

Pre-publication version

Presented at the 58th Annual Meeting of the Western Region of North America – International Plant Propagators' Society, October 17-20, 2017, Wilsonville, Oregon, USA

Improved air layering system for tropical hardwood ornamentals in Hawaii

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Abstract

The U.S. patent literature contains many forms of air layering devices. Hard structures with hinged sides can be found in the form of orbs, ellipses, and multichambered plastic pots. Additionally, pre-cut plastic sheets with attached gauze pads as the rooting medium and hydrophilic polymer tubes provide alternatives to pre-sized, hard enclosures. A new air layering system was developed in Hawaii that provides for wide variation in stem diameters and rooting medium volume. In our air layering system, rooting medium (high quality, long-stranded sphagnum moss) is encased in a tubular plastic net sack with length dependent on stem diameter and desired rooting medium volume. Large, woody stems (4-cm to 8-cm diameter) of a sterile, ornamental shade tree (*Cassia ×nealiae* 'Wilhelmina Tenney', or rainbow shower) were the study structures used for refinement of the net sack air layering device.

To maximize success in rooting air layers on large stems of *Cassia ×nealiae* 'Wilhelmina Tenney' (rainbow shower), several aspects of the air layering technique needed to be optimized. Large, woody stems need freely slipping bark for easy girdling to stimulate root initiation. Once a 4-cm to 5-cm section of bark is removed, the underlying cambium layer must be thoroughly removed to prevent reconnection during the root initiation phase. A serrated knife is used to make a tangential cut from the outer bark to the hardwood stem section to expose the proper area of the cambium. Knife serration produces a ridged area that maximizes the surface area receiving Hormodin 3 (0.8% indole-3-butyric acid powder). A stiff textured brush (i.e., a new toothbrush) is best for inserting the hormone powder deep into these stem ridges.

Net sacks filled with rooting medium are treated with ready-to-use insecticide powder (5% carbaryl dust) prior to stem attachment to prevent ant colonization of the layer. Application of the moistened net sack begins at the top of the girdle and is tightly wound in a spiraling fashion around the stem. Increased rooting medium volume is achieved with overlapping layers of the netted medium. Once the desired rooting medium volume is obtained, an S-shaped fastener (an expanded metal paper clip) is used to secure the rooting sack to the stem.

When rainfall is expected during the root initiation period, drainage of the netted medium is enhanced by placing a wooden chopstick between the stem and the rooting medium. The entire netted sack is tightly covered with overlapping layers of 12-cm-wide black plastic shrink wrap, ensuring a loose fit at the top of the air layer and exposure of the drainage chopstick at the bottom. It is important to allow for swelling at the top of the air layer to prevent phloem restriction at the root initiation zone. The loose-fitting plastic wrap allows stem swelling as well as ant entry, hence the need for insecticide within the rooting medium. A properly applied net sack of rooting medium will allow for drainage, swelling above the root initiation zone, and insect exclusion.

In Hawaii, an actively growing tree will produce abundant roots in 2 to 3 months. Optimum time of year for air layering the 'Wilhelmina Tenney' rainbow shower stems is October to February, when winter rains stimulate growth and flowers are absent.

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