

COLD TREATMENT OF *TAXUS* CUTTINGS

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The effect of a cold treatment on rooted cuttings of woody ornamentals is very difficult to document from readings of past Proceedings. To be specific, in 1955 Charlie Hess reported that *Cornus florida* 'Rubra' required 1,000 hours at 32 to 45°F temperature to break bud dormancy. In 1958, Hank Weller presented an excellent paper relative to taking moderately rooted cuttings of *Buxus*, *Euonymus*, and *Ligustrum* and placing them in poly bags at 34°F for 4 months prior to field planting. Harvey Templeton, in 1957, also discussed *Viburnum carlesii* relative to dormancy after rooting. In 1966 a K.D. Holmes briefly reported on September stuck *Taxus* that were lifted as rooted cuttings in February, stored in poly bags at 36°F, and then spring-planted into transplant beds. The following year Andy Adams reported on azaleas stored as rooted cuttings. As recently as October 1982, during the Western Region Conference, Dennis Connor spoke on rooting kiwifruit cuttings, giving them a cold treatment for 30-days and then potting off the rooted cuttings.

In 1979, Dale Deppe, then the propagator at Zelenka Nursery, began testing the effect of a cold treatment on rooted *Taxus* cuttings. In April 5,000 rooted cuttings from each of 3 cultivars were lifted and placed in cold storage at 34 to 36°F. In June they were planted at the same time as freshly lifted plants. That same year he pulled various quantities of rooted *Taxus* cuttings at 2 week intervals from March 10 to May 22. His 1979 evaluation showed that 60-days of cold treatment gave a far superior summer flush of growth than the control plants, or those that were cold treated for either a shorter or longer period.

Based on Dale Deppe's studies it was decided that the Zelenka Nursery would set up a project to further explore this fascinating topic. On April 8, 1981, a total of 200,000 rooted cuttings were lifted, given 60-days of cold treatment, and planted into 10-row liner beds under lath shade. The evaluation of these 200,000 showed a strong flush of new summer growth, approximately 3 to 4 inches, while the control non cold-treated rooted cuttings showed the usual ½ to 1 in. summer growth flush. To say the least, the implications of this study were exciting. The nursery is scheduled to stick approximately 2,400,000 *Taxus* cuttings annually, and they were scheduled to grow 3 years under shade, and then to the field to grow into saleable sizes.

Based on the results of Deppe's 1979 tests and the quite pleasing results in our 1981 tests, a decision was made to lift 300,000 cuttings in early April of 1982, store them at 34°F for 60-days, and plant them into the transplant beds, with the balance of the crop coming directly from the greenhouse. Accordingly, on April 2, 5, 7, and 8, of 1982, a total of 352,387 rooted cuttings from 10 cultivars, were lifted and stored in waxed poultry boxes with moist sphagnum moss, at 34°F. They were then planted into the transplant beds on June 4 and 5, of 1982, with the control plants directly from the greenhouse benches planted the same dates. Once again, to our complete satisfaction, the summer flush of the cold-treated rooted cuttings was conservatively three times the flush of the greenhouse-maintained *Taxus* cutting crop. To show our confidence in this program it is contemplated that in April, 1983, about 1/3 of the entire crop presently in the greenhouse will be lifted in April and stored for the 60 day period. It is quite conceivable that in a few years 50% of the November/December stuck crop will be lifted in April, stored at 34°F, and lined out to the transplant beds for 2 years rather than the present 3 year program. The economic implications of a million units lined out for 2 years rather than 3 years are obvious.

An additional benefit of this program is the opening of bench space. For many years our nursery was not able to turn two crops annually in the raised benches which have the advantage of bottom heat as well as mist capabilities. Since the nursery has a wide variety of deciduous flowering shrubs, over-wintered in polyhouses, the cutting wood availability early is almost unbelievable. Many of us, myself included, have experienced over the years the remarkable and incomprehensible theory of juvenility. When one takes cuttings of almost any species of deciduous plant, from container-grown plants under winter poly covered, the rooting percentages virtually is mind boggling. If you are experiencing poor economic rooting percentages give strong consideration to using the juvenile cutting.

