Propagation of Florida and Piedmont Azalea from Stem Cuttings

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Objective

The objective of this experiment was to determine the optimum hormone concentration and mist interval for propagation of *Rhododendron austrinum* and *R. canescens.*

Introduction

Native azaleas are undoubtedly some of the most spectacular flowering deciduous shrubs. They add much needed color to the landscape in the early spring when few other plants are blooming. Two of the earliest flowering native azaleas are *Rhododendron austrinum* (Small) Rehder and *R. canescens* (Michaux) Sweet (Galle, 1987).

Rhododendron austrinum (Small) Rehder, Florida Azalea, is a medium to tall branched shrub to 15' tall (Galle, 1987). Flower color ranges from pure yellow to yellowish-orange. Flowers 1" to 1-1/2" long appear prior to the leaves in clusters of eight to 15 blossoms. The native range of Florida Azalea is northern Florida, coastal Alabama and Georgia, and southeastern Mississippi. Florida Azalea is hardy in USDA hardiness zones 6b-10a.

Rhododendron canescens (Michaux) Sweet, Piedmont Azalea, is a medium to tall shrub that may exceed 15' tall and may sometimes be stoloniferous (Galle, 1987). Flower color ranges from white to medium or dark pink with white to dark pink corolla tubes. Piedmont Azalea seldom has a blotch. One to 1-1/2" flowers appear prior to or with the leaves. The native range of Piedmont Azalea is the coastal plains of North Carolina to Florida and west to Oklahoma and southeastern Texas. Piedmont Azalea can also be found in the Piedmont areas of North Carolina, Georgia, Alabama, Mississippi, Tennessee, and Arkansas. Piedmont Azalea is hardy in USDA hardiness zones 6a-10a.

Reports vary concerning the ease of propagation for native azaleas. Bir (1992) reported that native azaleas root best when terminal softwood cuttings are taken when new growth has ceased. Use a 0.5 to 0.8% IBA powder or 1,000-2,500 ppm (parts per million) IBA solution. New growth should be forced under lights, or rooted cuttings should be left undisturbed through normal winter chilling until new growth starts in the spring. Galle (1987) reported that Florida Azalea is easy to propagate from softwood cuttings while Piedmont Azalea is moderate to easy to propagate from softwood cuttings. Berry (1998) reported that Florida and Piedmont Azalea can be propagated from soft new growth using 5,000 ppm K-IBA. Optimum months are mid-May through mid-June. Knight *et al.* (2001) reported the best rooting response for Piedmont Azalea occurred between 8,000 and 10,000 ppm K-IBA. Utilization of a 10,000 ppm K-IBA quick dip resulted in 100% rooting.

Dirr and Heuser (1987) reported that stoloniferous native azaleas often root easier than non-stoloniferous species. Major problems associated with native azalea propagation are rooting the cuttings and inducing new growth in the spring. Six-inch cuttings should be taken when they are slightly firm. Cuttings should have all but four leaves stripped and be wounded. Use 4,000 ppm IBA with a fungicide and stick cuttings in a 100% peat moss medium.

Materials and Methods

Six-inch (15 cm) terminal softwood cuttings of *R. austrinum* and *R. canescens* were taken on April 11, 2003, from established plantings at Crosby Arboretum, Picayune, Mississippi (USDA zone 8b). Cuttings were stored at 100% relative humidity during transport to Poplarville, Mississippi, and were stuck the same day. Two to four terminal leaves were left on each cutting, and the basal end was wounded to a length of 1" (2.5 cm). Cuttings were quick-dipped for 5 sec in the respective hormone solutions and immediately stuck in 3" (7 cm) pots to a depth of 1". Propagation medium was 100% pine bark amended with 5 lbs (2.9 kg) dolomitic limestone and 1-1/2 lbs (0.9 kg) Micromax per cubic yard (cubic meter). Cuttings received mist from 7:00 a.m. until 17:30 p.m. Average light levels ranged from 800-1,000 $\mu mol \cdot m^{-2} \cdot sec^{-1}$. Neither fertilizer nor bottom heat was utilized. Cuttings were harvested July 2, 2003.

Hormone concentrations utilized in this experiment included 0; 2,500; 5,000; 7,500; or 10,000 ppm K-IBA, with water as the solvent. Misting intervals were 4 sec/6 min or 4 sec/12 minutes. Data collected for this experiment included percent rooting, cutting growth, cutting quality (0-5, with 0 being dead and 5 being a healthy, well-rooted cutting), root number, length of three longest roots, and root quality (0-4, with 0 being dead and 4 being excellent).

Cuttings were arranged in a 5 (hormone concentration) x 2 (mist interval) factorial arranged in a randomized complete block design with 6 replications consisting of 2 plants per treatment. All data were subjected to ANOVA statistical analysis, and

means were separated using Fisher's Protected Least Significant Difference (LSD, $p<0.05$). Each species was analyzed as a separate experiment.

Results

Florida Azalea. *Hormone level.* Percent rooting ranged from 62.5% for cuttings dipped in 0 or 2,500 ppm K-IBA to 100% for cuttings dipped in 10,000 ppm K-IBA. Cuttings treated with 5,000 or 7,500 ppm K-IBA had 50.0% or 37.5% rooting, respectively (Table 1). Hormone concentration had no influence on cutting growth. Cuttings treated with 7,500 ppm K-IBA had 2 to 5 times more roots compared to cuttings treated with 2,500 or 0 ppm K-IBA. There were no differences in root numbers between cuttings treated with 0 or 2,500 ppm K-IBA or 2,500, 10,000 or 5,000 ppm K-IBA. Average root length was greatest for cuttings treated with 7,500 or 10,000 ppm K-IBA compared to 0 or 2,500 ppm K-IBA. Cuttings treated with 5,000 ppm K-IBA were similar to all other treatments. Root quality was greatest for cuttings treated with 10,000 ppm K-IBA and poorest for cuttings treated with 0 ppm K-IBA. All other treatments were similar.

