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## **PROPAGATION BY ROOT CUTTINGS**

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Although propagation by root cuttings generally plays a minor role in the nursery industry, it presents a potential source of readily available material and perhaps should be considered more widely for those species which can be economically and practically propagated by this method. Plants propagated by root cuttings will be true-to-type, except for periclinal chimera plant types which do not reproduce true-to-type. A favorable aspect of root propagation, especially for the manager or foreman, is that it requires little skill to do and can be easily taught. Root cutting propagation will be illustrated by discussing some of our methods employed at Sheridan Nurseries and highlighted by examples of some species propagated.

A year prior to planting a field with root cuttings, it is seeded with a clover cover crop. A relatively sandy soil is preferred. The field is prepared for spring planting by fall plowing, adding required P and K according to a soil test, and cultivating. An application of Treflan (1 to 1½ lb/A) prior to planting helps in maintaining weed control.

Collection of roots presents a challenge. If they cannot be easily gathered from field-harvested plants, then they must be tediously dug from stock plants. Following collection, roots are stored in a barn in boxes containing a mix of composted bark and brick sand (3:2,v/v). Storage in the barn exposes the roots to temperatures which fluctuate from -2 to +6°C. in our area.

In February, after the majority of our grafting is completed, the root cuttings are made. Cuttings, approximately 12 cm in length, are made with a flush cut on the proximal end and an angled cut on the distal end to indicate the correct planting

direction and maintain the proper polarity. After trimming, the root pieces are placed into boxes, covered with the bark-sand mix, and again stored in the barn until planting.

In April, cuttings are planted with a four-row trencher. The final spacing is at  $5 \times 30$  cm. Planting requires 7 people: 1 driver, 4 planters, 1 tamper, and 1 supplier. Following planting, the soil is tamped down around the cutting and mounded up to cover the tips with a cultivator-packer. A straw mulch helps to retain moisture, control weeds, and keep unwanted traffic out of the beds. The straw is removed when shoots begin to show, usually the beginning of June.

During the growing season, the root cuttings are irrigated and fertilized with 100 lb/A ammonium nitrate. Enide 15W (6.85 lb/A actual) and Dacthal 75W (16.5 lb/A actual) applications help to control weeds. Plants harvested that fall, are graded and either replanted at  $15 \times 42$  in. spacing, potted, or sold.

Some shrubs, perennials, and one tree species are propagated at Sheridan Nurseries from root cuttings. Roots of *Campsis radicans* and *Aralia elata* receive no special treatment. In order to increase the number of takes and the size of a one year plant of *Rhus typhina* 'Laciniata' root cuttings are potted into a mix of bark, peat and sawdust (6:1:1,v/v/v) and placed in a greenhouse at 20°C. In the beginning of June they are potted into a #2 container.

Roots of *Aesculus parviflora* are taken off stock plants in the fall. Cuttings are placed into plug trays containing Vitamix, covered with sphagnum, then placed in a greenhouse at 20°. In the beginning of June are potted into a #2 container.

*Prunus × cistena* root cuttings after treatment with a 0.95% IBA powder, are stored in the barn until the beginning of April. They are then given a 3 to 4 week warm treatment of about 18°C to promote callusing. Cuttings are planted in a polyhouse (15°C), spaced at  $2.5 \times 5$  cm. Once shoots have begun to sprout, they are fertilized with a 20-20-20 formula, at 200 ppm weekly. During the summer, these shoots provide a good source of softwood cuttings. Plants are dug in the fall.

*Papaver orientale* is propagated in August after the foliage has begun to die back. Cuttings, approximately 3 mm thick and 8 cm long, are placed directly into pots with tips barely exposed. Pots are kept well-watered and shaded in a cold frame. Shoots should be visible in about 4 weeks. Plants are sold the following year. Cuttings of *Armoracea rusticana* are propagated by the same method.

*Phlox paniculata* cultivars are propagated in the beginning

of October from root pieces approximately 1 to 2 mm thick and 5 cm long. The root cuttings are planted upright in flats of mix, covered with moist sphagnum, then stored in a cool greenhouse (15°C). In January, shoots start to show and the sphagnum is removed. The new plants are watered and fertilized with a 20-20-20 formulation at 200 ppm. Cuttings are moved into plugs and later potted on. *Salvia superba* 'East Friesland' is propagated the same as *Phlox*, however, cuttings taken in late August are planted into a cold frame. *Anemone japonica* root cuttings made in February are kept in the greenhouses like *Phlox*. This is one way to prevent freezing of the stock in most years.

*Populus* 'Tower' is the only tree presently grown at Sheridan's from root cuttings. At one time the nursery also propagated *Gymnocladus dioicus* this way. These cuttings are made similar to those of *Campsis* and *Aralia*.

At Sheridan Nurseries, we have begun to explore the possibility of propagating, both root and hardwood cuttings in "Spencer-Lamaier" rooting trays. The objective is to produce a strong, established plant with a good root ball which can be readily transplanted.

There are, of course, many other shrubs, trees, and perennials which can be easily propagated by root cuttings. The plants discussed here give a brief outline of our root cutting propagation methods. Extensive lists of plants may be found in past IPPS Proceedings or most any book on propagation.

## PROPER SELECTION OF PROPAGATION MATERIAL CAN BOOST NURSERY PRODUCTIVITY<sup>1</sup>

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**Abstract.** Three year height data from a *Betula papyrifera* provenance test was used to show the economic benefits of proper selection of propagation material. The best of 8 commercially available seed sources (number 1306, obtained from Musser Forest and Herbst Tree Seed) averaged 8.3 ft in height vs. 7.4 ft for the 8 commercial source average. The shortest source was 6.1 ft. Based on fall 1985 wholesale prices, planting seedlings from

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