be propagated by seed following stratification, or the cultivar propagated by pencil-sized root cuttings taken in January-February when the plant is dormant.

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TEN WOODY PLANTS THAT DESERVE A LONGER LOOK

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Describing ten new outstanding plants is impossible. Describing ten outstanding plants is easy. The following plants have crossed my path many times. I have observed them north and south — east and west. Many grow in my garden and others have been used in propagation studies. These plants offer the southeastern nurserymen an opportunity to compete in the burgeoning market for "new" and better plants.

1). *Magnolia grandiflora*, southern magnolia, is embarrassingly variable when grown from seed. Most nurserymen realize this and have either made selections from seed populations or grow known cultivars. At least 25 cultivars are reported in the literature. Propagation is difficult. Grafting/budding, as well as cuttings are used. For the past three years we have worked with 'Bracken's Brown Beauty'. These are handsome trees with lovely blooms and beautiful fruit. Initial results were disastrous but through trial and error the following propagation procedures have evolved that produce 90% and greater success.

Water management has been a real problem. Intermittent mist, using an interval of 2½ sec./5 min. from 8 a.m. to dark has seemed to solve the problem. Sand or peat:perlite stayed too wet, so coarse perlite was substituted as the rooting medium. No concentrations of IBA in 50% alcohol gave good root-

ing results. In August, 1984, a rooting study with IBA, NAA, Wood's Rooting Compound and Dip'N Grow was conducted. Rooting was dismal, largely due to water management. Only NAA-treated cuttings or those treated with Dip'N Grow, which contains NAA, rooted. In comparative studies in 1985, 1% NAA produced 100% rooting compared to 27% rooting with 1% IBA. Cuttings were collected in South Carolina on July 3 and had rooted 10 weeks later. The NAA cuttings averaged 11 roots. IBA cuttings had one root. Thirteen of 15 NAA-rooted cuttings were successfully transplanted while only 2 of 4 IBA-rooted cuttings survived. There was no leaf drop with NAA.

Other factors that contributed to the success described above are:

1. Four- to 6-inch semihardwood cuttings from 8- to 10-ft. nursery-grown trees.
2. Terminal bud removed.
3. One-in. deep wound, one side.
4. Two terminal leaves left intact.
5. 1% a-naphthaleneacetic acid in 50% alcohol, 5-sec. dip, 5000 to 10,000 ppm NAA seems ideal.

In follow-up studies, we have found this formula to be foolproof for 'Bracken's Brown Beauty'.

Studies with terminal bud removed or present, and different concentrations of NAA are underway and should contribute more pieces of information to the jigsaw puzzle we like to call "*Magnolia grandiflora* cutting propagation."

Obviously, there is more than one way to root cuttings of *M. grandiflora*. The following points should be considered:

1. Use young stock plants (juvenile condition)
2. Practice good sanitation
3. A hormone is necessary, either concentrated dip or soak, Hormodin #3 or Rootone F.
4. IBA is preferred, based on most published research but NAA may be worth testing
5. Wounding is beneficial.
6. Cuttings should be in a semi-hardwood condition (terminal set) and not actively growing.
7. When rooting commences, reduce mist and start hardening process
8. Rooted cuttings transplant readily but care must be exercised not to damage the fleshy roots, which are often sparse
9. In southeastern U S July and August are probably the best months to take cuttings
10. Bottom heat is beneficial but is not used by all propagators
11. Medium should be well-drained and flats or beds should be deep (4 in. or more)

12 Intermittent mist on the order of ± 2 sec /5 to 6 min. appears essential in most cases

13 Four-to 6-in. long cuttings with 2-to 5-terminal leaves are ideal.

14 Cutting leaf surface to reduce area is not necessary.

15 Shading cuttings during rooting might be beneficial although two schools of thought exist.

The key to rooting *M. grandiflora* 'Bracken's Brown Beauty' is good water management and naphthaleneacetic acid. Whether this formula will work on other cultivars is unknown but should at least be examined.

2). *Disanthus cercidifolius* is a most unusual member of the Hamamelidaceae. It has redbud-like leaves, brilliant claret-red fall coloration and purplish insignificant flowers in October. It is a multiple-stemmed shrub that grows 10 to 12 ft. high and is free of insects and diseases. Best growth is achieved in moist, well-drained, acid soil and partial shade. Cuttings rooted in high percentages when collected in June, treated with 1% IBA-alcohol quick dip, placed in peat:perlite, under mist. Cuttings should be potted immediately after rooting (about 6 weeks) and fertilized with 18-6-12 Osmocote. Interestingly, fertilized plants continue to grow and may be 12 to 18 in. high by October.

3). *Malus* 'Callaway' is well-known to southern nurserymen. Introduced by Mr. Fred Galle, formerly of Callaway Gardens, it has become the standard of crabapple excellence for southern gardens. Pink buds open to 1½-in. diameter white flowers, followed in September-October by 1¼-in. diameter reddish fruits. The foliage is scab-free and suffers none of the miseries associated with the "rosy bloom" types such as 'Hopa', 'Eleyi' and 'Almey'. Traditionally, crabapples have been budded, but cutting propagation and tissue culture have entered the field.

