

HIGH HUMIDITY FOGGING PROPAGATION AND TECHNIQUES TO OVERCOME STRESS FOLLOWING MID-SUMMER OPEN GROUND PLANTING

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Byland's Nurseries is a wholesale nursery operation located in the Okanagan Valley of British Columbia. Although we grow fruit trees and have a retail garden centre the main thrust of our business is the production of woody ornamentals for colder climates. The plants we produce are either sold as container-grown plants or bareroot. We grow these plants in a semi-desert, zone 5, climate. Summer temperatures routinely exceed 95°F and winter temperatures occasionally go down to -25°F.

A few years ago when our old temporary wooden propagation structures were beginning to show their age we decided to build more modern propagation structures.

As a part of this modernization we investigated the possibility of using a fog system for the following reasons.

- 1) To speed up rooting time by using higher greenhouse temperatures so as to turn material in the propagation structure over more frequently.
- 2) To reduce the occurrence of overwatering the rooting media, causing the cuttings to decay.
- 3) To reduce the amount of supervision required by conventional mist systems
- 4) To be able to use the fog system to humidify our refrigerated storage building during the fall, winter, and early spring.

The Mee Fog System was selected and purchased and has performed flawlessly for 3 years, now running 9 months of the year.

The fog system was designed to handle 3 houses 30' × 96' in size although we currently use it in just one house. Four lines run down the house with nine nozzles per line for a total of 36 nozzles per house. The lines are set 6 feet above the ground. This may seem like a lot of nozzles but they are needed during the summer with its very low humidity.

For ventilation only a jet fan with a polytube is used. This is set to come on at 90°F. The fog system runs from 7 AM to 8 PM. The on/off interval depends on the temperature and whether or not the skies are sunny or overcast. On very hot sunny days the "on" time is 4 minutes and the "off" time is as little as 1 minute. On cooler days the "on" time is 4 minutes and the "off" time is 4 minutes. On rainy overcast days the "on" time can be as little as 2 minutes and the "off" time 4 minutes.

We try to keep the propagation structure foggy enough so that the fog just starts to clear up after the "off" interval. Trials to reduce the amount of time the fog system runs have proved to be less than satisfactory. Some woody ornamentals require less moisture than our *Sambucus racemosa* 'Plumosa Aurea' but, unfortunately, this species set the minimum fog requirement.

All of our propagation is done on the ground. Our greenhouse has a root-zone heating system in the ground but this is not used for softwood propagation.

For most of our softwood propagation the cuttings are stuck directly into 2½ in. pots or into Styroblocks. Styroblocks are used extensively by the forestry seedling industry but we have adapted one type to fit the needs of our nursery. The Styroblocks we use are cut by the factory to give us exactly the same soil volume as a 2¼ in. pot. The main advantages of Styroblocks are ease of handling and quick extraction of the plants. Styroblocks also have a rib design which we feel produces a superior root system. The main disadvantages of Styroblocks are cost and the fact they are brittle and break easily. Another disadvantage is that one gets fewer plants per square foot due to their design.

In our propagation house we can hold approximately 60,000 2¼ in. pots. We try to turn material in the house 2.5 times during the propagation season. We could probably do this 3 times if we removed the plants more quickly after they have rooted.

Whenever possible, cuttings are cut the same day they are stuck. We try to time the pruning of certain plants to coincide with the optimum time to make cuttings of that particular plant. For example *Prunus virginiana* 'Shubert' cuttings are made the third week of June which coincides with the time they are pruned (feathered) in the field. Cuttings are gathered and placed into large garbage bags and brought back to the cutting shed within 2 hours of cutting. The cuttings are taken only in the early morning. This procedure greatly increases efficiency in the nursery. Before and after the cuttings are made they are stored in a refrigerated room at 40°F.

In the last few years we have experimented extensively with the elimination of wounding the cuttings. We now just strip the lower leaves off of most plants and find that the rooting of most cultivars has been unaffected.

After the cuttings have been dipped in a hormone/Benlate mixture they are stuck into 2¼ in. pots, Styroblocks, or sandbeds according to a set production schedule. The Styroblocks and the 2¼ in. pots have the same rooting medium consisting of the following; 50% perlite, 30% peat, 20% sand, plus 1.5 lbs per yard³ Micromax, and 6 lbs per yard³ Osmocote (18-6-12).

The flats containing the 2¼ in. pots and the Styroblocks are filled at the potting department, palletized, and moved with a

forklift to the propagation structures where they are used.

