munity and church. He is a very wealthy man as a result of his endeavors. However, I know he considers his greatest wealth to be his many friends, and they are legions because he has done much for so many.

Ladies and gentlemen, our Award of Merit recipient for 1988 is Leonard Savella.

Friday Morning, December 9, 1988

The Friday morning session convened at 8:00 a.m. with David Schmidt serving as moderator.

VENTILATED HIGH HUMIDITY PROPAGATION

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Ventilated high humidity propagation research began in 1974 as an effort to improve nursery propagation. Intermittent mist was the method of propagation commonly found in nurseries at that time and still remains in common usage. Losses of cuttings from poor management were common and indicated that improvement was needed. Excessive drenching of the cuttings and the resultant evaporative cooling were contributory, if not the cause of propagation failures. Vigilant care minimized these problems, but in practice, too many nurserymen were not that vigilant. They needed a method of propagation that would reliably produce better results with less care.

The concept of ventilated high humidity propagation was developed by 1978 and the Agritech humidifier was introduced to make it into a workable propagation system. Several other types of humidifying equipment were also introduced but none were based upon the ventilated high humidity concept. The poor performance of some of these installations dampened the enthusiasm for propagation with high humidity. Better humidifiers and closer adherence to the original concept of ventilated high humidity propagation was needed before the full value of this system of propagation would be known.

A humidifier was designed and built for ventilated high humidity propagation by 1983. It was designed to be reliable and efficient at producing large quantities of fog and delivering it in a 30 mph air current. After four years of testing, this humidifier was introduced as the "Humidifan." It is portable, easy to set up and satisfies the requirements for ventilated high humidity propagation. It is easily operated and requires relatively small amounts of attention.

Ventilated high humidity propagation solves many of the problems associated with intermittent mist. Saturation of the propagation medium is not a problem because most of the water remains suspended in the air as fog. Any excess is eliminated through the exhaust fan. Evaporative cooling at the location of the cutting is eliminated by transferring evaporation to the area of the humidifier. In the absence of evaporative cooling in the propagation bed, cuttings are warmed by solar heating. The temperature of the cuttings is controlled by directing the high velocity humid air from the humidifier over them. This warming of the propagation bed is found to be beneficial for promoting rooting to such an extent that rooting hormones are no longer beneficial for rooting cuttings of relatively easy-to-root species.

Several practices commonly used for nursery propagation are no longer necessary. Propagation facilities are no longer considered to be permanent since humidifiers are portable. Cuttings can be propagated without transplanting or moving the plants. The humidifier is moved instead. Cuttings can be prepared without leaf area reduction because wilting during the initial days of propagation is eliminated. Changing of intermittent mist intervals with weather changes is also eliminated since the humidifiers run constantly throughout the day and require less adjustment for weather conditions. Ventilated high humidity propagation simplifies propagation when used properly.

In addition to simplifying propagation, ventilated high humidity propagation improves rooting and produces better plants. In order to understand how it produces better plants, a well entrenched concept of intermittent mist must be examined. The concept is well established that cooling of the top and warming of the bottom of the cutting produces favorable conditions for root initiation. Cool tops are thought to suppress shoot growth which occurs at the expense of rooting and weakens the cutting. When using intermittent mist, evaporative cooling conveniently lowers top temperatures. Installing bed warmers raises bottom temperatures. While this practice may be beneficial for intermittent mist, the same type of practice has not been useful for ventilated high humidity propagation.

Bed warming is beneficial and occurs as a characteristic of ventilated high humidity propagation (2) but cooling of the top to the extent found in intermittent mist propagation does not occur. With warm bed and air temperatures, cuttings tend to grow shoots as well as roots. Instead of weakening the cutting, actively growing buds and leaves promote root initiation (1) and recovery of the cutting to become a larger and healthier plant than is ordinarily propagated under mist (Fig. 1).

Figure 1. Comparison of *Photinia serrulata* cuttings propagated under ventilated high humidity (left) and intermittent mist (right).

Leafy cuttings that root quickly and easily, root before shoots can grow regardless of which method of propagation is used. Most of the cuttings that root more slowly begin or continue new shoot growth under ventilated high humidity propagation and root as newly grown leaves mature to full size. Dormant deciduous cuttings prepared during the winter and propagated during the spring similarly grow new shoots with roots initiating at leaf maturity. Cuttings of some species root with difficulty under either mist or ventilated high humidity. Even though some of these cuttings grow shoots without rooting, they persist in remaining alive much longer under ventilated high humidity than under intermittent mist.

The idea that cuttings are weakened by shoot growth does not appear to be valid under ventilated high humidity propagation. If cuttings were weakened by regrowth, rooted cuttings with regrowth would make weak plants. Instead, plants with regrowth make strong plants capable of rapid recovery after transplanting. Stronger plants from rooted cuttings with regrowth are common from ventilated high humidity propagation and are typified by crapemyrtle, *Lagerstroemia indica,* grown in a nutrient experiment. Five hundred dormant 5 in. cuttings were propagated during April and 432 of them were transplanted during May to one gallon containers. They grew rapidly, flowered profusely, and became top heavy because of their large size by the end of the season. October fresh top weights averaged 0.5±0.1 lb, a large amount of growth for one gallon containers. Performance of this type is expected of liners propagated the previous year and is exceptional for rooted dormant cuttings. It is not the performance of weak plants.

Cuttings that remain unrooted would also be expected to be short lived if regrowth weakened them. Instead 100 unrooted cuttings from a hard-to-root mature tree of *Cryptomeria japonica* remained alive for a year. Fifteen percent rooted within 60 days, but the remainder rooted sporadically until approximately 85% eventually rooted. For comparison 50 cuttings of an easy-to-root cultivar, *Cryptomeria japonica* 'Elegans' rooted 98% within 60 days. The persistent viability of cuttings shown to be difficult-to-root because of factors other than the method of propagation indicates that regrowth during propagation is not always a weakening influence on cuttings even though they are unrooted.

The objective of propagation is to propagate healthy plants from cuttings. Research to develop the concept of ventilated high humidity propagation has succeeded in producing an easy and reliable method of producing quality plants.

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