MAGNOLIA GRANDIFLORA BY CUTTINGS

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Magnolia grandiflora, the Southern Magnolia, has been propagated usually from seeds; however, since cultivars are becoming more numerous, a vegetative method of propagation is needed. Graftage can be used; however, this increases production costs considerably. Thus, propagation by cuttings was investigated.

Enright (2) reported excellent rooting, using cuttings taken in late spring or early summer. Best results were obtained using a 10-second dip in a 20,000 ppm IBA solution with cuttings wounded basally on two sides. Cuttings taken in June and kept under intermittent mist averaged 84 to 88% rooted after 63 days in the bench.

March (3) reported that the cultivar, Freeman, was propagated by using semi-hardwood cuttings taken from juvenile plants. Hormodin #3 was used and cuttings were rooted in 8 weeks under mist.

Use of juvenile trees for cuttings was also reported by Curtis (1) who used hardwood cuttings taken in November. These cuttings from young, 4 to 6 foot trees, rooted readily when they were wounded and treated with Hormodin #3 and given bottom heat of 75 to 80°F. Watering was done by hand and was heavy, especially after cuttings were stuck.

Since procedures varied greatly, an experiment was begun in 1964 to determine the best method of propagating a selected clone by Robbins Nursery, Penderlea, N. C. This clone produces a narrow-pyramidal to columnar shaped tree. The ascending branches are filled with medium-sized light green leaves above with a dark brown tomentum beneath. The leaves are somewhat elliptical with slightly undulating margins and an acute point.

Cuttings were taken from about 10 to 12 foot trees in nursery rows. Cuttings had rooted well in some years but, generally, rooting percentages were very low. Current-season vegetative shoots were collected in mid-June, 1964, put in plastic bags, sprinkled and placed in a refrigerator at 40 to 45°F. until the cuttings were prepared for treatment.

Tip cuttings using the first five nodes, and leaf-bud cuttings from the 6, 7, 8 and 9th nodes were used for the mid-June and mid-July propagation dates. All cuttings were wounded heavily with two, 1 to 1-½ inch thin, longitudinal slices on the base of each cutting. These soft to semi-hardwood cuttings were 6 to 8 inches long. The bottom leaf was removed. The controls were soaked in distilled water for 80 seconds. Treated cuttings received a dip of 10, 20, 40, or 80 seconds in a 5,000 ppm IBA solution, which contained 50% alcohol. Five cuttings were used for each replication with four replications.

Intermittent mist, averaging 2 seconds on per minute, was employed during the first week after the cuttings were stuck. Misting began a half hour before sunrise and was terminated an hour after sunset. The misting interval, after the first week and throughout the remainder of the rooting period, was about 1.3 seconds on per minute. The medium was equal parts of German peat and coarse perlite. Bottom heat between 75 to 80°F. was used. The greenhouse was air-cooled with day temperatures averaging 75°F. with night temperatures in the sixties. The greenhouse was shaded, allowing about 60% of sunlight to enter.

Practically none of the June cuttings, which were very soft, rooted. Cuttings taken in July, August, and September rooted. For the July cuttings, which were taken July 15 and removed October 22, all treated ones rooted significantly better than the controls. The means for the 10, 20, 40, and 80 second dips in the IBA solution were: 90, 100, 100, and 85 percent respectively. The control mean was 15%. Rooting percentages in the leaf-bud cuttings were unsatisfactory commercially; thus, they were not continued in subsequent tests.

For the August 18 cuttings which were rated December 14, the same procedure was followed as in July. The means were for the 10, 20, 40, and 80 second dips in IBA solution: 100, 85, 75, and 35 percent respectively. The control percentage was 15 percent.

The mean average for the IBA treated cutting in September was 20%. The control cuttings had none which rooted. Since none of the treatments gave satisfactory rooting, no further dates were used and trials in subsequent years were limited to July and August.

The experiment was continued in 1965, using three treatments: a 10 second dip in a 5,000 ppm IBA solution, a 20 second dip in a 5,000 ppm IBA solution and the controls. The same procedures were followed as in 1964, except that 10 cuttings were used per replication. Cuttings were taken from trees about 15 to 20 feet high on July 15 and August 18. Means for the July date were 78% for the 10 second dip, 93% for the 20 second treatment, and 10% for the controls. The IBA treated cuttings rooted significantly better than the controls, both in numbers and in size of the root system. Means for the August cuttings were 85, 80, and 3 percent, again indicating significantly better rooting for the 5000 IBA treatment than the controls.

Cuttings were taken in 1966, but, due to power failures which occurred just after the cuttings were stuck, reduced rooting percentages which were below commercial acceptability resulted. The experiment was continued in 1967.

