Increased Māmaki Transplant Success with Non-Circulating Containers

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Introduction:
Māmaki (Pipturus albidus) is an endemic plant typically found in the understory of the forest. Historically used by Native Hawaiians for kapa and medicinal purposes. Māmaki can be found in the understory of native forest from sea level to elevations up to 6,000 feet (Wagner et al. 1990). There are four species of Pipturus in Hawaii (P. albidus, P. forbesii, P. kauaiensis and P. ruber) (Wagner et al. 1990). Hawaiian’s used the inner bark of the māmaki plant for tapa or bark cloth (Bishop Museum, 2018).

Results:
Locher et al. (1995) found that māmaki had anti-viral properties against Herpes Simplex Virus-1 and 2 and Vesicular Stomatitis Virus and inhibited the growth of Staphylococcus aureus and Streptococcus pyogenes.

Modification of the propagation containers, resulted in increased transplant success from an initial 10% to 90%. Installing root bound plants will cause the roots to eventually choke the plant to death. While Māmaki can also be vegetative (asexually) propagated with 4‐6‐inch‐long cuttings (Bornhorst, 1996), Karita et al. (2007) found that there are three major polyphenols (phyto-chemicals) in māmaki leaves which are: catechins, chlorogenic acid, and rutin; a flavonoid (plant compound) found in the polyphenol family. Concentrations of catechins and rutin in māmaki leaves were found to be higher than commercial tea leaves such as Gyokuro green tea leaves, Chinese oolong tea leaves, and Kenya black tea leaves (Karita et al., 2007).

Conclusion:
Māmaki grows on the edges and understory of mesic forests on all islands with the exception of Kahoʻolawe and Ni`ihau (Wagner et al. 1990). To meet the growing demand for māmaki for the local and export market, an alternative cropping system for commercial production in low land areas is being evaluated. Developing an alternative cropping system may help to reduce the overexploitation of māmaki being grown in our forest systems and destruction of surrounding resources. We are currently evaluating an agroforesty approach to provide shade for the māmaki plants for a minimum of two years or until productivity declines. Summ Hemp (Crotalaria juncea), is currently being used to provide initial shade for newly transplanted plants (photo 7).

Future work:
Today, there is an emerging local and global market for Māmaki tea. However, farmers have a difficult time meeting new market demands due to reported high mortality rates after transplanting Māmaki into the field (photo 1 & 2).

This study aimed to increase the success rate of transplanting Māmaki in non-forest areas by changing the methods and seedling containers used to propagate Māmaki.

Materials and Methods:
- Seedling mix included a ratio of 3 gallons Sunshine Mix (OMRI) to ½ cup of Osmocote Classic 14-14-14.
- Māmaki seeds were collected from the Poamoho Research Station and germinated in flat trays in February 2018 (photo 3).
- A month later, the seedlings were moved into an anti-circulating Ray Leach “cone-tainers” or T.O. Plastics Sure Root Plug Trays (Stuewe & Sons) in place of standard round plastic pots (photo 4).
- Once the seedlings had an established root system they were then transplanted into the field for evaluation at the Waimanalo Research Station.
- Transplants which were previously started in round pots had a mortality rate of 90% at the Waimanalo Research Station.

References: