Preliminary Rooting Evaluation of North American *Stewartia*, *Symplocos*, and *Persea*©

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INTRODUCTION

While there is an ever-increasing interest and demand for native plants by consumers, many of our more choice and intriguing native species defy most attempts at propagation. The mission of the Mt. Cuba Center is to study and develop methods of reliable production for native plants, particularly species of the Piedmont of eastern North America.

Three plants currently of interest to both Mt. Cuba Center and Lorax Farms for wider landscape use include silky camellia (*Stewartia malacodendron*), swamp bay (*Persea borbonia* var. *pubesans*), and horsesugar (*Symplocos tinctoria*).

Silky camellia is an attractive shrub to small tree native throughout the southeastern U.S.A. and beloved for its showy camellia-like flowers in early summer. Although selections are being made for improved flower quality and hardiness, asexual propagation and survival of plants remains a limiting factor in its success.

Swamp bay is a small evergreen tree or large shrub of the southeastern U.S.A. and is closely related to red bay. Its dark evergreen foliage, adaptability to a wide range of soil moisture conditions, and potential hardiness make it an ideal candidate as an addition to the palette of broad-leaved evergreens for the Mid-Atlantic Region. Unfortunately, very little is know about the propagation or production potential of this species.

Finally, horsesugar is an attractive, yet, often overlooked, deciduous to evergreen shrub to small tree found in the forest understory throughout much of the southeastern U.S.A. Its bright green foliage borne in whorls on the ends of the branches and its suckering habit provide opportunities for selection and development as another broad-leaved evergreen or deciduous shrub for the garden.

None of these plants are widely available, although a few nurseries are producing silky camellia by ground layering and seed propagation; both techniques are very time consuming.

METHODS AND METHODS

During the summer of 2002, Mt. Cuba Center and Lorax Farms collaborated in an effort to assess the potential of propagating the aforementioned species by cuttings. Softwood cuttings of *S. malacodendron* and *S. tinctoria* were collected from wild-growing populations in Sussex County, Delaware, and Chesapeake City, Virginia,

respectively. *Persea borbonia* var. *pubesans* cuttings were collected near Pocomoke City, Maryland. All cuttings were wrapped in moist paper towels, placed in an insulated cooler, transported to Mt. Cuba Center's greenhouse and placed in a refrigerator at 40°F for 1 to 2 days prior to distribution of cuttings for propagation.

Stewartia malacodendron cuttings were given treatments similar to the more commonly propagated Asian species, *S. pseudocamellia.* Cuttings were harvested from shoots in active growth that had not fully hardened off and without fully developed terminal buds. In most cases, cuttings had 5 to 7 nodes and were wounded prior to application of phytohormones. Cuttings of *S. tinctoria* and *P. borbonia* var. *pubesans* were in similar condition, although cuttings usually had 3 to 5 nodes.

At Lorax Farms, the cuttings were stuck into 2.25-inch pots with W.R. Grace 510 mix as a substrate. Cuttings at Mt. Cuba Center were of similar size, but placed in a peat and perlite (1 : 1, v/v) substrate. In both cases, cuttings were placed on bottom heat of 70°F with intermittent mist of 15 sec every 15 min. After 60 days the cuttings were evaluated for rooting utilizing a tug test or by visual inspection for the presence of roots. Results of the trials are listed on Table 1.

RESULTS AND DISCUSSION

Stewartia malacodendron

Lorax Farms. Cuttings treated with a liquid quick dip of Dip 'N Gro at 1400 ppm IBA/700 ppm NAA, rooted sparingly (32% rooting). The phytohormone concentration of the liquid quick dip was deliberately reduced due to concerns about the overwintering of *Stewartia* following rooting.

Mt. Cuba Center. Talc-based formulations were utilized and produced quite satisfactory rooting with 2000 ppm IBA (90% rooting), 4000 ppm IBA (100% rooting), and 8000 ppm IBA (88% rooting). In these cases, terminal cuttings were used and showed the most promise. Heel cuttings did root, but in lower percentages with 4000 ppm IBA and 8000 ppm IBA in talc yielding 63% rooting at both concentrations.

Symplocos tinctoria

Lorax Farms. Cuttings rooted poorly with a liquid quick dip of Dip 'N Gro at 1400 ppm IBA/700 ppm NAA (7% rooting).

Mt. Cuba Center. Cutting trials utilizing terminal cuttings dipped in talc-based formulations of IBA, produced modest rooting with 2000 ppm IBA (36% rooting), 4000 ppm IBA (54% rooting), and 8000 ppm IBA (52% rooting). Heel cuttings, as with *Stewartia*, yielded lower percentages with 2000 ppm IBA (0% rooting), 4000 ppm IBA (25 % rooting), and 8000 ppm IBA (19% rooting).

Persea borbonia var. *palustris*

Lorax Farms. Cuttings responded best to liquid quick dips of Dip 'N Gro at 1400 ppm IBA/700 ppm NAA with a 12% rooting of terminal cuttings.

Mt. Cuba Center. None of the treatments rooted using talc formulations. However, in another trial conducted at Mt. Cuba Center during the winter, *P. borbonia* var. *palustris* hardwood cuttings produced 60% rooting using 8000 ppm IBA in talc.

