

seedlings from Thymes Planteskole and, according to the Botanical Garden in Copenhagen, it is very rare to get fertile seeds from *Sinarundinaria* in our climate.

Though I should only talk about new conifers, I would like to mention that a large number of shrubs have been especially selected by Hornum Research station for landscaping purposes. Among others, two *Ribes alpinum* have been selected; a male cultivar—'Hemus', which has a nice shape, very healthy leaves, and a female—'Dima', which is more "open", but also with healthy leaves. *Lonicera ledebourii* 'Vian', which is a strong grower, very wind resistant, and has very fine leaves.

LOW COST TECHNIQUES FOR SUCCESSFULLY OVERWINTERING ROOTED CUTTINGS AND LINERS

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Happy Hollow Nursery is located in the central Fraser Valley, 45 min. inland from Vancouver, B.C. We are on Sumas Mountain, 600 ft. above the flat farmland. Situated in a valley on the mountain we are protected from cold northeast winds which causes desiccation of plants down below, but are subject to being a "frost pocket" caused by air drainage off the mountain, and cold air settling in the valley.

Early fall frosts are to our advantage by putting the plants into dormancy slightly earlier than other places. Late spring frosts can be a problem after plants have started growing.

Our winter protection is based on encouraging acclimation, using the plants own abilities to withstand cold. We do everything we can to encourage cold acclimation in the fall, and everything we can to keep them dormant all winter, until danger of frost is over in spring.

Eighty percent of our business is in the production of lining-out stock, mostly deciduous and broadleaf evergreen shrubs. All cuttings are direct-stuck from plugs, 73 to a flat, 2¼ and 3¼ in. pots in the size of container they are to be sold. Overwintering has been our major limitation on volume production. Winter space is always in restraint. Not everything can go into heated houses, and not everything grows well in heated houses. Many plants require a cold period before they can properly break dormancy and grow in the spring.

In determining the method of overwintering any particular plant, the first consideration is the plant's inherent hardiness—the ability of a plant to survive a set minimum temperature. The central Fraser Valley is rated as Zone 7B. We grow plants for the north (Zone 1), the prairies (Zone 2 & 3), back east (Zone 3 & 4), and Vancouver/Victoria (Zone 8). Plants rated hardy are only that hardy *when given the conditions to develop that hardiness*.

The roots are the least hardy part of a plant. Plants in containers can be rated two Zones more tender than their counterparts in the ground. Plants, such as liners in small pots, are even more tender.

Any plant less hardy than a Zone 4 (Toronto/Chicago), I protect inside a polyhouse for the winter. Any plant in a pot smaller than a 3¼ in. pot, regardless of hardiness rating, is overwintered in a polyhouse.

Liners kept outside include dogwoods, euonymous, spirea, and potentillas. These are mostly deciduous plants rooted directly in 3¼ in. pots. They are rooted early in summer and placed outdoors as soon as they are rooted, then sold the following spring. Precautions with these include doing them early enough to be thoroughly rooted prior to winter. In the fall sawdust is heaped around the edges of flats and in the crack in between. As colder weather approaches more sawdust is added, right over the pots. We hope to have the leaves gone prior to any cold spell.

“Cold spell”, means a period of a few days or more of 22°F weather, where the pot surface freezes and does not thaw during the day. Cold weather such as this is our main concern, because as the weather lasts, the frost goes deeper and deeper into the pot, even though the temperature may remain the same. During a period such as this sawdust is shovelled right over the pots, burying the plants completely. This weather is also very drying. The sawdust is not only a great insulator, it also holds the moisture in and keeps out the drying winds.

We save our old plastic off the greenhouses for overwintering. Plastic is laid over the beds of liners and held down with pieces of firewood. Water is put over the plastic and left to freeze and hold the plastic down. The plastic is left on until the cold spell is well broken and the pots have thawed. The sawdust is not removed until spring and the danger of a cold spell is past, usually February 15th to March 1st. The sawdust also insulates from warmth in spring and helps keep the plants dormant longer, helping to avoid damage from late spring frosts.

Inside the polyhouses we overwinter our broadleaf evergreens and smaller sized liners. We have heated houses, heated with rootzone hot water, fuelled with propane. We let frost in to obtain dormancy and the necessary cold requirements. A plant kept active will be far more sensitive to cold than a plant allowed to enter

dormancy and maintain its own hardiness. House doors are left open in fall. Poly is not replaced before the last week in October. Once plants are dormant deciduous leaves are removed with a commercial vacuum cleaner. Botrytis in a polyhouse can cause far more damage than any cold, deciduous plants being the most difficult. Thermostats in these houses are set at 32°F. In a cold snap, used poly is laid over the plants to keep the heat down at plant level. These houses are also double poly, which will save about 30% of heating costs over single layer.

For overwintering larger sized plants in 1, 2, and 5 gal. containers we again separate according to hardiness ratings. For zones 1, 2 and 3 plants we use no protection. Zones 4 and 5 plants are left outdoors but are packed pot to pot and banked with sawdust around the edges of the beds for insulation.

Plants rated Zones 6, 7 and 8 are moved into unheated, single-layer polyhouses. In a cold spell, used poly is laid over the plants, and left until the weather breaks, hopefully for not more than a week at a time. We again try to use the plants' own abilities by not fertilizing in fall and keeping the plants thoroughly watered. The doors of houses are left open and well-ventilated as long as we can in fall. We want to discourage growth after October 15th and encourage dormancy. In spring we discourage growth until all danger of frost is over; white poly is useful for this. When the houses stay cold in the day, the plants tend to remain dormant several weeks longer.