early spring.