It is clear that *Stewartia* and *Symplocos* softwood cuttings responded best to talc-

Table 1. Rooting results for the three native species: *Stewartia malacodendron*, *Symplocos tinctoria*, and *Persea borbonia*.

Stewartia malacodendron

Lorax Farms Trials:

From 06/05- 08/05, Grace 510 mix, bottom heat at 70°F, mist, DNG 1/7, 1400 ppm IBA, 700 ppm NAA.

Terminal cuttings total	136
Rooted	43
Percent rooted	32

Mt. Cuba Trials:

From 6/05-08/15, peat:perlite (1:1, v/v), bottom heat at 70°F, mist.

Hormodin Powder 0.2% IBA

Terminal cuttings total	21
Rooted	19
Percent rooted 90%	

Hormodin Powder 0.4% IBA

Terminal cuttings total	21
Rooted	21
Percent rooted	100
Heel cuttings	8
Rooted	5
Percent rooted	63

Hormodin Powder 0.8% IBA

Terminal cuttings	21
Rooted	18
Percent rooted	88
Heel cuttings	8
Rooted	5
Percent Rooted	63

Symplocos tinctoria

Lorax Farms trials:

From 06/05- 08/05, Grace 510 mix, bottom heat at 70° F, mist, DNG 1/7, 1400 ppm IBA, 700 ppm NAA.

Terminal cuttings total	121
Rooted	8
Percent rooted	7

Mt. Cuba trials:

From 6/05-08/15, peat:perlite (1:1, v/v), bottom heat at 70 ° F, mist, not wounded; data from three different accessions were pooled to get an overview of rooting potential.

Hormodin powder 0. 2% IBA

Terminal cuttings total	25
Rooted	9
Percent rooted	36
Heel cuttings	11
Rooted	0
Percent rooted	0

Hormodin powder 0. 4% IBA

Terminal cuttings total	24
Rooted	13
Percent rooted	54
Heel cuttings	12
Rooted	3
Percent rooted	25

Hormodin powder 0. 8% IBA

Terminal cuttings total	23
Rooted	12
Percent rooted	52
Heel cuttings	11
Rooted	2
Percent rooted	19

Persea borbonia* var. *pubesans

Lorax Farms trials:

From 06/05- 08/05, Grace 510 mix, bottom heat at 70° F, mist, DNG 1/7, 1400 ppm IBA, 700 ppm NAA

Terminal cuttings total	32
Rooted	4
Percent rooted	12

Mt. Cuba trials:

From 6/05-08/15, peat/perlite 1/1, bottom heat at 70 ° F, mist

Hormodin powder 0.2% IBA

Terminal cuttings total	5
Rooted	0
Percent rooted	0

Hormodin powder 0.4% IBA

Terminal cuttings total	5
Rooted	0
Percent rooted	0

Hormodin powder 0.8% IBA

Terminal cuttings	5
Rooted	0
Percent rooted	0
Heel cuttings	3
Rooted	0
Percent rooted	0

Stuck 1/23/01, evaluated after 3 months.

Hormodin powder, 0.8% IBA

Hardwood cuttings terminal cuttings	10
Rooted	6
Percent rooted	60

based formulations of IBA. Since cuttings treated with Dip 'N Gro did not drop their leaves, two factors could account for the poor results with this root hormone: (1) it is possible that the NAA had a detrimental affect on the rooting; or (2) the concentration of the phytohormones was simply not high enough to induce satisfactory rooting. Further trials need to be conducted to determine whether a higher concentration of Dip N Gro would yield better results; however, caution is urged due to the possible negative side affects of poor overwintering.

Persea borbonia var. *pubesans* proved to differ from the other two species and did respond to the Dip N Gro formulation albeit at a low rooting percentage. Since there is virtually no information available on the rooting of *P. borbonia* var. *pubesans,* very little can be inferred as to the degree of affect that this hormone level will have on the overwintering of the rooted cuttings. Again, however, cuttings rooted at Mt. Cuba Center during the winter using 8000 ppm IBA in talc-based formulations rooted and overwintered satisfactorily.

More comprehensive studies need to be conducted with all three species to determine the optimum time of year for rooting, survival, and subsequent growth of rooted cuttings. It is gratifying to note, though, that all three species responded to phytohormone treatments which provides encouragement for further investigation.

RECOMMENDATIONS

In all three species, terminal cuttings seemed to be the most desirable portion of the plant for rooting. This is not unusual since many plants respond best to terminal cuttings; and, physiologically, this makes sense because many phytochemicals associated with the rooting of cuttings are manufactured in the terminal buds.

There is little or no information available regarding how early cuttings can be collected for these species; however, it would be helpful if cuttings could be propagated earlier in the season due to the relatively long time it takes for cuttings of these species to root. This might be advantageous for both increased rooting percentages and overwintering of rooted cuttings.

Talc formulations seem to produce the best results with both *S. malacodendron* and *S. tinctoria*; overwintering success has yet to be measured, though. A liquid quick dip shows promise for *P. borbonia* var. *pubesans*, but further investigation is warranted. Obviously more work needs to be done before we can bring all three of these species up to acceptable production levels.