In our work, cuttings taken in late May, treated with 2500 ppm IBA-alcohol quick-dip rooted 87% in 5 wks. Plants continued to grow after transplanting and many were 1½ ft. high by mid-October. Northern liner producers have gone to cutting production. Plants range in price from $1.31 to $1.58 each compared to rooted cuttings of common plants that average $0.35 to $0.85 each. The advantages of own-root crabapples include no incompatibility problems, reduced or no suckering, and lower production costs.

In another experiment, cuttings collected on June 25 and treated with different IBA levels rooted 92 and 96% when treated with 2500 and 5000 ppm IBA-alcohol quick-dip (Table 1). The cuttings were transplanted immediately after rooting and fertilized with 18-6-12 Osmocote. By October 15, 71% had

broken bud and were actively growing. All cuttings collected on May 29 broke bud after transplanting.

Table 1. Effect of indolebutyric acid concentration on the rooting percentage, root number, and total root length of *Malus* 'Callaway'

IBA concentration (ppm)	Total Rooting Percentage	Root Number	Root Length
0	40[z]	1	7 cm
2500	92	7	67
5000	96	13	99
10000	76	7	35

z Cuttings collected June 25, evaluated August 20, 1985 Number represents average of 20 cuttings per treatment

4). *Calycanthus floridus* 'Athens' ('Katherine') is a yellow-flowered, exceedingly fragrant form of the native sweetshrub. This robust form has large lustrous dark green leaves and forms a 6 to 10 ft. high, mounded, somewhat stoloniferous shrub. Flowers appear before the leaves in April and continue sporadically into June. Cutting propagation has proven difficult with rooting averaging around 50%. Alcohol quick-dips burn the cuttings and have not proven highly successful. In 1985 the potassium salt of IBA, which is soluble in water, was used along with a host of other treatments. Cuttings were taken on August 13 and evaluated October 1. K-IBA proved excellent and resulted in 93% rooting (Table 2).

Table 2. Effect of selected hormone treatments on rooting percentage of *Calycanthus floridus* 'Athens'

Treatment	Rooting Percentage	Root quality
Control	37	Poor
50% ethanol quick-dip	41	Poor
1% IBA-50% ethanol-quick-dip	82	Good
1% K-IBA in H_2O-quick-dip	93	Excellent
1% K-IBA in H_2O-24 hour soak	0	All cuttings dead
1% NAA 50% ethanol-quick-dip	7	Poor

5). *Amelanchier arborea*, downy serviceberry, needs selection work in the southeastern U.S. This superb small tree offers white flowers before the leaves in late March-April, palatable purplish fruits, fine yellow to red fall coloration and smooth gray bark. Unfortunately, seedling material is variable in all traits mentioned above as well as leaf retention. Many

trees drop their leaves before coloring in the fall. A tree on the University of Georgia campus has consistently beautiful apricot fall color while a grouping of six trees at the Botanical Garden offers no color. All came from the same nursery source. *Amelanchier arborea* and other species have been rooted successfully from softwood cuttings taken when the new growth was several inches long. *Amelanchier laevis* has been successfully tissue-cultured.

6). *Illicium parviflorum*, anisetree, is a worldbeater in the opinion of this author. It might prove to be a suitable replacement for the evergreen privets that have been devastated by the low temperatures of recent winters. *Illicium parviflorum* has survived −9°F without significant injury. The plant forms an upright, broadly pyramidal evergreen shrub and may also develop a suckering habit. I have seen both types. the 2- to 4-in. long, olive-green leaves are consistently beautiful through the seasons. The small yellowish-green flowers and brownish, star-shaped fruits offer little interest. It thrives in moist soils but, on the University of Georgia campus, has been used in dry situations under heavy shade with good success. Cuttings collected in late August and treated with 0.3% IBA-50% ethanol quick-dip rooted 100% in 4 to 6 wks. Several Georgia propagators are producing the plant and have had no trouble rooting it. Landscape designers and contractors have become interested in this species and are now specifying it. It is native to moist soil areas in Georgia and Florida.

7). *Stewartia monadelpha*, tall stewartia, was purchased in dormant condition by the author as *S. pseudocamellia*. When it flowered, I found out the true identity. Any stewartia is a wonderful garden plant, and this has proved no exception. The rich reddish brown, exfoliating bark is the outstanding attribute, although fall color in one particular year was an excellent bronze-red. The white flowers are only about 1-in. diameter and do not hold a candle to those of *S. pseudocamellia*, *S. koreana*, *S. ovata*, or *S. malacodendron*.

Over the years I have lost every rooted cutting of *S. monodelpha* during overwintering. Cuttings taken on June 16, treated with 0.5% IBA-alcohol, rooted 100% in 8 wks. Cuttings were stuck in individual cells and undisturbed, yet bark split occurred. Attempts with extended photoperiod to induce growth after rooting have been unsuccessful. Seeds of *S. monodelpha* germinated successfully by providing 5 months of warm/3 months cold stratification.

