PROPAGATION OF CLONAL ROOTSTOCKS BY HARDWOOD CUTTINGS

DOUGLAS E. SABIN

Daybreak Nursery
P.O. Box 428
Cornelius, Oregon 97006

There are five main methods of propagating rootstocks: by seed, softwood or hardwood cuttings, root cuttings, mound layering, and tissue culture. Our firm has specialized in the growing of hardwood cuttings since 1955, when Lyle Brooks, my grandfather, retired as co-owner of the Carlton Nursery Co. and began the Daybreak Nursery.

The hardwood cutting method is an excellent way to propagate fruit tree rootstocks such as those for plums, pears, and cherries. It is also an excellent way to propagate certain shade trees such as London planetree *(Plantanus × acerifolia)* and *Prunus × cistena*. There are two times in the year in our area when such hardwood cutting material can be gathered and rooted successfully — the months of November and December (late fall and early winter) and the last half of February and the first half of March (late winter and early spring).

Cutting material should be taken from stock trees that have been in place for at least two years. Material can be taken off younger stock trees but the success rate will be reduced by at least 50%. Material can also be collected from the tops of cutting beds or from one-year budded rootstocks in the nursery but the success rate of this source of material can be as low as 10 to 20%, depending on the time of collection. Such material is often too green and varies drastically from year to year. Mature stock trees that in our climate are watered once in June and once in August are, by far, the best source of cutting material. Maturity in these stock trees will vary from year to year but not as drastically as in the cutting beds or nursery row, as the amount of water they receive over the summer months is minimal, as compared to the great volume of water applied to the cutting beds or nursery row required for vigorous growth before budding. No one calendar date will ever be correct for taking cuttings on a year to year basis.

Stock trees are generally planted on a 2 by 6 ft. spacing. The 6 ft. spacing between rows allows adequate room for tilling and is necessary for good branching. It is also necessary to let in the proper amount of sunlight. Stock trees should be tilled 4 or 5 times a year and the proper sprays applied when required. Healthy stock trees are essential for success in rooting hardwood cuttings.

After the cutting material has been collected it should be made into cuttings by at least the 5th day. If the cutting material begins to dry out the cuttings will not root successfully. Cuttings can be made as short as 6 in. or as long as 24 in. The shorter cuttings seem to do better as the amount of stored energy required to get them started in the spring is not as great as that needed for longer cuttings. Basal cuttings are always more successful than are the 2nd or 3rd cutting on the same branch.

After any side shoots have been trimmed from the main cuttings, they can be tied in bundles of 50 or 100, depending on size, and topped to length. They should then be dipped in a rooting hormone immediately. A fresh cut on the basal end is required for rapid hormone intake. The cuttings should not be dipped in the rooting hormone for any longer than 5 seconds. Also the rooting hormone should be no deeper than ¼ in. There is no advantage, and often a disadvantage in dipping more than just the extreme basal end.

For both spring and fall cuttings, a solution of 2500 ppm indolebutyric (IBA) is used. The solvent consists of 50% grain alcohol and 50% lukewarm water.

Within the hour these treated cuttings should be packed in wooden crates, such as lettuce crates or apple boxes, and sealed with poly-lined kraft paper, wiht at least two inches of semi-moist peat moss placed in the bottom of the box. This peat moss will help maintain humidity in the box for the storage period that follows. No heating cables under the rooting medium are required, nor is it necessary to cool the tops of the cuttings to stop new shoot growth.

After packing, the boxes are then transferred to a temperature controlled room and left for a period of from 9 to 14 days for spring cuttings, and up to 30 days for fall cuttings. Fall cuttings are usually more successful than are spring cuttings. Fall cuttings tend to remain dormant during callusing while spring cuttings will begin to break new shoot growth, which is detrimental when transplanting to the beds. The temperature of the callusing room should be kept at a constant 64°F.

After the cuttings have been properly callused, they should be transferred to cold storage (34° to 36°F) until planting time in the spring. It is not necessary for these cuttings to be rooted at the time of planting; in fact, it is harmful. The rooting should take place in the ground. If possible, planting in our area should begin by April 1st and be completed by May 1st. The ground temperature should be at least 55°F before planting.

