stock plants as well as a good cutting drench for prevention of rots and molds. We will continue to try to perfect this system as we have seen enough good results to encourage us even though there are many problems yet to overcome.

MY EXPERIENCE WITH HIGH HUMIDITY PROPAGATION

BUTCH GADDY

Colesville Nursery, Inc.
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Colesville Nursery is a wholesaler container nursery located in Charles City, Virginia. Since 1975 we have produced about 100 different cultivars of woody ornamental landscape plants. Currently, 7 acres are in container production and 10 acres are in field production. When we first began nursery production 100% of our liners were purchased from other nurseries; today, we are propagating 95% of our own material.

Since commencing our operations, we have employed a wide variety of propagation techniques. Initially we experimented with small propagation tents, but those turned out to be inefficient. We next set up a greenhouse using intermittent mist. But we soon discovered that our water source — a nearby pond — contained trash particles that clogged up the mist nozzles even when a filter was used. We then tried brass spinners, but found that method unsatisfactory because of low water pressure and uneven soil saturation.

In 1980, on the advice of Dr. Daniel Milbocker of the Virginia Truck and Ornamentals Research Station in Virginia Beach, we began using the high humidity propagation system. Dr. Milbocker presented a paper on the high humidity propagation system to the Southern Region of the IPPS in Huntsville, Alabama (2).

We began using the system to maintain the highest possible humidity in our propagation houses during daylight hours at a temperature conducive to root initiation without saturating the soil around the cuttings. We use an Agritech high humidity unit which is built in Raleigh, North Carolina. The humidifier has 4 centrifugal nozzles that produce droplet sizes ranging from 10 to 50 microns with a water output of up to 50 gph. A fan mounted behind these revolving nozzles suspends the droplets in 4000 cubic feet of air per minute, traveling at 30 mph. This unit is suspended by an oscillator that directs the air flow horizontally in an adjustable arc of approximately 90° (2). This unit is designed to humidify 1000 ft^2, but we have found through experimentation that 600 to 800 ft^2 is more realistic in our long and narrow greenhouses.

As the amount of water put out by the humidity unit ranges from 0 to 50 gph, we are able to adjust the volume of water according to the weather. On very cloudy and cool days the unit is rarely turned on. On clear, hot days (80°F and up), the unit is set between 40 and 50 gph. We have found that maintaining a greenhouse temperature below 100°F produces the most successful rooting.

In each of our houses, which are 20 × 96 ft. and 20 × 80 ft., one unit is placed at an air intake with an exhaust fan at the opposite end of the house. A second unit is placed midway on the same side of the house. While we are still adapting the system to take into account dry spots, we have found that placing the easier-to-root plants in those areas reduces loss of total propagation area.

Our summer propagation of broad-leaved evergreens begins by mid-June. The soil mix contains equal parts of pine bark, perlite, and peat moss, plus limestone, superphosphate, Banrot-Topsin M (thiophanate-methyl) + Truban (Koban, Terrazole, Ethazol), and trace elements added. We are direct sticking cuttings into 2½-in. and 3-in. plastic pots or cavity trays. We omit a rooting hormone for easier-to-root plants (cotoneaster, forsythia, some azaleas, viburnum, and euonymus) because we have found no measurable difference when we administer the rooting hormone. When we do use a rooting hormone, it is Hormodin #2 (0.3% indole-3-butyric acid).

We purposely root the cuttings as quickly as possible and move them to a liner house to make room for the next crop. The high humidity propagation system allows us to plant 2 to 2½ crops, where before we were able to propagate one crop in the same period of time. We have found the average time in the propagation house for the many cultivars we grow is about 8 weeks. Timing seems to be the key to rooting with the high humidity unit; if the cuttings are taken too late they will either root slowly or not at all. However, because this system does not saturate the soil with water, a slow-to-root cutting will take root in the spring when the weather begins to warm up.

Winter propagation of conifers usually begins in mid-December. The propagation houses are maintained at about 40°F to prevent freezing. Again, as in the summer propagation, we are direct sticking the cuttings into 2-in. cell trays, with the same soil mix and hormone. We usually finish taking the cuttings by mid-February. The easier-to-root conifers such as *Juniperus horizontalis* 'Wiltonii' and *Juniperus horizontalis* 'Plumosa Compacta Youngstown' will begin to root around March 1, with the best rooting as the weather warms up. We

usually have 85 to 95% rooting of our conifers. Again, we have found that high humidity units enhance root progression by keeping the cuttings in good shape until temperatures rise. With the addition of bottom heat, we believe rooting would take place even faster.

Throughout the summer and winter propagation seasons, we have had few problems with disease, applying fungicides only as needed.

Despite our success rate we are not completely satisfied with the two units we have now. Since certain cultivars have different rooting responses, the location of the different plants around the unit is important. As an example, one row of flats with × *Cupressocyparis leylandi* cuttings began 3 ft. from the unit and ended 20 ft. from the unit. Within the first 10 ft. we had 90% take on the cuttings, but from there until the end of the row the percentage gradually dropped to a 30 to 40% take. The manufacturer is correcting this problem by pressurizing the hub that the nozzles are attached to and creating a more even mist with smaller droplets.

Overall we believe the high humidity propagation system has aided the success of our operations. The system has allowed us to become more self-sufficient in the propagation phase of our business.

LITERATURE CITED

1. Milbocker, D.C. 1979. Ventilated high humidity propagation guide. Virginia Tech. Orn. Res. Sta., Virginia Beach.
2. Milbocker, D.C. 1980. Ventilated high humidity propagation. *Proc. Inter. Plant Prop. Soc.* 39:480-482.

HIGH HUMIDITY PROPAGATION

CARROLL G. HALL

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At Carroll's Plant Center we are using high humidity for cutting propagation. Three Agritech mist blowers can maintain 100% humidity in our 22 × 98 ft greenhouse. During most of the rooting season (June-October) we keep the humidity from 90% to 100%, adjusting the amount of water, registered in gallons per hour (gph), according to time of day and weather conditions. The mist blowers are set on 24-hour time clocks, which will automatically turn the blowers on and off, but the gph adjustment is made manually throughout the day. The