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Asexual Propagation of *Forestiera neomexicana* (A. Gray) Using Semi-Hardwood Stem Cuttings

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Summary

Forestiera neomexicana (desert olive) a native plant found throughout arid regions in the southwestern United States. This species could be utilized more broadly within ornamental landscapes in urban settings. Little is known regarding asexual propagation techniques for producing this plant and experiments were undertaken to study this. Results show a numerical trend suggesting that increasing IBA concentration leads to bolstered root length and number of roots. Additional studies are needed.

INTRODUCTION

Forestiera neomexicana (desert olive), also referred to as New Mexico Privet or New Mexico Olive, is a native plant found throughout arid regions in the southwestern United States. Purportedly resistant to both drought and periodic flooding, this species could be utilized more broadly within ornamental landscapes in urban settings as well as in green infrastructure, replacing invasive privets (*Ligustrum* spp.). Desert olive has performed well in the living collections of the Minnesota Landscape Arboretum

(USDA zone 4b) showing promise for use in the Upper Midwest. However, little is known regarding asexual propagation techniques for producing this plant.

Our objectives were to:

1) Determine if *F. neomexicana* requires the application of auxin for adventitious rooting, and if so;
2) Which concentration(s) of IBA maximize rooting and root length of semi-hardwood cuttings.

MATERIALS AND METHODS

Semi-hardwood cuttings were collected from an accession at the Minnesota Landscape Arboretum in Chanhassen, MN on July 22, 2022. The propagules collected were 5-node terminal cuttings, ~9 cm in length. Cuttings were treated with 95% ETOH (control only); 1000 ppm IBA; 2000 ppm IBA; 3,000 ppm IBA (each dissolved in 95% ETOH) using a 3-sec quick dip of the basal ⅓ of the cutting. The cuttings were stuck in individual cells of 72-cell trays using a completely randomized design with four experimental units per treatment comprising six single cuttings each (N=336, n=84). Cells of the trays were filled with 100% perlite. The trays were then placed in a mist bay greenhouse located in Saint Paul, Minnesota, where the intermittent mist sprayed for 8 sec intervals, every 4.5 min in 25°C conditions. The average Photosynthetically Active Radiation (PAR) recorded in the mist bay was 129 $\mu mol \cdot m^{-2} \cdot s^{-1}$.

Data were collected 35 days after cuttings were stuck and placed in the mist bay. A root was counted if it measured ≥ 0.25 cm in length. Data were analyzed using a one-way ANOVA and Tukey's HSD for mean separation.

RESULTS AND CONCLUSIONS

In this study, semi-hardwood stem cuttings rooted at 21%, 62%, 74%, and 87% for non-treated controls, 1000 ppm, 2000 ppm, and 3000 ppm IBA, respectively (**Fig. 1**). Treatments of 1000 ppm, 2000 ppm, and 3000 ppm IBA were all significantly different when compared to the non-treated control for number of roots (**Fig 2**). However, the three IBA treatments were not significantly different from each other. This trend can also be seen for root length (**Fig. 3**).

Figure 1: Above (left to right): Control (non-treated), 1000 ppm IBA, 2000 ppm IBA, and 3000 ppm IBA.

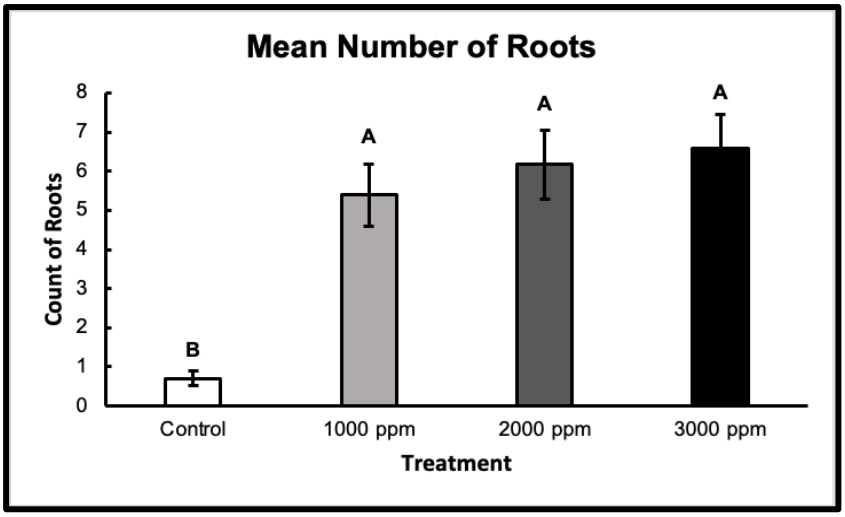

Figure 2: Number of roots on rooted stem cuttings of *F. neomexicana* 35 days after treatment with auxin. Roots ≥ 0.25 cm long were counted. Error bars indicate the standard error of the mean at 5% confidence. Means with the same letter are not significantly different.

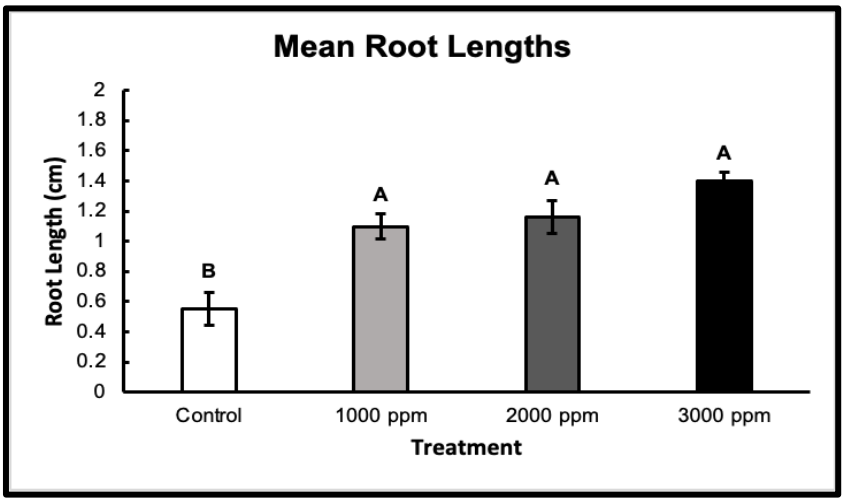

Figure 3: Lengths of roots on rooted cuttings of *F. neomexicana* 35 days after treatment with auxin. Roots ≥ 0.25 cm long were counted. Error bars indicate the standard error of the mean at 5% confidence. Means with the same letter are not significantly different.

Every treatment involving the application of IBA increased the number of roots and root length compared to non-treated controls. Similar rooting was observed across treatments with IBA. Based on these results, we recommend growers apply 3000 ppm IBA on semi-hardwood cuttings of *F. neomexicana* to maximize rooting percentage, the number of roots, and root length. These data show a numerical trend suggesting that increasing IBA concentration leads to bolstered root length and number of roots, therefore, higher concentrations of IBA could be explored to further maximize rooting and root length of cuttings of *F. neomexicana*.

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