Rooting Magnolias From Cuttings

by Gene Eisenbeiss

Propagation of magnolia clones and named cultivars by vegetative means such as cuttings, grafting, budding, or layering is desirable since they will not come true from seed. Even though magnolias are easier to propagate from seed than vegetatively, seedlings of named cultivars are almost always inferior to their parents. Many magnolia cultivars also are sterile and produce little or no viable seed. The only way these can be propagated clonally is by vegetative means.

A question frequently asked is whether magnolias can be rooted from cuttings. The answer is a qualified "Yes." Practical or commercially economical methods have been developed for only a few species, hybrids, and some of their cultivars.

Magnolia quinquepeta (Buc'hoz) Dandy (liliflora, Desrouss.), *M. kobus* var. *stellata* (Sieb & Zucc.) Blackburn and hybrids, and *M.* × *soulangiana* Soul. and its cultivars are grown commercially in large quantities from cuttings. To a lesser extent a few cultivars of *M. grandiflora* L., *M. virginiana* L., and certain cultivars of hybrids of these two species, such as 'Freeman' and 'Maryland,' also are grown from cuttings. Some cultivars of *M. grandiflora* produced this way are 'Pioneer,' 'St. Mary,' 'Victoria,' 'Giant Beauty' and 'Little Gem.'

Although cuttings of these magnolia selections cannot be classed as easy to root and frequently fail or root in low percentages, almost all of the other magnolia species are extremely difficult to root by comparison. An extensive review on rooting of other magnolia species indicated that literature is so limited that it would be of dubious value in this report.

Since the grafting of magnolias has been well known for more than a hundred years, why is there interest in rooting cuttings? Rooted cuttings have both advantages and disadvantages compared to grafting or budding. Among their advantages is that they are cheaper to produce in quantity than grafts. They average more uniform growth, since seedling understocks for grafts can be variable in growth rate.

Grafting is a slower process and requires more skill than the preparation and insertion of cuttings. Plants from rooted cuttings are not subject to graft union failures that occur sometimes years after they are made. Grafted plants are commonly subject to suckering from the understock, which can outgrow the scion and may be difficult for the amateur gardener to distinguish from the scion, especially in winter.

Grafting plants, on the other hand, does not require the extensive facilities necessary for production of rooted cuttings and, as with budding, can sometimes be done outdoors without special cultural conditions. Grafting and budding can be done over a much longer period, while the timing for taking cuttings can be very critical. For example, grafting and budding can be done with dormant scions and dormant understocks. Dormant cuttings, especially of deciduous magnolias, are extremely difficult to root. Grafting or budding can be performed successfully with scions that would be in too poor condition to use as cuttings. The size, twig length or stem diameter of a scion is not nearly as critical for grafting or budding as it is for cuttings suitable for rooting.

When well grown, grafted plants have a head start on cuttings, since there is already an established root system for the scion. When no satisfactory means of rooting cuttings can be found, there is no recourse for vegetative propagation but to graft, bud, or layer.

Why some magnolias can be rooted and others cannot is unknown. It is known that a great many factors are involved in the rooting of any kind of plant, both before the cutting is removed from a plant and afterward. For example, the rooting ability of a plant appears to be influenced genetically. That is, some plants (genera, species, and cultivars) consistently root easier than others year after year and this ability can be inherited. Most named cultivars of *M.* × *soulangiana* can be rooted from cuttings. One of the parents of this hybrid, *M. heptapeta (denudata),* is extremely difficult to root from cuttings, but the other parent species, *M. quinquepeta,* is rootable. The ease of rooting of the hybrid

appears to be derived from the *M. quinquepeta* parent.

Another factor in rootability is the age of the plant from which cuttings are taken. Except for plants that are very easy to root, the older the stock plant the more difficult it is to root cuttings from it. Cuttings taken from a young seedling will root easier than those from a 20-year-old tree. The latter may be virtully impossible to root. Even when a plant is grown from a rooted cutting, subsequent cuttings from it will be more difficult to root as the plant becomes older. This condition is called, for lack of better terminology, physiological aging.

Other factors affecting a stock plant that influence the rooting of its cuttings are its general health, its nutritional status, and the environmental stresses it has endured for at least the previous 12 months. Exactly how much these factors influence rooting ability have not been well defined. However, yearly variations in rooting ability commonly occur.

The techniques of preparing cuttings and selecting the rooting environment are controllable. The methods reported here are based on what has succeeded for some magnolia propagators and are not meant to exclude different methods that have been successful for others. Great advances have been made in scientific knowledge about vegetative propagation, but the conditions in each propagation facility are so different that the art or craft of propagation and practical experience are still major factors in successful rooting of cuttings. Success by any method of rooting magnolias is not to be looked down upon.

It was not until the advent of intermittent mist, root promoting substances, and the practice of wounding cuttings, adopted about 1950, that rooting of magnolias became a widely accepted commercial practice. Before this grafting was the principal means of vegetative propagation.

The development of misting equipment eliminated the need for almost constant hand watering of cuttings in the summertime. Mist provides an almost continuous layer of water on the leaves of cuttings and high humidity over the cutting bench to help prevent wilting. The primary objective in handling cuttings is to provide conditions to keep them alive long enough to root.

It must be appreciated that a severed plant twig with no roots has lost most of its ability to take up water. If a cutting loses its leaves from lack of water uptake, it may remain alive, but will lose most of its ability to produce roots. Although leafless cuttings sometimes root, the time until rooting is much delayed and the percent of cuttings that ultimately root can be expected to be very low.

Root promoting substances have been used successfully on magnolias. Their action hastens rooting and they should not be thought of as a substitute for good cultural conditions. High strength materials such as Hormodin # 3, Rootone 10, and Jiffy-Gro are commonly used on magnolia cuttings. For those wishing to prepare their own materials, liquid or powder formulations varying in strength from 5,000 to 20,000 parts per million indolebutyric acid have been reported as beneficial for magnolia cuttings. The optimum strength of this material and others like it is just below the strength that will kill the base of the cutting.

Some growers also treat the bases of cuttings with Fermate or Captan and other fungicides to discourage the growth of stem rotting fungi under the wet conditions of a propagation medium. Success with fungicides for this purpose is variable. One critical factor is that no single fungicide will control all of the kinds of stem rotting organisms which may be present.

The technique of wounding cuttings has been shown to improve rooting, but the reasons for its success are not understood. The procedure is to remove a slice of bark from ¼ to ¾ inch long on opposite sides of the base of the cuttings with a sharp knife. The cut need only be deep enough to slightly

penetrate the bark to the cambium layer next to the wood.

The time for taking cuttings is important with magnolias. For deciduous types, the most popular are softwood cuttings taken after the terminal buds are formed on the current season's growth. Cuttings can be taken from additional flushes of growth during the growing season.

Propagators vary in recommending a time for taking *M. grandiflora* cuttings, from mid-summer to late fall. It would appear that timing for this species is not as critical as for deciduous magnolias. W.J. Curtis in the AMS Newsletter 12(2): 31. 1976 indicated a preference for late November.

The use of tip shoots of the current season's growth 4 to 8 inches long is a standard practice for magnolia cuttings. Some propagators prefer what are called "heel cuttings." When "heel cuttings" are made the entire current season's shoot is included plus a small section of the previous flush of growth. The idea is that the pith region in the center of the current season's magnolia shoots is quite large with a considerable amount of open air spaces. When cuttings are placed in the propagation medium, the open spaces and fine tissue of the pith provide excellent conditions for the growth of stem rotting fungi. The use of "heel cuttings," which includes a small section of the previous growth where the pith region is considerably reduced, is thought to reduce this problem. This theory has not been adequately proven and the better rooting results from the use of "heel cuttings" may be due to other factors.

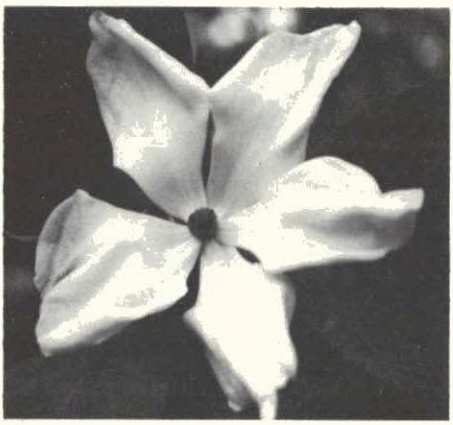
In handling cuttings in hot weather, special care is needed to preserve the moisture content of the leaves. Cuttings are best taken in the early morning and should then be stored in polyethylene bags and refrigerated at 30° to 50°F. for about 24 hours. During preparation, cuttings should be handled as rapidly as possible to avoid wilting. At least 3 to 4 leaves should be retained on each cutting. The larger the leaf area the better will be the rooting, provided the rooting conditions can support leaf retention. Some propagators will reduce the leaf area to as few as two leaves per cutting or retain 3 to 4 leaves and cut each leaf in half crosswise. Either method can be satisfactory.

Magnolias will root in a wide variety of media such as coarse sand, perlite, vermiculite, and mixtures of these with coarse peat or milled sphagnum moss up to a 1:1 ratio. It is important that the medium have near perfect drainage. Prior to the general use of automated mist systems it was standard practice to tamp the propagation medium firmly, but with mist systems this is not necessary. Cuttings should be inserted about 1½ inches deep and spaced about 3 inches apart or far enough to avoid crowding of leaves. If the leaves between cuttings are too crowded, the excessive shading will result in leaf drop.