After our plants have rooted they are placed in cold frames with a 25% shade netting stretched on it. We used a green shade netting which we import from Holland. It is far less expensive than shade cloth and is much easier to put on and remove.

The cuttings are misted, using an overhead irrigation system, for the first week after they are removed from the fog house. These plants are irrigated for 5 min. every hour. After a week the plants are incorporated into our normal irrigation schedule. If we run out of room the plants can be moved into the full sun after 2 weeks or so.

During the second week of August the rooted cuttings are transported into the field. Any cover crops which were used have been incorporated into the ground 2 weeks previously. Three or four days before field-planting begins the empty fields are thoroughly irrigated. Just prior to planting, the fields are ploughed using a spading machine and rotovated. A shallow trench is made using a V-plough.

The rooted cuttings are thoroughly watered before going to the field and only the plants that can be planted that day are brought out to the field. The rooted cuttings are quickly and easily extracted from the Styroblocks, as opposed to 2¼ in. pots. They are planted in 4 ft. rows with 6 in. between the plants.

Immediately after an irrigation line has been passed the water is turned on and one-inch of water is applied. This is repeated the second day after planting. Periodic irrigation is continued until the plants have started to form new roots into the soil. The plants are then incorporated into our regular irrigation program. A good quality irrigation system is required to be able to plant during mid-summer in a hot, dry climate like ours. One has to be able to irrigate on demand and provide uniform coverage.

This procedure provides us with young, vigorous 1½ year plants. We found that the regular 2 year program for growing shrubs produced plants which were too large for sales or 2-gallon container production.

BRUCE BRIGGS: Anton, on your work with *Picea*, what time of year do you take the cuttings?

ANTON THOMSEN: We take the cuttings the first part of June and get 80 to 90% rooting at that time. We use a mist line inside a tunnel house.

JIM WELLS: I was interested in your growing *Taxus* in containers. What rooting medium did you use for this?

ANTON THOMSEN: The *Taxus* in containers have been giving us some problems but we cut down on the watering which has helped. The medium is 70% light peat, 20% Grodan, which is a special fiber material to give good aeration—then 10% sand.

VOICE: What is the name of your new lilac that you showed?

ANTON THOMSEN: Jose—like in San Jose.

VOICE: This is for John Byland. In your high humidity propagation, how are you controlling moss and algae?

JOHN BYLAND: The only place we have an algae problem is on the walkways. The flats we use seem to tolerate a certain amount of algae. We really don't have an algae problem.

VOICE: Question for Anton. What is the cultivar of the blue upright growing juniper you showed? What experience have you had in field growing it?

ANTON THOMSEN: I suppose you mean the *Juniperus scopulorum* type. It is 'Blue Pyramid'. We have had no problems with it.

**PLANT INTRODUCTIONS FROM MONROVIA
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The Monrovia Nursery Company has always taken great pride in helping to introduce new plants or reintroduce old garden favorites into the nursery trade. Many times these plants come from around the world, or from such places as other nurseries, botanical gardens or arboretums, and even from home gardeners' backyards. At Monrovia Nursery, we are constantly scouting the fields of our containerized stock looking for sports of plants that have growing and marketing potential. Often times, these plants warrant a trademark or plant patent. Listed below are a few new and old cultivars of worthy note:

Actinidia arguta 'Ananasnaja'. This is commonly known as the Siberian gooseberry. It is a deciduous vine much like *Actinidia deliciosa*, except that the foliage is narrower and devoid of hairs. This cultivar was selected for the large size of its fruit ($\frac{3}{4}$ in. to $1\frac{1}{2}$ in. in diameter) which has lime-green flesh and a smooth skin; the fruit can be eaten like a grape—skin and all. The fruit ripens in September and October, earlier than *Actinidia deliciosa*. This cultivar is a female plant requiring a male pollinator. This plant is excellent for trellises and arbors, and may be planted as a scrambling shrub. It is hardy to zone 4, growing well at the Arnold Arboretum in Jamiaca Plain, Massachusetts, where it has tolerated -35°F .

Bougainvillea hybrid 'Oo-la-la'™. This plant is a sport of *Bougainvillea* 'Rosenka', and was found in a bed of 'Rosenka' by an employee at Monrovia Nursery Company. This new cultivar has the same dwarf, mounding habit, and free-flowering habit as 'Rosenka', except that the flower bracts are a vibrant reddish-purple. The plant is hardy to zone 10.