

## Propagation of *Magnolia grandiflora* Cultivars

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### GRAFTING AND BUDDING

**Grafting and Budding Production of *Magnolia grandiflora* Cultivars.** Grafting and budding require rootstocks which vary in growth response, winter hardiness, transplanting adaptability, and are compatible with selected scion cultivars. Although, only a limited number of plants can be generated by each worker, skilled grafters have a high grafting success with most cultivars. March is the best month for grafting and budding in South Carolina—but March is very busy with the nursery shipping season, and greenhouse space is generally limited.

Each cultivar has a root system morphology that is unique to itself and this is also true of *M. grandiflora* seedling rootstocks. Seedling rootstocks have a direct influence on the phenotypic development of the scion cultivar. Rootstock effects on scions have been shown with many plant species and cultivars. Differences in root growth and root size can be seen by examining root development of different *M. grandiflora* cultivars.

The uniqueness of *M. grandiflora* cultivars are only achievable if the cultivar is grown on its own root system. The goals of plant propagators should be: (1) developing uniformity of plant cultivar performance in container and field production nurseries, (2) maintaining uniformity of plant height as a given cultivar matures, and (3) maintaining uniformity of growth once the finished plant is transplanted into the landscape.

### CUTTING PROPAGATION

**Advantages of Propagating *Magnolia grandiflora* Cultivars by Stem Cuttings.** There are many advantages of propagating *M. grandiflora* cultivars by cuttings compared to grafting and budding systems. Over the years, stem cutting propagation has proven to be the most economical method of propagating cultivars of this species.

*Magnolia grandiflora* cultivars have been difficult to produce from stem cutting in large numbers on a consistent basis. The problem is it is very cultivar specific—hence, some cultivars are more readily available in the nursery trade than others. For example, Shady Grove Nursery's Cultivar 'Claudia Wanamaker' is consistently propagated in many different regions of the southeastern U.S. Most cultivars that lack or have moderate pubescent hairs on the abaxial side (underside of leaf, furthest away from the axis of the stem) are generally easier rooted than those cultivars which are heavily pubescent with a ferruginous color on the abaxial leaf surface. There is a great demand for difficult-to-root cultivars (the above mentioned, aesthetically attractive "brown-backed" cultivars—and those cultivars that are continuous flowering) such as 'Hasse', 'Little Gem', 'D.D. Blanchard', 'Brakens Brown Beauty', 'Coco', 'Russet', 'Samuel Sommer', 'Teddy Bear', and other cultivars.

Cultivars, such as 'Little Gem' and 'Hasse' have become very popular due to their blooming habits, small leaf size, and growth habits. These cultivars are in high demand with landscape designers, architects, home gardeners, and nurserymen. The demand for significant quantities of medium-size, high-quality, own-root, container-grown, readily available, southern-grown liners of these and many other cultivars—has spurred many propagators to look for improved stem cutting propagation methods for more consistent rooting of *M. grandiflora* cultivars.

**Tips for Successful Rooting.** The fact is: if you try enough methods, enough times throughout the year you will find the right set of conditions that give consistent, yearly results.

No one cultivar roots with the same requirements as another cultivar!

Some cultivars will root well from old (10+-year-old) stock plants, even better than more juvenile plants of other cultivars, while some will not!

"Brown-back" cultivars are harder to root. The heavy felt on the leaves and stem cause too much rooting hormone to stick to cutting base and moisture control on foliage is more difficult.

Stem cuttings taken July through November, March, and April have been successfully rooted at our nursery.

Most of the time, terminal buds should be mature (hardened-off) and not forcing into new growth—there are always exceptions to this.

Cuttings do not have to be tip cuttings with terminal buds. The condition of the wood in relation to starch and auxin build-up has the most to do with how well the cuttings root, survive, and break bud and start to grow.

Cuttings should have at least two leaves, and depending on cultivar leaf size, up to four leaves. Leaves may need to be cut to reduce the size to allow economical numbers of cuttings to be stuck per unit area of propagation space. You need to have sufficient area for air circulation and light penetration around each cutting—which is an index of how much foliage to retain and how close to space cuttings.

