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Propagation of Shumaka™ Crape Myrtle

Jenny B. Ryals, Patricia R. Knight, Scott Langlois, Eugene Blythe, J. Skylar Baldwin, Christine Coker, Gary Bachman, Jim DelPrince, and Anthony T. Bowden
Coastal Research and Extension Center, South Mississippi Branch Experiment Station
P.O. Box 193, Poplarville, Mississippi 39470, USA

j.ryals@msstate.edu

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Abstract

Shumaka™ crape myrtle is a hybrid resulting from the cross of *Lagerstroemia* 'Arapaho' and an unknown pollen donor. Industry recommendations are needed for propagating this new Mississippi State University crape myrtle selection. Hence, the objective of this research was to determine optimal commercial auxin formulation and concentration, with and without basal wounding, for hardwood cuttings of Shumaka™. Hardwood cuttings quick-dipped in Hortus IBA Water Soluble Salts™ (Hortus IBA) at 5000 ppm had higher root quality ratings compared to cuttings that were wounded and received no auxin. However, cuttings quick-dipped in Hortus IBA did have better root quality compared to cuttings treated with Dip'N Grow® (DNG); root quality and number increased with increasing concentrations of Hortus IBA. Cutting quality (rooted, transplant-ready cuttings) also increased when Hortus IBA concentrations increased. Results suggest that hardwood cuttings of Shumaka™ crape myrtle will root without wounding or use of auxin. However, a basal quick-dip in Hortus IBA 5000 ppm results in a higher quality liner.

INTRODUCTION

Crape myrtle, *Lagerstroemia*, is considered a staple in many southern landscapes (Wilson et al., 2007). A number of crape myrtle cultivars flower for more than 100 days, providing an aesthetically appealing landscape element with a color palette that is constantly expanding (Byers, 1983; Knight et al., 2006). Mississippi State University has been active in developing new crape myrtle selections, including Shumaka™. Shumaka™ is a hybrid resulting from crossing *Lagerstroemia* 'Arapaho' (Pooler, 2006) and an unknown pollen donor.

Shumaka™ has a unique very light pink flower color and large growth habit. Three-year-old plants in a research setting have grown more than 6 m (20 ft) and flower from early June through late August. The bark is smooth to exfoliating, with an outer bark that is grayish brown in color.

When releasing a new crape myrtle, like Shumaka™, it is important for nurseries to know the best propagation and production methods to scale-up plant numbers to meet market demands. Propagation of crape myrtle via softwood or hardwood cuttings is widely described as easy (Byers, 1983; Dirr and Heuser, 1987). Wade and Woodward (2001) reported that propagation of a crapemyrtle is easiest when using semi-hardwood cuttings from new growth. Byers (1983) propagated 20 cm (8-in.) hardwood cuttings taken after frost and stored overwinter. Dirr and Heuser (1987) reported that hardwood cuttings propagated in early February rooted better (43%) than cuttings propagated in early January or early March; bottom heat and peat:perlite or bark media was used. Propagation scheduling and preference, at a nursery, will determine whether it is more beneficial to propagate hardwood cuttings, soft or semi-hardwood cuttings.

Easy-to-root species like crape myrtle can certainly be scheduled around crops that have more specific propagation requirements. To assess the best way to propagate Shumaka™, two studies were conducted. Study one evaluated the optimal commercial auxin formulation and concentration and basal wounding for hardwood cutting propagation, while study two evaluated the optimal commercial auxin formulation and concentration - and impact of cutting stem position for soft or semi-hardwood cutting propagation of Shumaka™. However, this paper will only discuss results from the hardwood cutting study.