Rooting should begin within 3 to 4 weeks during the summer and up to twice this length of time in the fall. For cuttings of *M. grandiflora* taken in the fall, when temperature in the propagation facility is 70°F. or less, additional bottom heat in the medium, up to 10°F. higher than the air temperature, is very beneficial.

During our preparation for the release of 'Ann,' 'Betty,' 'Jane,' 'Judy,' 'Pinkie,' 'Ricki,' 'Randy,' and 'Susan,' (all cultivars of *M. kobus* var. *stellata* × *M. quinquepeta*) from the National Arboretum in 1968, we produced large numbers of plants from cuttings. The best rooting occurred with the following methods during the initial production and the years following. Cuttings 4 to 6 inches long were made from the current season's growth, just after the terminal bud was formed. Leaves were reduced to 3 to 4 per cutting with the leaves cut in half. A wound was made on both sides of the base of the cutting from ¼ to ¾ inch long to a depth just touching the wood.

The cuttings were dipped in Hormodin #2,



Magnolia cylindrica *at Bethesda, Maryland*

stuck in a medium of peat moss and coarse sharp sand 1:1, and placed under intermittent mist. Mixtures with peat or milled sphagnum and perlite or sand at 1:1 ratios were equally good. Cuttings were taken at various intervals from June through July always with tip cuttings that had complete terminal buds.

The highest rooting, 80 percent, occurred in cuttings taken in early June when the first flush of growth had just set terminal buds. The rooting percentage was lowered each time cuttings were taken from later flushes of new growth. Cuttings were ready for potting after 70 days.

In different years, with the same methods, rooting percentages varied from 5 to 80 percent. We also found that as the original stock plants increased in age, the ease of rooting cuttings decreased while cuttings from younger plants were consistently easier to root.

Although the rooting percentage declined as the age of the stock plants increased, the change in age did not account for the up and down variation that occurred between years. We were satisfied that our rooting conditions were reasonably consistent and could attribute the variation only to influence by the climate on the stock plants for the previous 12 months.

For the home gardener with no propagation facilities, there is a small scale technique by which magnolia cuttings can be rooted. This method is called the "Window Sill Greenhouse." A mixture of coarse sand and milled sphagnum moss or coarse peat 1:1 is thoroughly mixed and soaked in water, then wrung out by hand to remove excess water. It is then placed in a 6 × 8 × 4 inch polyethylene bag to about 1/3 of its volume and gently tamped. Prepared cuttings are inserted (2 to 4 cuttings depending upon their size).

The cuttings are watered lightly, just enough to wet the leaves. The bag is then tied at the top and placed in light shade such as a window sill, where no direct sunlight can reach it. If there are no air leaks in the bag, no further watering is needed until the cuttings are rooted. All other procedures for collecting and preparing cuttings remain the same and should be carefully followed.

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- Ron Brightman, Edmonds, Washington, reports from the Puget Sound area that his *Magnolia grandiflora* has "recently developed that unpleasant yellowish-green leaf color that seems to haunt this species in the Seattle area" and that he'll fertilize it. At the University of Washington Arboretum in October 1977 he saw fox squirrels eating the bright orange seeds of *M. sargentiana robusta,"* which with *M. campbellii mollicomata* seems to have had full crops in the last few years.

- Gene German, Fort Bragg, Calif., says there were few seed in 1977 on magnolias there or at Strybing Arboretum, San Francisco. *M. cylindrica* at Strybing had two green cones and one *M. campbellii* had a half-dozen ready to pick. He did see *M. delavayi* in bloom and thought its flower looked like *M. sharpii,* which was in flower in the garden of Floyd Cogburn of Fort Bragg in September 1975. *M. sharpii* also has flowered at Strybing. The unidentified species I collected near the *M. sharpii* habitat in Chiapas had similar flowers on a practically glabrous plant *(M. sharpii* leaves have a pronounced indumentum). — J.C. McDaniel

- Ken Durio was impressed by the Gresham hybrids he saw at Gloster (Miss.) Arboretum in March 1978, particularly the size of the seedlings of *M.* × *soulangiana* 'Lennei Alba' × *M.* × *veitchii,* and the flower forms, from broad and cup-shaped to loose and floppy and sculptured, flat, platter size blooms. Colors were from near white through light pink to light, purplish pink.

- Archalie Harman has an exciting new seedling that bore its first five flowers this year, a cross between *M. denudata* and *M.* × *soulangiana* 'Grace McDade.' "It has the color of *denudata* with very faint color at the base of petals, otherwise white. Petals are shaped like 'Grace McDade,' round at top, larger than 'Lennei Alba,' but remind me of it; thick, thick substance and a vigorous grower."