

A Comparative Study on Propagation Methods of *Ficus alii*

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Introduction:

Ficus alii is considered a difficult-to-root plant with extremely important landscape function in Barbados. Several factors influence the rooting of the species, such as stem cutting length, growing medium, environmental conditions and method of propagation.

For this project, our goal was to find a quicker and more economical way to propagate the *Ficus alii*. The National Conservation Commission currently propagates the plant by air layering, which involves removing a piece of bark and treating the wound with growth hormone before wrapping it in soil with aluminum foil. However, the stem cutting method could potentially be a quicker and less labour intensive propagation method for a species that is needed in large volume for both hedges and specimen trees. Even though the NCC is a government agency, it does rely heavily on revenue through commercial landscaping activities. Hence, maximizing this profit would allow them to work more efficiently, with more funding for other projects, such as the management of national parks and beaches.

The experiment therefore consisted of different trials aiming at determining first the best length of stem cuttings between small (15-20 cm), medium (20-40 cm) and large (40-60 cm), as well as the

rooting hormone powder (0, hormone #1 at 0.1 IBA and hormone #2 at 0.3 IBA) that lead to the best root development. A follow-up experiment aimed at determining which type of propagation is the most economical, fastest and gives the best rooting results. The propagation methods compared were stem cutting, banding, and air layering, with four different air layering techniques and two banding techniques.



Figure 1. *Ficus* cutting area at the NCC.

Hypotheses:

1. *Ficus alii* plants propagated through stem cutting root as quickly as the traditional technique of air layering.
2. Specimen rooting success is greater with rooting hormone added before planting.
3. Specimens grown in soil and perlite growing medium have a higher rooting success than those grown in sand growing medium.

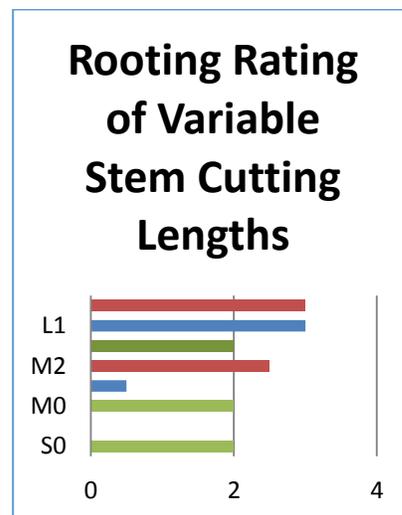
Methods:

A preliminary trial was done to determine the stem cutting specimens that were best rooted based on the length of the cutting (small <20 cm, medium 20 cm, and large <40 cm) and rooting hormone strength (none, #1 or #2). After deciding which cutting size and hormone treatment had the best results (large and medium sized cuttings with hormone #1), a follow-up experiment was set up in order to compare root growth in the medium of perlite and peat moss, with a ratio of 2 to 1, versus the NCC's sand medium. A separate experiment was performed comparing four air layering techniques to find the most efficient technique based on time it takes for specimens to root and rooting success. The four techniques included the traditional method, the scratch method, the peeler method and the flap method. The scratch method was done using a serrated knife on the bark, which was the quickest process. The peeler method was similar to the previous one, but a carrot peeler was used to remove parts of the bark. The flap method involved creating a slit with a knife and filling the flap with peat moss. Finally, a third experiment was done comparing two banding techniques to the other propagation methods based on labour intensity and time for plants to root and rooting success. The two techniques varied based on material, one of them using duct tape wrapped around the branch and serrating it lightly, and the other using Velcro around the branch to wound it slightly. The results of rooting

will be based on a scale from 0 to 3, with 3 as heavily rooted and 0 as no rooting.

Results:

The Velcro banding method had little rooting results, eliminating the technique as a possible option for the NCC. The duct tape banding method was quick to root, however, the overall rooting performance was low, rated 1 on our rooting key. Furthermore, these methods were more labour intensive as cuttings, and almost as labour intensive as air layerings. The different types of air layering performed at the NCC confirmed that the traditional method, removing a piece of bark around the whole stem, was the most efficient, with the highest rooting performance. The scratch, peel and flap method did not have an important rooting density with a rating of 0. The stem cuttings had the best results, especially the large and medium sized cuttings with hormone #2 added to them.



Graph 1. Stem cutting lengths (L=large, M=medium, S=small, and 0=no hormone, 1=hormone #1, 2=hormone #2)



Figure 2. Some cuttings with rooting and some without rooting.

Conclusion:

We have several recommendations for the NCC to ameliorate their propagation of the *Ficus alii* species, a plant in high demand all over the island. Stem cuttings can be performed in addition to the traditional air layering technique. Both methods have positive and negative aspects. Stem cutting propagation is a lot faster and less labour intensive than air layerings. However, it also has a higher failure rate. Using both techniques for the varying uses of the plant could potentially create more plants for the NCC to sell in response to the popularity of this species in Barbadian landscape horticulture. The air layerings could be used as a decorative, more elegant plant to sell at a higher price, whereas the stem cuttings are more numerous and could be used for hedge growing.

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