All of us at Zelenka Nursery are content with the concept of the cold treated *Taxus* cuttings. At this nursery all of the bottom heated, raised benches are devoted to *Taxus*. By removing half of the crop in April, and sticking deciduous softwood cuttings which can be rooted in 90 days, increased productivity of this bench space can be realized.

I am firmly convinced at this point that the 60 day cold treatment program will definitely have an economic impact. I feel that after we have rooted the *Taxus* cuttings, we can then interrupt that cutting's growth habit by giving it a certain number of days of chilling. When this cold-treated cutting

then is planted in a liner bed, the plant then "wakes up" and makes a growth flush that is not comparable to a cutting taken directly from a bench which has not been cold treated. We have not experimented with any other species in this manner. Since *Taxus* is a very important crop for this nursery, if we can eliminate one year's growth from the time we stick the cutting until we harvest the saleable plant, we have saved a considerable amount. The aim, of course, of everyone in this room is to produce the best quality plant in the shortest period of time.

As everyone in the room is aware, the motto of the International Plant Propagators' Society is "To Seek and To Share". It is through papers which have been published in past Proceedings that we learn of techniques which help us to be a better professional in the science of plant propagation. Much data has been tested and tried by propagators before us and I know that there are a myriad of techniques and practices on the horizon. It is my hope that these remarks might be of benefit to some of you in the room who are saddled with a shortage of bench space, and a propagation list that won't fit the benches. You might wish to do some testing by removing early and then early sticking that second crop. I cannot tell you conclusively that the 60-day period is right for you, but I would use it as a guide for any areas of the country that experience the cloudy days during the winter that we experience in Western Michigan. If any of you do some testing during the spring of 1983, I would be quite interested in your results.

GLEN LUMIS: I agree with you on the chilling. Do they flush right after you put them out?

RALPH SHUGERT: We see the flush quite early.

GLEN LUMIS: In the next year did you notice any reduction? I noticed some?

RALPH SHUGERT: No, we did not. With that growth the first year we feel we are building a sufficient root system.

BRUCE BRIGGS: With some tissue-cultured plants, such as apple, if you give them a cold period for 30 days after rooting, they grow better.

JOERG LEISS: We have been cold-storing our *Taxus* cuttings for 3 years. We do it so that we can get away from having to shade.

LARRY CARVILLE: I have a question on the availability of deciduous material in your polyhouses during April and May. What state of growth will the plant material be in at this time?

RALPH SHUGERT: Last year we had, I believe, 7 genera

from the 15th of April to the 1st of May showing new growth of 4 to 8 inches.

LARRY CARVILLE: So the amount of new growth depends upon the genus and species.

RALPH SHUGERT: Yes. Our weather is very dark in December, January, and February, but when the days lengthen and the sky opens up in the spring the plants just take off.

DIRECT STICKING OF CUTTINGS IN GRO-PLUGS®

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Abstract. Many deciduous cuttings can be directly stuck into Gro-Plugs® and successfully rooted. This method greatly reduces stress encountered in transplanting the rooted cuttings into the field or container.

At the 1980 IPPS Eastern Region meeting we reported on the practical application of Gro-Plug® systems in growing ornamentals (1). That report primarily dealt with seedling-grown conifers. This report will give our experience in directly sticking softwood cuttings into Gro-Plugs®. This system allows us to overcome the problems of a short season here in northeastern Wisconsin and still transplant softwood cuttings out to the field or container the same season. We have used this system on many species and cultivars of *Berberis*, *Cornus*, *Cotoneaster*, *Euonymus*, *Lonicera*, *Physocarpus*, *Potentilla*, *Ribes*, *Rosa*, *Spiraea*, *Salix*, and *Weigela*.

CUTTING WOOD

Selection. Selection of proper cutting wood material is of paramount importance. The art of exactly when to take a cutting must be left to the individual propagator and the environment in which he is working. Cuttings should be taken only from true-to-name mother plants.

Cutting preparation. We take our cuttings in June as early as the wood is ready. The cutting wood is watered with Phosan 20 at the rate of one tsp. per gal. of water. The wood is then rinsed with fresh water. We make the cuttings with two or more nodes and approximately 3 to 5 inches in length. The basal cuts are made ¼" below a node and the lower leaves are stripped off. The tops are pruned, in the case of shrubs, to force lateral growth.