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Photo 1: Rooting media of sphagnum moss in plastic net sack

# Improved Air Layering

Media filled netted sack: An improved air layering device for Hawaii's hardwood ornamentals

*By Joe DeFrank, Ph.D. University of Hawaii-Manoa.*

**T**he U.S. Patent literature contains many forms of the of air layer devices. Hard structures with hinged sides can be found in the forms of orbs, ellipses & multi chambered plastic pots. Additionally, pre-cut plastic sheets with attached gauze pads for rooting and hydrophilic polymer tubes provide alternatives to pre-sized hard enclosures. A new air layer system was developed at the University of Hawaii that provides for wide variation in stem diameters and rooting volume. In our air layering system, rooting media (high quality long stranded

Photo 2: Bark must be easy to remove to prepare air layer root initiation zone





Photo 3: Use serrated knife to make angled cut into bark to expose proper layer of tree's cambium

sphagnum moss) is encased in a tubular plastic net sack with length dependent on stem diameter and desired rooting media volume (Photo 1). Large woody stems (2-4 inch diameter) of a the Rainbow Shower tree (*Cassia x nealae* cv. 'Wilhelmina Tenney') were the study structures for refinement of the net sack air layer device. To

maximize rooting success of these large stems, several aspects of the air layer technique need to be optimized. Large woody stems need to have freely slipping bark for easy girdling to stimulate root initiation (Photo 2). Once a 2-3 inch section of bark is removed, the underlying cambium layer must 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 where roots will form (Photo 3). Knife serration produces a ridged area that maximized the surface area receiving rooting hormone (0.8% indol-3-butyric acid powder, Hormodin 3) (Photo 4). A stiff texture brush (i.e. new toothbrush) is best for inserting the hormone powder deep into the stem ridges. Net sacks filled with rooting media are treated with ready-to-use insecticide powder (carbaryl, 5% dust) prior to stem attachment to prevent ant invasion 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. You can increase the volume of the rooting media volume by overlapping layers of the netted media (Photo 5). Once the desired rooting media volume is obtained, an s-shaped fastener (expanded metal paper clip) is used to secure the rooting sack to the stem. When rainfall

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Photo 4: Serrated knife used to make stem ridges for rooting hormone placement



is expected during the root initiation period, drainage of the netted media is enhanced by placing a wooden chop stick between the stem and the rooting media. The entire media sack is tightly covered with 6 inch wide black plastic shrink wrap, ensuring a loose fit at the top of the layer and exposure of the drainage chop stick at the bottom. It is important to allow for swelling at the top of the layer to prevent choking the stem at the root initiation zone. The loose fitting plastic wrap allows stem swelling and ant entry, hence the need for insecticide within the rooting media. A properly applied media filled net sack will allow for drainage, swelling above the root initiation zone and insect exclusion. In Hawaii, an actively growing tree will produce abundant roots in 2-3 months (Photo 7). Optimum time of year for air layering the Wilhelmina Tenney cultivar is October to February when winter rains stimulate tree growth and flowers are absent. Potted air layers of mature woody stems produce abundant flowers for 3-6 weeks allowing breeders easy bench top cross pollination in their efforts to create new cultivars (Photo 8).



Photo 5: Long media filled netted sack is overlapped around tree stem to increase rooting volume.



Photo 7: Rainbow shower trees can produce a mass of roots in 2-3 months when air layer conditions are optimized



Photo 8: Air layers of mature woody stems will produce flowers in pots for bench-top breeding programs that seek to produce new cultivars