MATERIALS AND METHODS

Medial hardwood cuttings with a length of 12.7 cm (5 in.) were taken from Shumaka™ stock plants and stuck to a depth of 2.5 cm (1 in.) on 1 Feb. 2017. Cuttings were placed in 100% perlite in 7.6 cm (3-in.) containers. The 2x3x3 factorial experiment included two basal wounding treatments (wounded or non-wounded), three commercial auxin formulations [Hortus IBA (Hortus IBA Water Soluble Salts™), Dip'N Grow®, or Hortus IBA + KNAA (Hortus IBA Water Soluble Salts™ + NAA potassium salt)], and three auxin concentrations (0, 1000, or 5000 ppm IBA). DNG and Hortus IBA + KNAA formulations contained NAA at one-half the rate of IBA. KNAA is a research-only product but was added to Hortus IBA in selected treatments for comparison with DNG. A randomized complete block experimental design with five single cutting replications was utilized. Data were collected 60 days after sticking cuttings in perlite and included: rooting percentage, growth index (new shoots), cutting quality (0-5, with 0 = dead and 5 = transplant-ready cutting), total root number, average root length (of three longest roots), and root quality (0-5, with 0=no roots and 5=healthy, vigorous root system). Data were analyzed using linear mixed models and generalized linear mixed models with the GLIMMIX procedure of SAS (ver. 9.4; SAS Institute Inc., Cary, NC).

RESULTS

Rooting percentage, root number, average length of three longest roots, and growth indices were similar among treatments (Table 1). Cuttings that were not wounded and dipped in DNG 5000 ppm had higher root quality ratings compared to wounded control cuttings, wounded cuttings dipped in Hortus IBA 1000 ppm, non-wounded cuttings dipped in DNG 1000 or 5000 ppm, or non-wounded cuttings dipped

Table 1. Influence of basal wounding treatment, auxin concentration, auxin source on rooting percentage, root number, average length of three longest roots, root quality, cutting quality, and growth of Shumaka™ crapemyrtle.

Treatment[z] (ppm)	Rooting (%)	Roots (no.)	Mean length of 3 longest roots (inches)	Root quality rating[y]	Cutting quality rating[x]	Growth index[w]
Wounded control	40a[v]	4.0a	4.0a	1.9c	2.1ab	5.4a
Non-wounded control	60a	4.1a	4.3a	2.4abc	2.2ab	5.5a
Wounded Hortus IBA 1000	80a	3.4a	3.2a	2.2bc	1.8b	6.3a
Non-wounded Hortus IBA 1000	100a	1.8a	3.2a	2.3abc	2.1ab	5.4a
Wounded Hortus IBA 5000	100a	4.3a	4.0a	2.5ab	2.3ab	5.9a
Non-wounded Hortus IBA 5000	80a	7.4a	4.6a	2.8a	2.6a	6.2a
Wounded Dip'N Grow 1000	60a	1.9a	4.9a	2.3abc	2.2ab	4.7a
Non-wounded Dip'N Grow 1000	40a	1.7a	3.5a	2.1bc	1.9ab	6.1a
Wounded Dip'N Grow 5000	80a	4.5a	4.4a	2.4abc	2.2ab	5.7a
Non-wounded Dip'N Grow 5000	80a	2.0a	3.6a	2.2bc	2.0ab	5.1a
Wounded Hortus IBA 1000 K-NAA 500	100a	2.7a	4.3a	2.3abc	2.2ab	5.6a
Non-wounded Hortus IBA 1000 KNAA 500	100a	2.2a	2.8a	2.2bc	2.0ab	5.2a
Wounded Hortus IBA 5000 K-NAA 2500	100a	3.5a	5.2a	2.4abc	2.3ab	5.9a
Non-wounded Hortus IBA 5000 K-NAA 2500	100a	4.5a	4.0a	2.4abc	2.2ab	5.1a

[z]Dip'N Grow and Hortus IBA + KNAA formulations contained NAA at one-half the rate of IBA.
[y]Root quality (0-5, with 0=no roots and 5=healthy, vigorous root system).
[x]Cutting quality (0-5, with 0=dead and 5=transplant ready cutting).
[w]Growth index=(width1+width2+height)/3.
[v]Means followed by the same letter are similar according to Holm-Simulated method for simultaneous comparisons ($\alpha = 0.05$).

in Hortus IBA (1000 ppm) + KNAA (500 pm). Cuttings that were not wounded and dipped in DNG 5000 ppm had higher cutting quality ratings compared to cuttings that were wounded and dipped in Hortus IBA 1000 ppm. All other cuttings had similar quality regardless of treatment.

