

PROPAGATION AT MONROVIA NURSERY

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The major areas I will discuss concerning propagation activities at Monrovia Nursery are cuttings, budding, grafting, and fern propagation. The potting operation will be explained also.

Approximately 80% of our production is from cuttings. All of it is done in flats. We have a special crew whose sole job is collecting the cutting wood. About 90% of the cuttings come from the container material. The other 10% comes from plants we have planted on the banks as parent stock. There is about one person collecting cutting wood in the field to every five persons making and sticking the cuttings. After taking the cutting material it is kept in walk-in coolers at 40°F until they are made. We usually make the cuttings within 3 days from the time of collection.

The basic propagation medium we use is 90% of ¼" perlite and 10% fine peatmoss. Calcium is added during mixing to provide sufficient amounts of this element for proper root growth. A flat filling machine places the medium into the flats at the rate of 15 flats per minute. After the flats have been filled a copper compound is applied evenly over the surface of each flat. This is to reduce the spread of fungi on the soil surface after pasteurization. For pasteurization, the flats filled with the medium are placed on racks and put into a steam chamber and kept there for the required length of time at 145°F.

The cutting shed is arranged so that the equipment we have can drive through the center. The women sit on the outside perimeter. Sticking benches are located down both sides near the middle. Intermittent mist lines are above the sticking benches so that the cuttings will not dry out while waiting to go to the misting areas for rooting.

The ladies in the cutting shed use either knives or clippers, depending on the wood being cut. We expect each lady to cut, dip in IBA, and stick at least 2,500 cuttings per 8 hr. day. This will vary with different plant materials. The ladies are also expected to wash their cuttings before sticking in 200 ppm of Consan. This is to surface disinfect the cuttings. We use primarily 3 different strengths of liquid IBA. They are 1,000 ppm, 3,000 ppm, and 6,000 ppm. The solutions are color coded so that mistakes from the use of wrong strength hormones are held to a minimum.

The material moved into and out of the cutting shed is handled by machinery. The flats are brought into the cutting shed from the steam pasteurization unit by forklift. After the cuttings are stuck into the propagation medium the flats are removed, using a rack placed on the back of a small vehicle.

The cuttings are taken either to one of the indoor mist areas, one of the outdoor mist areas, or into the high humidity house. We now have 10 indoor mist houses and 75 outdoor mist beds. The indoor houses are independently controlled for temperature and misting frequency. The outdoor mist beds are all independently controlled for bottom heat and misting frequency. We are using Flora-Mist nozzles in all intermittent mist areas. The high humidity house has under-bench misting, a pneumatic misting system, bottom heat, evaporative cooling, and a water recycling system. All conifers root best in the outdoor mist areas. Camellias and azaleas root best in the high humidity house. Many of the tropical and sub-tropical plants are rooted inside. We are finding that more and more species can be rooted in the outdoor mist areas.

After the cuttings are rooted in one of the above areas the plants are moved to a hardening-off section and stay there two weeks before potting. In the hardening-off area we use Robert's irrigation nozzles which are spaced at 20-foot intervals instead of the Flora-Mist nozzle interval of 3 feet.

Seed propagation accounts for 15% of our production and is done in flats. Most of the seed we use is bought from various seedsmen. A small amount is collected by us. One idea which helps is using a measured amount of seed per flat. The person sowing the seeds then has a guide to follow. We have one cooler for seed stratification and one for seed storage. The stratification cooler is kept at 34°F and the storage cooler at 40°F. To reduce disease problems in the seed flat we cover the soil surface with a thin layer of silica sand. The purpose of the sand cover is to have a quickly drying surface area and to reduce growth of fungal mycelium by having an inorganic surface.

Grafting and budding represents 3% of our total production. Annually we have to teach quite a few people new to our organization how to graft. The two easiest types to teach are the cleft and the side graft. Consequently those are the ones we use. We grow most of our own understock. Most of our grafting is done from December through February. The budding is done from May through October. We use the T-bud because it is an easy one to teach.

Most ferns we grow are propagated from spores. The spores are collected from stock plants and are sown on sphagnum moss after it has been steam pasteurized. After 6 to 12 months the young sporophytes are transplanted into transplant flats. They stay in the transplant flat about six months before being transferred into 2¼" pots.

The potting shed is designed similar to the cutting shed. The ladies work along the outside edges and our equipment can drive through the center of the building. The potting bins are filled from

the outside with the front end loader of a tractor. The pots are supplied between the bins from the outside. The plants are brought from the hardening-off area on a rack trailer. The cuttings are pulled and trimmed by a crew of pullers. After the plants are potted they are placed on rollers and pushed to the end of the building where a rack trailer is loaded with the plants and taken to the liner area. Our minimum requirement for potting is 2,000 3" pots, 2,500 rose pots, and 3,000 2¼" pots per person per 8 hr. day.

MODERATOR TOMLINSON: Thank you, Bill. Our next speaker has a strong background in ornamental horticulture. He graduated in 1964 from California Polytechnic University and then went to Michigan State in 1966 for an M.S. degree. He worked as a co-ordinator for New Mexico State University and then went to Hawaii where he worked in Ornamental Horticulture Extension and also consulting for Cal-Turf in Hawaii. Presently he is technical director in charge of research at Hines Wholesale Nursery, Santa Ana, California. I would like to introduce Dennis McLain.

LARGE SCALE PROPAGATION AT HINES NURSERY

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An hour's drive south of Los Angeles is located Hines Wholesale Nurseries — growers and distributors of ornamental nursery stock. From a small ten-acre operation nestled among the orange groves of the immense Irvine Ranch of Orange County, the nursery has prospered and grown over the years. Today, Hines Nurseries encompass over 300 acres of container-grown stock. So ideal is the year-around climate that seven other wholesale growers of ornamentals have located on the Irvine ranch. To provide one-stop shopping, Hines has expanded its product line to well over 1800 items, ranging in size from the small liner to the 24-inch boxed specimen. Last year, over six million containers were distributed within the continental United States. In an operation of this size, plant propagation is an extremely important facet of the business.

PROPAGATION FACILITY

Over ten acres of the nursery is devoted to propagation and liner production. The principal propagation structures are simple