

1:1, 300 to 400 per flat. We use Hormodin #3 for the rooting compound and bottom heat of 70°F. A supply of cuttings is insurance against the time when *Acer palmatum* seedlings are not available.

PROPAGATION OF *PICEA GLAUCA* 'CONICA'

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We began experimental production of *Picea glauca* 'Conica,' dwarf alberta or dwarf white spruce, about 3 years ago in search of some new items to add to our production. It was our opinion that we could propagate this plant without too much difficulty, but we were not sure that we could adapt it to our operation. Our production is such that it is not feasible for us to root any plant that we cannot propagate in quantity.

We began by sticking a limited number of cuttings in December in the manner that we stick *Taxus* cuttings. The cuttings were stuck in ground beds in a poly house. The medium consisted of soil, finely ground pine bark and coarse sand. Since there was no heat in the house, the cuttings did not root until early summer after the soil had warmed to about 70°F. During the winter, the cuttings were kept turgid by light intermittent mist. The mist was removed after rooting had been accomplished. The plants were grown under 50 percent shade and responded well to fairly heavy applications of fertilizer. During the following winter, the plants were kept in a poly house with no heat. During the second summer, the plants were grown under shade in the same beds in which they were rooted. By the end of the summer the plants were 3 to 6 inches tall and large enough to go into a gallon can.

Now that we were fairly sure of our procedure, we were ready to put this plant into production. Our big problem was finding enough cuttings to justify propagating the plant. We were able to purchase some unrooted cuttings and continue our experiments for an additional two years. During the intervening period we talked with as many propagators as we could to gain more knowledge about the plant and about its propagation procedures. We were of the opinion that taking dormant cuttings during the winter was the best method. However, we discovered that some people were rooting cuttings in pure sand during the summer with excellent results.

This year we decided to purchase sufficient plants for cut-

tings. In October of this year I made a trip to Oregon and purchased 2,000 one gallon *Picea glauca* 'Conica' plants. While in Oregon, I visited most of the nurseries in the Portland area with particular emphasis on propagation and production of *Picea glauca* 'Conica.' I found that these nurserymen were not only rooting *Picea glauca* 'Conica' in quantity, but were also rooting *Picea pungens glauca* and *Picea abies nidiformis*. Most were using normal greenhouse procedures and were rooting in sand or a mixture of sand and perlite.

In summary our procedures are as follows:

1. Cuttings are made of current year's growth as it begins to harden off. Under ideal conditions a plant will make about three flushes of growth and will root in summer or winter. We use upright and side shoots with equal success.

2. We put in our cuttings anytime during the year that we can find a satisfactory cutting that has hardened off sufficiently, whether it be winter or summer. The cuttings that we stick in the winter do not root until the following spring when the soil has warmed up to about 70°F. Unheated open beds are used. The medium is a mixture of approximately equal parts of soil, pine bark and sand. Any mixture that drains well seems satisfactory. The cutting is stuck through the mix to dirt bed. We expect the cutting to root in the mix and the roots to extend into the dirt bed where it will be grown undisturbed for two years.

3. A fairly strong hormone, 1 percent (10,000 ppm) liquid quick dip, is used.

4. Plants are grown under 50 percent shade. In winter plants are protected by a plastic and shade cloth covered structure.

5. Plants are liquid fed with 20-20-20. Two year, 4 to 6 inch, liners are sold bare root. These are large enough for a gallon can.

We normally obtain 80 to 85 percent rooting under good conditions and have found that we can thus profitably adapt production of *Picea glauca* 'Conica' to our operation.