For a more thorough examination of treatment factors, selected treatment combinations were compared using the Shaffer-Simulated method for simultaneous comparisons. Treatment comparisons were as follows: wounded vs. non-wounded, Hortus IBA vs. no auxin, DNG vs. no auxin, Hortus IBA + KNAA vs. no auxin, Hortus IBA vs. DNG, DNG vs. Hortus IBA + KNAA, Hortus IBA vs. Hortus IBA + KNAA, Hortus IBA at 5000 vs. 1000 ppm IBA, DNG at 5000 vs. 1000 ppm IBA, and Hortus IBA + KNAA at 5000 ppm IBA vs. 1000 ppm IBA.

Rooting percentages, average length of three longest roots, and growth indices were similar regardless of treatment comparison (Table 2). Wounding or use of DNG or Hortus IBA + KNAA had no influence on cutting data.

Cuttings that were dipped in Hortus IBA, regardless of concentration, had a better root quality compared to cuttings dipped in DNG. Root quality, root number, and cutting quality all increased when Hortus IBA concentrations increased.

Table 2. Direct comparisons of selected treatment combinations on rooting percentage, root number, average length of three longest roots, root quality, cutting quality, and growth of Shumaka™ crape myrtle.

Comparison	Rooting (%)	Roots (no.)	Mean length of 3 longest roots (inches)	Root quality rating[z]	Cutting quality rating[y]	Growth index[x]
Wounded vs. non-wounded	NS[w]	NS	NS	NS	NS	NS
Hortus IBA vs. no auxin	NS	NS	NS	*	NS	NS
Dip'N Grow vs. no auxin	NS	NS	NS	NS	NS	NS
Hortus IBA + NAA vs. no auxin	NS	NS	NS	NS	NS	NS
Hortus IBA vs. Dip'N Grow	NS	NS	NS	*	NS	NS
Dip'N Grow vs. Hortus IBA + NAA	NS	NS	NS	NS	NS	NS
Hortus IBA vs. Hortus IBA + NAA	NS	NS	NS	NS	NS	NS
Hortus IBA 5000 vs. Hortus IBA 1000	NS	*	NS	**	**	NS
Dip'N Grow 5000 vs. Dip'N Grow 1000	NS	NS	NS	NS	NS	NS
Hortus IBA + NAA 5000 vs. Hortus IBA + NAA 1000	NS	NS	NS	NS	NS	NS

[z]Root quality (0-5, with 0=no roots and 5=healthy, vigorous root system).
[y]Cutting quality (0-5, with 0=dead and 5=transplant ready cutting).
[x]Growth index=(width1+width2+height)/3.
[w]NS=Not significant or significant at $\alpha = 0.01$ (**) or 0.05 (*) using the Shaffer-Simulated method for simultaneous comparisons.

DISCUSSION

Rooting percentages ranged from 40% to 100%, within the range reported by Dirr and Heuser (1987) for hardwood cuttings and similar to those reported by Dirr (1990) for summer-propagated 'Natchez' crape myrtle using 5000 ppm IBA or 95% ethanol, the solvent used for IBA. Blythe et al. (2003) reported greater than 90% rooting when using 1000 ppm DNG for 'Natchez' crape myrtle. Blythe et al. (2003) reported that 'Natchez' crape myrtle cuttings receiving DNG 1000 ppm as a basal dip had more roots compared to cuttings receiving no auxin, but 'Natchez' cuttings receiving K-IBA as a basal dip had similar root numbers compared to cuttings receiving no auxin. These results are similar to those reported by Dirr and

Heuser (1987) indicating use of auxin increased root number and improved quality of 'Natchez', 'Tuscarora', and 'Muskogee' crape myrtle cuttings. Differences in rooting percentages may be due to differences in cultivars evaluated or cultural conditions of the parent material (Davies et al., 2018).

Propagation methods that provide the grower with a quality product while allowing for maximum efficiency - are critical to the success of that plant in the market. Overall, the results from this study suggest that hardwood cuttings of Shumaka™ crape myrtle will root without wounding or use of auxin. However, a basal quick-dip in Hortus IBA 5000 ppm does result in a better liner.

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