The 1967 cuttings were taken from young trees grown from the 1964 cuttings. They averaged about 5 feet high. Cuttings from a second clone "B" were also included. This clone has medium-large, dark, waxy green leaves above and a

heavy, rusty brown tomentum beneath. The thick, oblong leaves with an acute tip have prominent veins and smooth margins. The trees are broad-pyramidal, having dense ascending branches. Trees flower when they are young, usually in mid-July and August. Bright red fruits, heavy with seeds, follow. Growth of the trees is fast, and young trees fill out well.

Procedures were varied only slightly in 1967. Once cuttings were stuck, a Captan drench, using 3 tablespoonfuls (50WP) in 4 gallons of water, was applied biweekly. Every four weeks a 20-20-20 soluble fertilizer was applied at the rate of 1 oz./7 gal. water. Several different treatments were used. These and the rooting percentages for the two clones are given in Table 1.

In the July trials all hormone treatments gave significantly higher rooting percentages than in the controls, as well as better root systems. The most initials and greatest branching of roots were seen in the IBA treatments. Although no significant differences were noted among growth-promoting treatments and the controls in clone "B" in August; nevertheless, in most cases, roots in the control were very small with usually only one intial.

Table 1 Rooting percentages for *Magnolia grandiflora* cuttings in 1967.

Treatment	Dip	Clone "A"		Clone "B"	
		July 13[1]	Aug 16[2]	July 13[1]	Aug 16[2]
5000 ppm IBA	10 sec.	82.5	90.0	85.0	95.0
5000 ppm IBA	20 sec.	87.5	72.5	85.0	95.0
Jiffy Gro 33-⅓%	10 sec.	87.5	67.5	87.5	90.0
5000 ppm & 100 ppm Boron	20 sec.	90.0	60.0	85.0	87.5
Chloromone 33-⅓%	10 sec.	82.5	57.5	85.0	77.5
Control - water	10 sec.	27.5	45.0	45.0	80.0

[1]Cuttings removed October 4
[2]Cuttings removed Nov 2

In conclusion, with the two cultivars used in this experiment, propagation by semi-hardwood cuttings taken from mid-July to mid-August rooted satisfactorily if they were treated with 5,000 ppm IBA solution for 10 to 20 seconds. Cuttings were rooted under interrupted mist, with the mist on about 1.3 seconds out of every minute from a half-hour before sunrise to an hour after sunset. Bottom heat between 75 to 80°F was employed. The three-year mean for the mid-July cuttings dipped for 10 seconds for the 5,000 ppm IBA solution was 83.5%, while for the mid-August cuttings, 91.7%.

LITERATURE CITED

1. Curtis, W J 1965 Rooting of *Magnolia grandiflora*. Proc Int. Pl Prop. Soc 15 142-143

2 Enright, L J. 1958 Response of *Magnolia grandiflora* and several species of Berberis to root promoting chemical treatments Proc. Pl Prop Soc. 8·67-69
3 March, S G 1962 Excerpts from question-answer period Proc Pl Prop. Soc 12 127

MODERATOR TUKEY: Our next speaker comes from Oklahoma. Mr. Henry Walter is from the Park Department, Oklalahoma City, and he will talk about "Propagation of *Hibiscus rosea-sinensis*".

PROPAGATION OF CHINESE HIBISCUS

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The Oklahoma City Park Department yearly grows about 3000 Chinese hibiscus plants which are used as annuals in its parks. Being not only concerned with the propagation and production, the behavior of the plant in the parks is also of primary importance. After testing well over 150 varieties of Chinese hibiscus, a few have been selected which are produced in the above mentioned quantities. Ease of propagation, vigorous growth, abundance of flowers, as well as all-summer performance, are the key factors used in variety selection. Over 100 varieties are still grown in the display gardens and the testing continues as new selections become available. Most of the so-called "show varieties" are produced on a two year basis; that is approximately nineteen months from a cutting to a planting sized hibiscus. We will limit our remarks to the varieties that are produced in one growing season.

Washed sharp sand is used as a rooting media. This is placed in a well drained propagating bench with thermostatically controlled bottom heat. Tests seem to indicate that a mixture of 1/3 sharp sand, 1/3 peat moss and 1/3 Perlite gives excellent results. Additional tests will be conducted with this media. Cuttings are made in September. The condition of the cutting wood determines how early in the month propagation is started. Tip cuttings are used and these are usually 6 to 8 inches long, depending on the vigor of the plant. All flower buds are removed. Usually about ⅔ of the lower leaves are stripped and the final cut is made just below a bud. Wounding by removing a one inch sliver on one side of the cutting promotes a better root system as these plants are callus rooting. The cuttings are treated with Hormodin No. 2 powder prior to insertion in the sand where they are packed tightly in place. The use of Hormodin No. 3 is often desirable on some of the more difficult to root varieties. Tests are also being conducted with Jiffy-Gro which to date are promising. It is usually necessary to cover the cuttings with paper during the day for a few days. This is especially true if the weather is extremely bright and hot. A minimum temperature of 65 de-