

Plant Propagation Structures

Structures that are used for propagating plants by seed, cuttings, and grafting.

1. One structure is designed for temperature and light control where seeds are germinated, cuttings rooted, or tissue cultured plants develop roots and leaves. Greenhouses and Quonset frames are used for this purpose.
2. The other structure is constructed to acclimatize young, tender liner plants. Cold frames low polyethylene tunnels, sun tunnels and shade houses are used for this purpose.

Tissue Culture Facilities: a unit that consist of separate preparation, transfer, and growing areas designed to develop and harden tissue cultured plants.

Greenhouses: structures that are used for the production of pot plants, foliage plants, bedding plants, and cut flowers.

Types: Gable-roof construction (it has more expensive, reinforced support for hanging mist systems, supplementary lightings, or additional tiers of potted plants.)

Retractable roof (it has a roof that can be opened during the day and closed at night.)

Quonset-type (it is inexpensive propagation house made of bend tubing or PVC frame that is covered with polyethylene.)

Used to propagate the following types:

- Tissue Culturing
- Cuttings
- Seedlings and Plugs
- Grafting and Budding
- Layering
- Liner Stock

Hot Frames and Tunnels (they are similar in function as a greenhouse an may consist of a wooden box or frame with a sloping, tight-fitting lip made of window sash. A tunnel is made from hoped metal tubing or bent pvc pipe, which is covered with polyethylene plastic sheets.)

Used to propagate the following types:

- Cuttings
- Seedlings
- Grafting and Budding
- Liner Stock

Cold Frames (They are similar to a greenhouse except no tissue culturing and are designed to condition or harden rooted cuttings or young seedlings.)

Lathhouse or shade house (same as greenhouses except on tissue culturing). It provides outdoor shade and protects container stock from high summer temperatures and high light intensity.

Greenhouse Heating and Cooling Systems

Gas Heating System – Gas-powered heaters with fans are used to disperse hot air to all sections of the unit through plastic tubes (polytubes).

Pad and Fan System – units are cooled by the use of large evaporative cooling systems. The pad and fan system is built at one end of the unit with large exhaust fans at the other. Fog can be used to cool greenhouses, but is more expensive than other methods.

Bench and Root Heating System – heat is applied below the plants, which hastens the germination of seeds, rooting of cuttings, or growth of liner plants. Hot water is recirculated through pipes placed on or below the benches.

Greenhouse Covering Materials

Glass – It is more expensive than plastic coverings, yet for a permanent installation, glass may be more satisfactory than others. Glass is superior to plastic coverings in light transmitting properties and lower relative humidity problems.

Flexible covering material – Polyethylene is a low-cost plastic for covering propagation structures. Use 4-6 mils for best results.

Rigid covering material - Acrylic (Plexiglass, Lucite, Exolite) is a highly weather resistant material, has excellent light transmission properties, retains twice the heat of glass, and is very resistant to impact, but is brittle.

Polycarbonate – This material is similar to acrylic in heat retention properties, with about 90 percent of the light transmission of glass.

Fiberglass – a corrugated or flat resin reinforced with fiberglass is long lasting, lightweight, and easily applied.

Containers for Propagation

Flats – Shallow plastic, Styrofoam, wooden, or metal trays. Used for seed germination or stem rooting. The 11 x 21 inch plastic flats are the industry standard.

Clay Pots – These are used for growing young plants. They are easily broken, and accumulate salts and calcium on the clay surface.

Plastic Pots – lightweight, reusable, round or square containers used for the propagation of seeds, bedding, and flowering plants.

Fiber Pots – Round or square, pressed peat or wood fiber containers. Popular because they are biodegradable and can be installed in the ground with the plant.

Peat and Fiber Blocks – solid, prepunched containers used for germinating medium for seeds and as a rooting medium for cuttings, especially for chrysanthemums and poinsettias.

Plastic Containers - heavy to thin-walled, black, gray or white, one -, three-, and five-gallon containers used for transplanting and upgrading liner stock for future growth and development.

Polyethylene Bags – a plastic bag used for growing rooted cuttings or seedling liners to a salable size. They are considerably less expensive than rigid plastic containers and seem to be satisfactory as containers.

Wood Containers – a square box constructed for holding large, field-grown, woody plants for several months or years.

Soil Types and Nutrition in Propagation Media

Mixture Characteristics:

- Provide structure
- Decomposed and stable
- Sufficiently porous
- Disease and pest free
- Low salinity
- Steam-pasteurized or chemically treatable
- High Cation Exchange Capacity (CEC)
- Consistently uniform, available and economical

Soil and Media Components

Soil – sand, silt, and clay

Sand – decomposed quartz particles 0.05 to 2.0 mm in diameter.

Peat Moss – decomposed bog vegetation used to hold water in soil mixes

Vermiculite – a hydrated magnesium-aluminum-iron silicate mica mineral that expands when heated. Sold in four sizes: #1 (5-8 mm); #2 (2-3 mm); #3 (1-2 mm); and, #4 (0.75 – 1 mm).

Perlite - a gray-white volcanic silica material. Size range is from 1.6 to 3 mm in diameter. Low CEC and mineral content as well as fluoride production.

Pumice – Volcanic rock used in mixes to increase aeration and drainage.

Shredded Bark - wood products made from redwood, cedar, fir, pine, hemlock, or various hardwood bark species as a component in growing and propagating mixes.

Fertilizers

Preplant – gypsum, dolomitic limestone, and microelements

Postplant – nitrogen, phosphorus, and potassium in a slow-release fertilizer form.