

Vegetative Propagation of *Limonia* and *Pittosporum spp.*

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Introduction

Ferronia limonia and *Pittosporum tobira* are two species of plants that are becoming increasingly popular in Barbados' landscapes due to their attractive appearance and flowers as well as their capacity to act as windbreaks. While *Pittosporum* is known as an easy to root plant, very little is known about *Limonia* as far as vegetative propagation goes. Both are usually propagated by seed in Barbados.

Objective

The NCC asked us to find alternative methods of propagation to both *Limonia* and *Pittosporum* as their usual seeding technique is not productive enough for the rising demand these plants have for the landscape. To do so, we decided to try stem cuttings for both species and additionally do air layering for *Limonia*. Since very little research has been done for these plants, we tested multiple rooting hormone powders at different strengths as well a liquid rooting hormone to test the optimal percentage needed for propagation. We also used 3 different media to see which would allow the plants to grow roots the fastest.

Material and Methods

• *Pittosporum tobira*

576 cuttings of about 6 in. each were made out of which 288 were semi-hardwood and 288 were hardwood. No softwood was used for *Pittosporum* as previous research showed that the optimal type of cutting for *Pittosporum* was semi-hardwood.

Afterwards, we separated the cuttings in three different media. One was the standard sand that the NCC uses, one was composed of 80% peat, 10% of the NCC's soil mix, and 10% perlite, and one was composed of 80% coconut-coir from the SBRC, 10% coconut compost from the SBRC and 10% of the NCC's soil mix.

Then they were further separated into 4 distinct rows. The first was a control with no rooting hormones. The second and third were dipped in rooting powder at 0.1 % and 0.2 % IBA respectively. And the fourth row was dipped in Dip N' Grow, a liquid rooting hormone.

• *Ferronia limonia* (stem cuttings)

216 softwood cuttings of about 6 in. each were taken for the *Limonia* propagation. We had a smaller number than for the *Pittosporum* because we were also doing air layering of the plant. We had very little information to go from for the *limonia* but one research recommended softwood, which is why we favoured that wood-type.

Afterwards, we once again separated them into the three media previously described for the *Pittosporum*. Every media had an equal number of *Limonia* cuttings.

Then, we separated them into four rows. The first was a control with no hormone used. The second, third, and fourth were all dipped into rooting hormone powder of different concentrations, which were 0.1 %, 0.2 %, and 0.8 % IBA respectively. Additionally, we had some extra cuttings and decided to dip them into the liquid Dip N' Grow hormone.

• *Ferronia limonia* (air layering)



Limonia (left) and *Pittosporum* (right) stem cuttings with bud breaks after 3 weeks, and air-layering of *Limonia* (middle)

We chose 15 branches in the *Limonia* reserve at the NCC on which to perform air layering. All the branches were of about the same height and width. We used a sharp knife to cut a ring around the base of the branch to remove the bark and reveal the cambium. We then filled a piece of aluminum foil with soaked peat sprinkled with rooting hormone powder at 0.2 % IBA and wrapped it around the exposed cambium. We made sure the aluminum foil was tightly sealed as we did not want the moisture to escape, or any insects to get into the foil.

We then spent 8 weeks observing our cuttings. Our weekly measurements were focused on the amount of cuttings that died, which row had the most bud break, and which medium had the best overall leaf development. After 8 weeks, we checked our air layerings and were able to transplant them as they had good root development. We placed them in plastic bags filled with the soil mix of the NCC after rinsing them in Sevin due to some plants being infested with ants. Then the potted plants were brought to the hardening area where they will remain until the NCC deems them sufficiently developed to use in landscape.

Results

Both the *Limonia* and the *Pittosporum* stem cuttings ended up dying by the 8th week. While all the *Limonia* were dead, some of the *Pittosporum* cuttings remained with green leaves but we suspect they will also dry out due to their lack of luster and drooping leaves.

However, both plant cuttings showed signs of bud break and leaf growth before they started dying.

Pittosporum had a slow bud break. We spent the first two weeks observing no growth and it is only at the third week mark that we observed bud break. After bud break started, the cuttings very rapidly developed a good amount of leaves that were very lush in colour. These leaves remained alive for another 3 weeks before they started drying out. By the 8th week, only 1/3 of our *Pittosporum* cuttings still had green leaves but they were all yellowing and dull in colour. When we dug out the cuttings, both dead and alive, we did not observe root growth on any cutting.

Limonia had a very fast bud break, showing many leaves in the week following the propagation. The cuttings showed signs of leaf development in every media as well as every hormone ratio, including the control rows. When we came back the following week, half of our *Limonia* cuttings were dried out and subsequently all the *Limonia* cuttings ended up dying in the following weeks until we lost them all. When we dug out the cuttings, we observed that no root growth had occurred.

Limonia air layering was a success. We lost 6 of our branches due to the holes in the foil which dried out the peat substrate, and pests of ants and centipede entering the aluminum foil wrap. Overall, 9/15 air layerings had developed a strong root system. Some of the aluminum wraps were infested with ants but that did not affect the development of the roots.

Limonia (left), *Pittosporum* (middle) stem cutting with no development of root system, and air-layering of *Limonia* (right) with strong root system.

Discussion

We believe our failure to propagate either *limonia* or *pittosporum* by stem cuttings is due to our media. Many weeds and mushrooms grew out of it, the latter of which is a sign of decay. Our coconut-coir medium in particular was also infested with



decomposers such as millipedes. Therefore, we believe that our media had some type of rot in it which affected the basal end of our cuttings and stunted the root growth. However, as we also successfully propagated *Musseanda* and *Ficus alii* in the same medium, we also consider that the conditions to propagate *Pittosporum* and *Limonia* were simply not optimal for their root development.

Alternatively, we were glad to see air layering work for *Limonia* as it is reportedly a hard to root plant. The fact that we managed to get strong enough root to transplant within the span of 7 weeks is very good for the NCC, as they can now start using this technique.

Conclusion

For future propagation of *Limonia*, we recommend to do air layering with 0.2 % rooting

hormone and perhaps look into the optimal conditions to propagate it via stem cuttings. As for *Pittosporum*, we recommend to use seeds as a propagation technique as it is the one that worked previously for the NCC. However, we encourage future researchers to look more deeply into the optimal conditions of stem cuttings for *Pittosporum* as it is supposed to be an easy to root plant.

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