ROOT ZONE HEATING IN CONTAINER PROPAGATION

ARTHUR J. OSLACH

Oslach Nurseries, Inc.
Simcoe, Ontario, Canada N3Y 4J9

Root zone heating has for many years been used in various types of nursery production. We, at Oslach Nurseries produce a large selection of conifer liners. We have used conventional propagation which consists of benches with hot water heating under the bench. This system proved unreliable and undependable in rooting a large number of conifers.

We, therefore, experimented with a new type of propagating structure and designed and built it especially for conifer production. Our first venture into root zone heating several years ago consisted of an in-ground bed lined with ½ in. polystyrene, with steel ¾ in. hot water pipes spaced approximately 10 in. apart. These pipes were embedded in cement sand and then further covered up with a layer of polyester to prevent damage to the system by rooting out of the bottom of the flats into the pipes and heat pipe areas. This system works quite effectively and we found that our production increased and the quality of our cuttings improved. At the same time we reduced our losses compared to the conventional rooting method. We then went ahead and designed and built a 24 ft. free-standing hoop house about 10 ft high at its peak. This house was covered with a clear double poly which was inflated with a squirrel-cage fan. A hot water boiler was installed and three beds were dug out and prepared in the manner previously described but instead of using galvanized pipe we decided to use a new product which was a high temperature flexible poly hose. This was installed the same way as the steel pipes. We have three beds in the house, each one has its own in-ground thermostat that has a sensing bulb placed between the hot water pipes and about ½ in. below the flats. Each bed is, therefore, controlled independently and can be turned on or off and set at various temperatures depending upon the crop being rooted. Each thermostat is connected to a zone valve that operates independently. The greenhouse is constructed with an exhaust fan at one end and louvers at the opposite end; this is to bring in cold air when required. The fan is generally sealed shut until the middle of February after which time we start to receive more light and find we cannot control the temperature in the greenhouse without exhausting air. Upon completion, we found that by maintaining the bottom temperatures on the conifer cuttings at about 68 to 69°F and a minimum top temperature of 35°F, we received excellent rooting results. We keep the top

temperature just above freezing. This is done by an independent ring of hot water radiators that are controlled by their own thermostat mounted at eye level. We find that the cool top temperature retards top growth in the month of December and January. We have excellent callusing and root initiation by the first week in February, which by that time, we find it difficult to maintain cool top temperature and therefore exhausting is necessary.

Since we keep the greenhouse very cool, little watering is required and we generally soak well once a week during the callusing period. We find that disease organisms are retarded and, therefore, spraying and drenching with fungicide is not necessary. All of our conifer cuttings are stuck in Kadon flats and the medium we use is straight perlite. We find that the flat system is ideal for this type of root zone propagation. The flats are then placed on the root zone bed completely sealing the heat into the bed and therefore the heat spreads out evenly on the bottom of the flats. By using flats the greenhouse also can be emptied in a very short time by the middle of May. We placed the flats under a lath house to harden off the rooted cuttings before they are either bedded or potted.

This system enables us to hold cuttings over a long period of time, thus spreading our work load out, especially during our busy season. We found with conventional bed rooting that the cuttings had to be out by the middle of May because of the high temperature conditions. Therefore, we were stuck with a large volume of plant material that had to be handled immediately during our busy season. This placed an added strain on our nursery operations. The house being cool has other advantages, the most important being that we are able to put a large amount of cuttings in a small area. We place approximately 100,000 cuttings in a 50 x 24 ft house. These cuttings are placed approximately 200 to 250 per flat. Such high numbers are unheard of in conventional houses with high temperatures where traditional propagators space their cuttings.

We have tried a large number of conifer clones and find that most clones respond well to this type of propagation on a constant basis every year. We also grow a range of ericaceous plants, including rhododendrons and blueberries. The medium we use for these plants is a 50:50 peat and perlite mix. Other than medium differences, the ericaceous plants are handled in the same manner as conifers in the root zone house. Our results are excellent and by the first week in May we have well-rooted rhododendron cuttings ready to go into a 1 gallon container. In conclusion, we find that this house is very easy to maintain and operate and gives us excellent results in our propagation schedule.