Cuttings should be planted in beds as opposed to single row planting to avoid sunburn and excessive loss of moisture. Sawdust or barkdust should be applied over the beds immediately as a moisture and weed controlling agent. The sawdust mulch should be at least 2 in. thick. It most soils it is necessary to punch a hole in the ground for each cutting before planting. The best spacing we have found for our cuttings is 3 in. apart across the bed and 4 in. apart running the length of the bed. Any farther apart and the cuttings will become too large in a single season; any closer together they will not achieve enough growth to bud. The cuttings should be planted to a depth of 6 or 7 in. for best results. The beds should be watered at least every 10 days from the time of planting in the spring to the middle of September.

Hygiene is one of the most important factors for success in making hardwood cuttings. The peat moss used for humidity control in the boxes should not be reused. All tables, walls, and floors in the warehouse should be sterilized with a Clorox solution before use each year. Also all pruning equipment should be sterilized in the same manner before use each day. Mold in the cutting boxes is one of the largest causes for failure. It can spread rapaidly in the callusing room and can kill all the cuttings in a box in a very short time. Immature cuttings particularly are likely to mold in the boxes and great care should be taken to use only mature cutting material.

To help keep mold under control, the cutting material should be dipped in a solution of Captan or Benlate and allowed to dry completely. This process should be done after the side branches have been removed from the main cutting but before the cutting sticks have been tied for sawing. As the cuttings are placed on top of the peat moss in the box for callusing, a 5% Captan powder should be sprinkled lightly over the peat moss to control mold. Also all stock trees should be sprayed in the fall, after leaf fall, with lime and copper sulphate mixed at the rate of 10 to 12 pounds of each to 100 gallons of water. This will also help control mold during the longer winter storage.

When the cutting material is removed from the stock trees, it should be placed in a clean wheelbarrow or placed on a tarp so as not to come in contact with the soil. Also the truck or trailer used to haul the cutting material to the warehouse should be lined with a clean tarp. Every effort should be taken to keep the cuttings as sanitary as possible. Success depends on strict compliance with these procedures.

Determining the correct time to take cuttings is the single most elusive aspect of our nursery work. What does well one

year may fail the following year. As the stock trees get older, the timing changes by several weeks. The amount of rainfall over the summer; the amount of sunny versus shady days; and the temperature all have a varying influence. In our locality it is best not to take cuttings until after the first major frost in the fall. Excellent records must be kept of all pertinent data and any changes in scheduling or procedures should be noted.

SOFTWOOD CUTTING PROPAGATION OF CERTAIN SHADE TREE SPECIES

LANCE LYON

Femrite Nursery Company
13193 Arndt Road, N.E.
Aurora. Oregon 97002

Softwood cutting propagation of deciduous trees is relatively new to the nursery industry. In the past most tree cultivars were produced by budding or grafting. This is still the most common method of propagation for most cultivars. However, this has created some problems. Notably delayed incompatibility in certain red maples. To circumvent this problem it has been necessary to find other methods of propagation. In 1976 Femrite Nursery began to experiment with rooting red maple softwood cuttings. This was done by placing the prepared cuttings in a flat for rooting under mist. The resultant rooting was adequate, but we lost many of our cuttings when we transplanted them to pots for overwintering. We began to look for some method to root the cuttings without having to transplant them.

After much trial and some error we have developed a method of propagation which works well for us. We now use a McConkey pot which is 2¼ in. square by 5 in. deep. We can put 49 of these in a 17 in. square mesh bottom flat. The flats are filled with pots and the pots are filled with a medium of 60% horticultural grade perlite and 40% aged sawdust. This medium gives good drainage while insuring adequate water holding capacity. The flats are then placed on the benches under mist.

The cuttings are taken, beginning in early July, from the stock garden or field stock. They are plunged in water immediately upon cutting to maintain their turgor. The cuttings are then brought into the warehouse where they are kept cool and damp until they are prepared for sticking. We make the cuttings 6 to 10 in. long depending on the cultivar and amount of scion wood available. One or two leaves are left on the cutting