Wounding encourages rots, the less you do the better—but some cultivars need a single or double wound on the cutting base to encourage callus development.

Rooting media can be any material that drains well—perlite; peat, perlite, and vermiculite (1 : 1 : 1, by volume); bark; bark and perlite (1 : 1, v/v); bark, perlite, peat, and clean builders sand (1 : 1 : 1 : 1, by volume), and any combination of these materials.

Magnolias can be rooted in 5.7-cm (2.3 in.) pots, 7.6-cm (3 in.) pots, 0.95-liter (quart), or 3.8 liter (gal) containers—to large, deep flats or in outdoor beds. The cutting should be stuck no more than 50% of the depth of the container or a maximum 6.4 cm (2.5 in.) deep.

**Environmental Conditions for Rooting Magnolias.** Cuttings in propagation structures can be under full-sun exposure to 70% shade. The geographical region, time of year, and frequency of irrigation dictates the need and degree of shade.

Irrigation is the *most difficult* factor to keep uniform across the propagation area! The propagator will have to vary the irrigation intervals each day. This is the "sixth sense" a propagator learns in his/her education by *rotting* and *rooting* enough cuttings to gain propagation knowledge of the cultivars.

Magnolias *like it hot*, and this is necessary to help mature or harden the cutting wood, callus the cuttings, and initiate rooting. We have also observed that higher

temperature suppress disease formation. In cold weather, maintaining a minimum bottom heat of the rooting media at 16C (60F) is advisable.

**Auxins.** Auxins are needed to root *M. grandiflora* cultivars and concentrations vary for 1000 to 15,000 ppm depending on the cultivar, age of stock plants, location on the stem that the cutting was taken from, time of year, mist irrigation interval, rooting media, and whether the cutting was wounded. Generally, 3000 to 8000 ppm of IBA, NAA, or the potassium salt formulations—K-IBA and K-NAA give the best rooting response. These auxins speed up the initiation of roots and stimulate a higher rooting percentage. Rootone, Woods rooting compound (concentrate and H<sub>2</sub>O, [1 : 1, v/v]), and Dip-N-Grow (concentrate and H<sub>2</sub>O, [1 : 1, v/v]) are commercial rooting formulations that enhance rooting of most cultivars.

Rooting time varies from 4 weeks to 4 months, and is based on stored carbohydrates, nutrients, and metabolites of the cuttings under environmental conditions that support cutting survival.

**Rooting of 'Little Gem' Cuttings.** 'Little Gem' cuttings stuck in August in South Carolina will root by February. Propagation media should be kept at a minimum of 16C (60F) for optimal rooting. Cuttings can be single wounded, and quick-dipped for 5 sec in (concentrate and H<sub>2</sub>O, [1 : 1, v/v] ) of Dip-N-Grow, Woods rooting compound, or Rootone. Intermittent mist should be set for 30 sec at 15-min intervals from 10 AM to 6 PM. The mist interval will need to be adjusted daily as the weather changes. Mist irrigation should be decreased to 3 to 4 hand waterings or heavy mistings each clear dry day, and further reduced to once daily as roots emerge; this will require the "sixth sense" propagators develop with experience. Large quantities of own-rooted, uniform-growing 'Little Gem', 'Hasse', and other *M. grandiflora* cultivars will allow the nursery industry to profit from this magnificent southern native and its spectacular cultivars.

## CONCLUSION

- The reality of rooting *M. grandiflora* cultivars is that no single cookbook recipe guarantees every propagator rooting success.
- All the above listed requirements hinge on taking cuttings from nutritionally fit stock plants. Excessive nitrogen fertilization without adequate balance of the other macro- and microelements will lead to low rooting percentages.
- Responses from callus formation, root initiation, bud forcing of rooted cuttings, resisting disease invasion—will vary with the cultivar, from stem to stem of the same cultivar, stage of growth, and the seasonal period that each cultivar reaches for optimal rooting by cuttings.
- Everblooming cultivars such as 'Little Gem', 'CoCo', and 'Brackens Brown Beauty' are more difficult to root than less precocious cultivars.