Mist Interval. Percent rooting ranged from 75% for cuttings placed in mist for 4 sec/6 min to 60% for cuttings placed in mist for 4 sec/12 min (Table 1). Mist interval had no influence on cutting growth, average root length, or root quality. Root numbers were 58% less for cuttings placed in mist beds for 4 sec/12 min compared to cuttings placed in mist beds for 4 sec/6 min.

Piedmont Azalea. *Hormone level.* Percent rooting ranged from 75.0% for cuttings treated with 0, 2,500, or 5,000 ppm K-IBA, 87.5% for cuttings treated with 10,000 ppm K-IBA, and 100% for cuttings treated with 7,500 ppm K-IBA (Table 2). Hormone level had no influence on cutting growth. Root number, average root length and root quality were greatest for cuttings dipped in 10,000 ppm K-IBA compared to all other treatments.

Mist interval. Percent rooting ranged from 95% for cuttings placed in mist for 4 sec/6 min compared to 70.0% for cuttings placed in mist for 4 sec/12 min (Table 2). Mist interval had no influence on root number, average root length, or root quality ratings. Growth was best for cuttings placed under mist for 4 sec/6 min.

Discussion

Florida Azalea. Hormone concentration had no influence on cutting growth. Root number, average root length, and root quality were generally the same regardless of whether cuttings were treated with 5,000, 7,500 or 10,000 ppm K-IBA. However, percent rooting was improved to 100% when cuttings were dipped in 10,000 ppm K-IBA compared to cuttings dipped in 5,000 or 7,500 ppm K-IBA. These results suggest that higher hormone levels may be most beneficial for propagation of Florida Azalea. Mist interval only impacted root number. It appears that 4 sec/6 min is the preferred mist interval for propagation of Florida Azalea.

Piedmont Azalea. Hormone concentration did not influence cutting growth. Cuttings treated with 10,000 ppm K-IBA consistently had higher root numbers, average root lengths, and root quality ratings compared to cuttings treated with other levels of K-IBA. Knight *et al.* (2001) reported similar results in a previous Piedmont Azalea experiment. Mist interval only impacted growth increase, and 4 sec/6 min appears to be the preferred mist interval for propagation of Piedmont Azalea.

While cuttings of both species treated with low levels of hormone rooted, the use of higher levels of K-IBA appears to increase root numbers, lengths, and quality. While the cuttings did root fairly easily as reported by Galle (1987), poor overall cutting quality suggests that initiating new growth is as difficult as reported by Dirr and Heuser (1987).

Literature Cited

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Table 1. Influence of hormone concentration and mist interval on rooting for *Rhododendron austrinum*.

Treatment	% Rooting	Cutting Growth	Root Number	Average Root Length[z] (cm)	Root Quality[y]
Hormone					
0 ppm K-IBA	62.5	3.0a[x]	6.6c	2.1b	0.2b
2,500 ppm K-IBA	62.5	4.4a	17.1bc	3.4b	0.7ab
5,000 ppm K-IBA	50.0	3.6a	21.9ab	4.2ab	0.7ab
7,500 ppm K-IBA	37.5	4.7a	33.9a	5.9a	1.2ab
10,000 ppm K-IBA	100.0	4.4a	21.8ab	6.0a	3.7a
Mist Interval					
4 sec/6 min	75.0	4.6a	25.6a	4.9a	0.9a
4 sec/12 min	60.0	3.5a	14.9b	3.8a	1.7a
Significance[w]					
Hormone		NS	*	**	**
Time		NS	*	NS	NS
Hormone* Time		NS	NS	NS	NS
Rep		NS	NS	NS	NS

[z] Average root length = length of three longest roots/3.
[y] Root quality rating = 0-4 with 0 being dead and 4 being a well-rooted cutting.
[x] Means followed by the same letter are not significantly different.
[w] NS, *, or ** means nonsignificant or significant at the 5% and 1% levels, respectively, according to LSD, $p<0.05$.

Table 2. Influence of hormone concentration and mist interval on rooting for *Rhododendron canescens*.

Treatment	% Rooting	Cutting Growth	Root Number	Average Root Length[z] (cm)	Root Quality[y]
Hormone					
0 ppm K-IBA	75.0	3.9a[x]	6.3b	2.5b	0.6b
2,500 ppm K-IBA	75.0	2.2a	8.5b	2.8b	1.0b
5,000 ppm K-IBA	75.0	2.3a	8.0b	2.9b	0.9b
7,500 ppm K-IBA	100.0	2.5a	5.3b	2.8b	0.8b
10,000 ppm K-IBA	87.5	5.6a	41.3a	7.0a	3.0a
Mist Interval					
4 sec/6 min	95.0	4.8a	14.3a	4.2a	1.4a
4 sec/12 min	70.0	1.8a	13.5a	3.0a	1.1a
Significance[w]					
Hormone		NS	**	**	**
Time		**	NS	NS	NS
Hormone* Time		NS	NS	NS	NS
Rep		NS	NS	*	*

[z] Average root length = length of three longest roots/3.
[y] Root quality rating = 0-4 with 0 being dead and 4 being a well-rooted cutting.
[x] Means followed by the same letter are not significantly different.
[w] NS, *, or ** means nonsignificant or significant at the 5% and 1% levels, respectively, according to LSD, $p<0.05$.