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## **AIR LAYERING: AN ALTERNATIVE METHOD FOR THE PROPAGATION OF MAHONIA AQUIFOLIUM 'COMPACTA'**

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At the 1985 IPPS, Western Region meeting, Dennis Connor of Monrovia Nursery Co. reported (1) on the production of *Mahonia aquifolium* 'Compacta' via cutting and tissue culture. Since then we have conducted an experiment to determine whether this plant could also be propagated utilizing air layering techniques.

Air layering is an ancient and, under favorable conditions, a very sure method of plant propagation for many plants. This method has been practiced in China and other Asian countries for thousands of years. The method has been used mostly with plants native to the tropics and subtropics; however, some hardy perennial plants such as dogwoods, hemlocks, hollies, rhododendrons, viburnums, and wisterias have also been propagated in this manner.

Basically the method involves the stimulation of root develop-

ment by injuring a stem and surrounding the wound with a medium which is porous enough to admit sufficient air and yet will remain moist enough to provide a good environment for root growth.

In our experiment we tested ten different methods involving different types of cuts, rooting media, and hormones. Several of the methods resulted in 100% rooting, but the following procedure was chosen as best to be used in full scale production.

We are air layering plants in #1, #2, and #5 containers, as well as stock plants growing in the ground. In either case, the process begins by first selecting the branches to be air layered and stripping all leaves from a 5 to 6 in. long section of the stem. This would normally leave a 6 to 9 in. tip extending above the point to be rooted. On long branches, two air layers may be made on the same branch. The wood must not be too soft. Well-ripened, one-year-old wood is ideal, but two year and older wood may also be rooted.

A wound is made in the center of the defoliated section by making a  $\frac{3}{4}$  in. long upward cut into the wood about  $\frac{1}{8}$  in. deep. A small amount of sphagnum moss, which has been soaked in a 60 ppm IBA solution, is placed under the resulting flap. Then some additional moist moss is placed around the area to form a small ball approximately 2 in. in diameter and 3 in. long. It is important that as much water as possible is wrung out of the moss so as to prevent decay.

Once the moss is in place the area is covered with polyethylene wrap (two layers) and tied with a Twistum at the top only. The top is tied to help prevent water from running down the stem and into the moss, since most of the plants are watered by overhead irrigation. Finally, the plastic wrap is covered with a piece of aluminum foil. This is done to help prevent overheating within the plastic.

This process is normally done by a two-person team with each team completing approximately 600 air layers per eight hour day.

Some rooting can be seen in as little as four weeks. However, the newly-rooted plants are not ready for removal for six to eight weeks. Once a large mass of roots can be seen under the plastic, the new plants may be severed from the mother plant. The plastic wrap is then removed and the plant is canned directly in a #1 container. Within eight weeks, roots can be seen at the bottom of the container and about a year later the new plant will be tall enough to be air-layered itself.

The air-layering of mahonias can probably be done any time during the year; however, we try to do them in the late summer and early spring. Plants rooted in the late summer may be canned during the winter when it is cool and plants done in early spring may be canned prior to the hottest part of the summer. Losses during canning have been surprisingly low, (less than two percent).

During these times of "modern" propagation techniques, we must not forget some of the old tried and true methods; for many

plants these old methods are still best.

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## **CAMELLIA GRAFTING AT MONROVIA NURSERY**

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Camellias are one of the major crops at Monrovia Nursery. We prepare in the neighborhood of 1,500,000 camellia cuttings per year resulting in the production of over 1,000,000 liners. Approximately 600,000 of these liners are used for the production of larger containers while the rest are sold as liners. Of the 600,000 or so #1 container plants produced each year, only about 5,000 are grafted, (this is only about 0.8%).

We graft camellias for one of three reasons. First some cultivars ('Pink Pagoda' for example) are very poor rooters or grow poorly on their own roots. Second, we can multiply new cultivars faster by utilizing both softer cuttings and heavier scionwood from the plants where cutting wood is limited. Third, when we receive wood of the new cultivars from other nurseries or arboreta the wood is often unsuitable for cuttings, but better suited for scionwood.

Camellias require considerable care during the grafting process. We have had the best results utilizing the following procedure. For understock, we use strong growing cultivars (usually *Debutante*) grown in #1 containers and produced by cuttings. The caliper of the understock should be about  $\frac{1}{4}$  in. diameter. To produce a plant of suitable size for understock it takes approximately 2½ years from the time of making the cuttings. Understock is hand selected and must not be too low-branched; it should have a straight base with little or no side branching for the first 4 to 5 in. above the soil. Many times, the best understock are the plants which are a little too "leggy" to be kept for growing on. Selecting them to be grafting understock makes good use of them.

Understock is brought into the greenhouse during the middle of December, about two weeks prior to grafting. Because of winter rains, the understock usually comes into the house quite wet. It often takes two weeks for the understock to dry enough to be suitable for grafting. We have found that if the soil is too wet, the plant will "bleed" heavily, which will interfere with callusing and contribute to disease problems at the graft union.