

SIDE VENEER GRAFTING

J. PETER VERMEULEN

*John Vermeulen & Son, Inc.
P.O. Box 267, Woodfern Road
Neshanic Station, New Jersey 08853*

At our nursery we primarily use the side veneer method of grafting. Most of our grafting is done in January and February, sometimes into March. Grafts made in the workshed are finished in two separate greenhouses, each with different micro-climates, one for conifers and the other for deciduous plants. The greenhouses are zone controlled for regulating temperatures for the differing requirements, (1) of the medium into which the pot and graft union are plunged (buried), and (2) the ambient air surrounding the tops, the latter being the cooler. We make approximately 50,000 grafts a year.

Understocks are potted well in advance of grafting time to permit good establishment. The recommended practice is to use dormant, sturdy, straight-stemmed seedlings between $\frac{1}{8}$ and $\frac{1}{4}$ in. in diameter. They should have good fibrous roots. In some species these requirements will be found in a one-year (1-0) seedling but, most generally, a two-year (2-0) seedling is used. Occasionally, a 3 year (3-0) or a once-transplanted seedling (2-1) is used.

At the time of potting the roots and top of the seedlings are pruned. Roots are pruned to encourage development of a more branched and fibrous root system as well as to permit easier potting. The tops are pruned in order to reduce transpiration and to permit easier handling by the grafter. Branchlets on the lower portion of the stem where the actual grafting occurs must be removed. Commercial grafters generally use a $2\frac{1}{4}$ in. diameter or square rose-pot for most understocks. This is necessary for economic reasons to better utilize expensive greenhouse bench space and lower subsequent shipping costs.

After potting, the understocks are placed in a frame, bed, or bench, with 50% shade and grown until grafting time. Irrigation should be sufficient to induce moderate but not excessive growth. Fertilize only to encourage root regeneration but not excessive top growth.

Scions used for grafting must be selected with care. Current or past season's growth is selected depending on the season of grafting. Many nurseries maintain stock plants which are carefully pruned to yield healthy and sturdy terminal growth suitable for scions. The caliper or thickness of the scion should match that of the understock.

Commercial grafting is done in winter and summer, the former being the most common. Aside from requiring a heated greenhouse, winter grafting permits handling dormant scions and semi-dormant understocks. This materially reduces the risks involved in summer grafting.

In winter grafting most understocks are brought into a cool greenhouse sufficiently in advance of the actual grafting to permit initiation of new roots but not top growth. The scionwood is collected as close as possible to the actual time of grafting. It is necessary to collect scionwood before damage from harsh winter weather. They should not be cut when frozen.

Grafting is generally accomplished under comfortable working conditions at a work bench and with the grafter seated. This promotes a relaxed atmosphere which, in turn, permits a greater number of good grafts to be made. It also permits the grafters to steady their hands, if necessary, by resting elbows or forearms on the bench while cutting into the understock. Techniques vary considerably with different grafters. It is extremely important to make clean straight cuts, both on the understock and on the scion.

Two commonly used methods in pot grafting are the side and the veneer grafts. The understock is usually cut first, then the scion. This permits the grafter to keep the scion in hand after making the cut, thus preventing contamination that could occur if it were laid down on the bench. With the side graft a cut about $1\frac{1}{4}$ in. long is made from top to bottom on a straight portion of the understock, and as close to the soil as possible. The cut is shallow but through the bark and cambium and slightly into the wood. At the bottom of the first cut a second cut is made downward and inward about $\frac{3}{16}$ to $\frac{1}{4}$ in. and through the veneer or flap made by it. This will leave a short projection or lip of bark and wood at the base of the cut on the understock to which the scion is fitted.

The scion is prepared by trimming off the foliage and branchlets on the lower quarter or third of the stem. A cut from top to bottom is made on the straightest side deep enough to expose the wood. The cut should be straight and level. A second cut is made across the base from top to bottom and slanting downward at the same angle as the cut lip on the understock. Lengthwise, the finished cut on the scion should match that on the understock. The scion is then fitted carefully to the understock being sure the respective cambium layers are in contact. If the scion thickness does not perfectly match that of the understock then the cambium layers of the two should be aligned along at least one edge. The two are then

tied making sure full and complete surface to surface contact occurs with no space between scion and stock. Rubber budding strips are the preferred wrapping material, but they must be removed prior to planting the finished graft in a bed or container.

