

## Propagation of Magnolias at Monrovia

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We utilize a variety of methods to propagate magnolias at Monrovia, including seed, cuttings and grafting. We produce over 200,000 of 18 varieties of evergreen and deciduous magnolias per year and sell them in sizes ranging from a liner to an MN (15 gallon).

The only magnolia that we propagate from seed is *Magnolia grandiflora*. The seed propagation process begins with collecting seed from trees on the nursery or purchasing seed from various seed companies or private individuals. The majority of these plants will serve as understock for grafting named varieties, with some sold as the straight species. Most of the seed we purchase has already been cleaned. The red flesh must be removed from the seed that we collect prior to stratification. This is accomplished by soaking the seed for 24 hours, followed by scrubbing with Ajax cleanser on a coarse metal screen over a sink.

Once the seed has been cleaned, it is mixed with a medium grade perlite, lightly moistened, sealed in a plastic bag and placed in a cooler at 40°F for 30–60 days, until the seed coat has begun to open indicating that it is beginning to germinate. The seed is sown in a media consisting of firbark, peat moss and perlite in 17" x 17" x 2 1/2" flats. The flats are placed in a greenhouse with bottom heat until the seed has germinated and the first set of leaves is partially developed. The flats are moved to a shaded area outside for 2 to 4 weeks to harden off before being potted. The seedlings are potted into a "tree pot," a 2 1/4" x 2 1/4" x 5" bottomless pot and placed outside in the sun to grow on.

Cutting propagation is used for nine of the fourteen deciduous varieties that we produce. These varieties include *M.*

'Galaxy,' *M. x loebneri* 'Merrill,' *M. x soulangiana*, *M. x soulangiana* 'Alexandrina,' *M. 'Randy'*, *M. liliiflora* 'Nigra,' *M. x loebneri* 'Leonard Messel,' and *M. stellata* 'Royal Star.' Some of these plants will serve as understock for other deciduous magnolias, but the majority will be sold as the variety from which they were cut. Softwood cutting material is collected from plants in the ground and in containers in April and May when the stems are slightly hardened. Cuttings are about six inches long with two or three leaves. About one inch of bark is sliced off one side of the base of the cutting, which improves hormone absorption and the formation of roots. As the cuttings are made, they are placed into a bucket that has numerous holes in its sides. Once the bucket is full, the bucket of cuttings is dipped in a 10 ppm chlorine solution to kill any harmful pathogens.

The cuttings are immediately taken to a greenhouse where machine-filled rose pots have been placed on bottom heated mist benches and watered. We utilize Dip N' Gro, a liquid rooting hormone, diluted with methanol at ratios of 1:1, 1:3, and 1:9, and Hormex 16 rooting powder to promote rapid, abundant and consistent rooting. Each variety has been trialled to determine the most effective rooting hormone. The base of each cutting is dipped in the appropriate hormone and stuck into a pot. The cuttings root in about three months with 45 to 75 percent successful rooting. The rooted cuttings are then moved out of the greenhouse to full sun to grow on.

Both evergreen and deciduous varieties are grafted. The plants are grafted in special grafting tents and kept in greenhouses until the graft has taken and can thrive outside. The grafting tents are prepared by covering the bench surface with waxed paper, then with peat moss, which is sprayed with Cleary's 3336 fungicide. Cleary's 3336 is a fungicide used throughout the grafting process to prevent infection of the grafts. The peat is moistened and maintains high humidity in the grafting tents to prevent the grafts from drying out. Small fans and convection tubes keep the air circulating to prevent disease development as well. The grafting tents are comprised of wood or metal frames covered with clear polyethylene plastic.

The evergreen varieties that we grow are *M. grandiflora* 'Monlia' Majestic Beauty™ P.P. 2250, *M. 'Monland'* Timeless Beauty™ P.P. 6178, *M. 'Little Gem,'* and *M. 'Saint Mary.'* Each is grafted in December through February onto *M. grandiflora* produced from seed. The plants that we use for understock can be in either a one gallon container, a tree pot or what we call a five inch pot (like a five inch tree pot), depending on the caliper of the scion wood of each variety. The tree pots have the smallest caliper and can only be used for *M. g. 'Little Gem.'* The five inch pots and one gallon containers can be used for all of the grafted varieties. The tree pots and five inch pots are used whenever possible to conserve space in the greenhouses. To prepare the understock, healthy plants of suitable caliper in all container sizes are selected, pruned to a height of three feet and all but three leaves at the top are removed. They are drenched with Cleary's 3336 fungicide and placed on prepared benches in the greenhouses. Scion wood is collected from plants in the ground and in containers, placed in plastic bags and transported to a greenhouse preparation area. Only the tips of stems are used to profice the central leader necessary for trees. All of the leaves are removed, and the scions are cut to a length of 8 inches. The scions are then rinsed with water, dipped in Cleary's 3336 fungicide, wrapped in newspaper, placed in a plastic bag and stored in cooler for up to one week.

Deciduous varieties are grafted in February and include *M. x veitchii* 'Columbus,' *M. 'Elizabeth'* P.P. 4145, *M. 'Vulcan,'* *M. 'Athene,'* and *M. 'Daybreak.'* We have had the best success using *M. stellata* 'Royal Star' as the understock for these varieties, but other varieties can be used as well. We select healthy one gallon plants, prune off all but the straightest stem and prune that stem to about three feet. The plants are then drenched and placed on the prepared benches in the greenhouses just as with the *M. grandiflora.* The scion wood for the deciduous varieties is collected from in ground and container plants, and it is cut into 8 inch pieces using shoots from the previous year's growth.

All magnolias are grafted in the greenhouses on the benches where they will reside until they are moved outside.

The grafter begins by making a two inch downward cut into the understock. He then selects a scion and makes an equal, tapered slice on each side of the base of the scion. The scion is now about six inches long and is inserted into the cut in the understock. The graft is then wrapped with a grafting rubber (like a cut rubber band). The plant is placed on the bench with the graft facing south towards the sunlight to promote a more vigorous scion and better take. In order to space the tree pots and five inch pots tightly together and still provide the scions with adequate exposure to the sunlight, the pots are placed at a 30 percent angle with the graft facing up. The surface area of the one gallon containers provides enough space between plants for adequate sunlight exposure to the scions, therefore the one gallon containers are left standing straight up.

Once a bench is full, the tent is sealed and the beginning date, completion date and name(s) of the varieties are written on both ends of the tent. The tent is opened after two weeks and the grafts are sprayed with Cleary's 3336. The grafts are moved to a shade area outside once callus has formed at the graft and the scion has at least three leaves, both indicators that the graft has been successful. Once outside they are sprayed every two to three weeks with Cleary's 3336. The plants spend three to four weeks in the shade until they are moved to a full sun location. The plants are sprayed with water one to two times each day while in the shade, for about two weeks more once moved to the sun and during very hot weather beyond that time.

The portion of understock above the graft is removed about two weeks after the plants have been moved out of the greenhouse. Once the scion has produced six to eight inches of new growth, the plants are staked and the grafting rubber is removed if it has not already deteriorated and fallen off on its own. The plants will then grow on and be ready to be sold or shifted into five gallon containers in a few months. ↪