8). *Hamamelis* × *intermedia* 'Arnold Promise' and other wonderful cultivars of witchhazel are superb garden plants for much of the U.S. southeast. Dr. J. C. Raulston, North Carolina State University, has assembled one of the best collections in

the United States and believes, like myself, that propagators are missing the boat. All flower in February-March, offer flower colors from soft yellow to red, fine fragrance and fall color. Grafting has been the principal means of propagation but many nurseries are reluctant to fool with grafting. I have seen many grafted forms of *H.* × *intermedia* with incompatability and pronounced suckering. Also, the understocks, usually *H. virginiana*, often overgrow the scions. I have rooted cuttings of 'Arnold Promise' every June-July using 1% IBA solution, peat:perlite, mist, and individual containers, but I have been successful in overwintering only two plants.

9). *Lespedeza thunbergii*, Japanese bushclover, is a superb plant for massing and large area use. In northern gardens it is a herbaceous perennial, but in Zone 8 (Athens, Georgia) it exists as a semi-woody shrub. I cut the plant back in late winter, apply a handful of 10-6-4 fertilizer and stand back and marvel. Growth of the season ranges from 4 to 8 ft. The stems start upright and gradually arch to form a fountain-like habit. The rich blue green foliage is maintained into November. The rosy-purple flowers appear in June and again in September with equal flair. The flowers are borne in a 2- to 2½ ft. long racemose-panicle that is almost unbelievable. I have grown the plant for three years and have been impressed by its heat- and drought-tolerance. It is easily rooted from softwood cuttings in May through August. A 1000 ppm IBA-50% ethanol quick-dip proves beneficial.

10). *Chimonanthus praecox*, fragrant wintersweet, has always been cherished for its fragrant winter flowers that appear in late December, peak in January, and perish in early February. It is a large (15 ft.), rather coarse shrub that is not suited for every landscape. The flower buds appear as golden-yellow inflated balloons and open to translucent yellow petals on the outside with a purple blotch in the center. A brilliant golden yellow-flowered form, 'Luteus' or 'Mangetsu', is available and is far superior to the usual form.

Seeds have proven easy to germinate when fruits are collected in late May-June, seeds extracted, and sown immediately. Germination is complete in four weeks and averages 90%. If fruits are allowed to dry, seeds must be provided a 2- to 3-month cold stratification period. Cuttings are not easy to root; however, 70% of the cuttings rooted when collected in late July in Athens, Georgia, treated with 3000 ppm IBA-alcohol quick-dip, and stuck in peat:perlite under mist. About half survived the winter. This may be a species where alcohol dips prove harmful.

The previous ten plants represent but a precious few of the magnificent garden gems that can be grown in southern

gardens. All do not propagate as readily as aucuba, abelia, and spirea but are certainly worth the extra effort.

NEW FOLIAGE PLANTS WITH POTENTIAL

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Shemin International is a world-wide plant resource for growers throughout the U.S. and Canada. We concentrate mostly on sales of foliage and flowering plants, with some ornamentals and perennials. Plants are provided in various stages, such as rooted and unrooted cuttings, seedlings, liners, or tissue culture in stages 2, 3, and 4. Our buyers travel extensively in search of new plants as well as high quality established cultivars. Plants come from Holland, Denmark, Belgium, Israel, Ivory Coast, Puerto Rico, Costa Rica, Honduras, Guatemala, Australia, and the U.S. I will briefly describe the plants we feel have or will have potential impact on the U.S. and Canadian markets.

1). *Dieffenbachia* 'Nelly'. This plant is a mutation found in France. It has a U.S. patent and is sold as an unrooted cutting. It has a strong branching habit, does not develop a leggy cane like other "camro" cultivars. The leaves are durable, with blended tones of yellow, cream and green. One 4- to 6-in. unrooted cutting produces an extremely compact 10-in. container plant in approximately 8 months.

2). *Dieffenbachia* 'Tropic Sun'. 'Tropic Sun' is a branched sport of dieffenbachia 'Tropic Snow' found in Belgium. One 18- to 20-in. unrooted cutting makes a heavily-branched 10-in. container in approximately 9 months. U.S. patent is pending.

3). *Ficus benjamina* 'Golden Princess'. This ficus, found in Holland, has lime green and cream colors on the leaf margin. It develops very distinct variegation up to 70% shade and grows as fast as *F. benjamina*.

4). *Schefflera* 'Diane': This plant, found in Japan, has yellow and green variegated leaves and stem.

5). *Schefflera* 'Gold Capello': Found in Holland, Gold Capello is a large grower with yellow-gold and green leaves. It is the strongest grower we have found of all the variegated schefleras.

6). *Schefflera* 'Renate': 'Renate' is solid green, very compact and has a curly-edged leaf.