The veneer graft is similar to the side graft; however, the second cut into the understock is not made, thus leaving a long lip or veneer. The scion receives three cuts instead of two, the first about 2 in. long on the straightest side, the second not quite as deep on the opposite side, and the third a short slanting cut across the bottom of the scion. The scion is then fitted to the understock with the slightly longer side of the scion fitted to the inner side of the understock. The veneer is then snugly fitted up and over the exposed outside cut of the scion and tied.

The grafts are then placed in a greenhouse bench with the pots plunged in moistened medium to a depth sufficient to cover the graft union. The medium may be sand, peat moss, perlite, or any combination. The purpose of burying the union is to keep the cut portions of stock and scion from drying out until callusing takes place. This time period will vary depending on the plant grafted and also the medium and ambient air temperatures. Initial medium temperatures should be kept in the range of 65° to 75°F for about 4 to 6 weeks. A heat source under the grafting bench (bottom heat) is highly desirable as it permits attainment of a proper medium temperature while maintaining lower top or ambient air temperature (50° to 60°F). After callusing has progressed to assure a "good take" the medium temperature should be lowered to approximately 55° to 65°F. The tops should be supplied with sufficient moisture to prevent cell collapse. This may be done by syringing, shading the greenhouse lightly, or by covering the grafts with white polyethylene sheeting. Daily lifting of the sheeting is recommended to introduce fresh clean air, thus preventing the buildup of pathogenic organisms.

After callusing is evident along the entire length of the union, the grafts are ready for hardening-off and preparation for subsequent transplanting. They are removed from the medium and carefully inspected for good callusing. Those that have taken well should at this time have the understock pruned back about half way. This serves to prepare the scion to assume its full responsibility as the top portion of the whole plant. It also reduces the total amount of foliage in the bench and serves to harden-off or prepare the callus tissue for transformation into bark. The pots of these good grafts are not plunged in the medium but placed on the surface of the medi-

um for another 4 to 6 weeks, after which time the remaining portion of the understock is removed. In this operation a clean sharp pruning shears is used, making a slanting cut of the understock down and away from the scion. Be careful not to cut the scion. Those grafts that have not callused sufficiently should be plunged again into the medium where they will remain until they do. Those grafts that have not taken and where the scion has deteriorated should be discarded.

SADDLE GRAFTING

LEONARD SAVELLA

Bald Hill Nurseries, Inc.

Victory Highway, R.R. #2, Box 140

Exeter, Rhode Island 02822

I will discuss a type of grafting, called a saddle graft, which is not used as often as some other types, but is valuable in certain situations. In saddle grafting the scionwood should be soft enough so that one can cut into the center of the wood with little effort and without splitting or otherwise damaging it. The scion is held with the base pointing away from the grafter. A 1 in. long cut is made starting about $\frac{1}{4}$ in. from the base and to the center of the scion. The scion is then turned over and an identical cut is made on the other side. The wedge of wood is removed. The rootstock is cut by making 1 in. long cuts on both sides of the top to form a wedge. The scion is placed tightly over the cuts on the rootstock and tied with a rubber band. If the union is to be waxed, grafting twine should first be used to tie the union.

The grafted plant is then placed in a poly chamber or grafting bench and buried with moist peat to above the union. Healing should be complete in 4 to 6 weeks. When the grafts are healed they are taken out of the chamber or bench, potted in growing medium, and set in the greenhouse where they are allowed to continue growing. In potting, the graft union should be left exposed.

Saddle grafting is more time consuming and, as a result, has decreased in popularity to the faster, more productive method of side veneer grafting.

Another technique I would like to discuss is the use of a poly bag chamber over the graft. The rootstock is decapitated at an angle at the desired height. Using the side veneer graft with the lip, the root is cut about $1\frac{1}{4}$ in. down. The scion is then cut on both sides into a wedge. Cutting the scion into a