REDUCING ENERGY REQUIREMENTS WITH VENTILATED HIGH HUMIDITY PROPAGATION

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Ventilated high humidity propagation is a system in which ambient air is continuously humidified and circulated over cuttings to prevent their wilting. Rooting of cuttings with this system has been observed to be approximately equivalent to intermittent mist with bottom heating. The objective of this report is to show that the energy requirements of ventilated high humidity propagation are smaller than for intermittent mist with bottom heating. Two types of energy are considered, the efforts of the propagator as well as the energy required to operate the equipment.

Intermittent mist systems require misting nozzles spaced to provide overlapping mist patterns over the propagation bed. The better quality systems operate at pressures approaching 100 lbs psi (690 kPa) and require 5 to 10 nozzles per 100 sq ft (9.3 m^2) of bed area. Satisfactory nozzles must have small holes or deflectors to permit use of slightly larger holes. These nozzles require considerable vigilance for opening plugged nozzles, adjustment and replacement of eroded parts.

The Agritech humidifier (Agritech Inc. Raleigh, NC), while not the only means of humidifying air, is available in models that were constructed for ventilated high humidity propagation. Each unit humidifies the air for as much as 1000 sq ft (93 m^2) of propagation area and may replace 50 nozzles. These units produce 200 lbs psi (1380 kPa) water pressure from centrifugal force and produce finer droplets through larger orifices than used for intermittent mist. Therefore the system requires little attention other than occasional filter cleaning and flow meter adjustments.

When propagating with the ventilated high humidity system, evaporative cooling of the cuttings and the propagation medium is not a problem. The humid air surrounding the cuttings prevents evaporation. Solar heat is absorbed by the propagation medium and tends to raise the temperature by as much as 7°F (4°C). This temperature difference functions similar to other forms of bottom heating and stimulates early root initiation.

Bottom heating, as used for intermittent mist propagation, requires the installation of electrical heating cables, hot water pipes or hot air ducts. The cost of electrical resistance heating during the period of propagating a crop of cuttings may cost as much as one dollar per sq ft of bed area. Operation of ventilated high humidity propagation equipment for similar lengths of time were calculated to be approximately one percent of that amount.

The energy requirements for ventilated high humidity propagation as compared to intermittent mist with bottom heating are lower both in terms of propagators efforts and equipment energy requirements.

OUTDOOR PROPAGATING AT ANGELICA NURSERIES

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The least expensive method of propagating cultivars would be the direct sticking of unrooted cuttings into beds or field rows. With cooperative weather conditions, this will work well with some plants, usually quick-to-root species handled as dormant hardwood cuttings. With the majority of Angelica's production done as softwood or summer cuttings, the procedure becomes a bit more difficult, because success would necessitate some type of watering system to keep the plant tissues turgid during the rooting period. A deep, well drained especially sandy soil might present the proper medium, but since our area has a heavy loam soil, which becomes waterlogged quickly under continuous watering, soil propagation under mist proves unsatisfactory.

Angelica Nurseries took the next most logical step, which was to create raised beds of sand, while providing more than adequate subdrainage, into which cuttings are stuck for rooting from March until September, as proper timing and scheduling permits.

For four years we have been testing and refining our setup in order to observe its potentials and limitations, and have developed a propagating setup consisting of six units, each unit consisting of two side-by-side beds, each bed measuring 6 x 100 ft constructed of salvaged railbed ties, giving a minimum bed depth of 8 inches (Figs. 1 and 2). Each unit has a water line down the middle, with its own solenoid valve and time clock, with the watering applied through nozzles on 30 in. risers spaced at intervals to provide total coverage of the stuck cuttings. Each unit is separated from the next, and the whole setup is enclosed by 6 foot tall reed matting. This effects a reduction in air movement across the sandbeds and moderates the drying effects of wind and wind interference in the nozzle watering pàttern; this prevents dry areas and dead cuttings. Each unit, with a spacing of 1¾ inches between cuttings, holds approximately 60,000 cuttings.

At present we are using a salt hay blanket as winter protection for the rooted cuttings to prevent desiccation of narrowleaf evergreens, and stem splitting of deciduous cuttings. As with any covering there is rodent control to contend with. The cuttings