

wedge shape will not leave a knob on the stem after the graft has healed and the plant has grown for a few years. Be sure the bark at the base of the scion does not separate from the wood. If it separates then make new cuts. Scions with the separated bark will not take. The union is then tied with a rubber grafting strip. It is advisable to leave a space between loops of the tie to allow for the callus to form between rootstock and scion. It is also advisable to keep the rubber strip above the base of the scion as it should not be covered.

After the graft is made and tied a ball of wet sphagnum moss, the size of a lemon, is tied to the rootstock 1 in. below the union. A plastic bag is then inflated and put over the scion and down below the sphagnum moss where it is tied with another rubber strip. This method is useful to the propagator who has limited greenhouse space. The grafted plants can be stood-up in the aisles of the greenhouse or at the ends where they are out of the way. No other care, except for watering, is needed until the grafts have healed.

### **SHIELD BUDDING**

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Shield or "T" budding is the most widely practiced form of detached scion grafting used in commercial propagation because it is easy to perform, fast, and effective. It is used for hybrid roses, fruit trees, and ornamentals such as dogwoods, lilacs, and shade trees.

The knife used for budding is rounded on the end of the blade, which facilitates making the cuts. In contrast a grafting knife is straight to the end and comes to a sharp point. Budding knives may have a folding or stationary blade and usually some form of an attachment to help "lift" the bark if necessary after the cuts are made. This attachment can be a thin piece of bone attached to the handle or an extra "bump" on the top of the blade. Whatever knife is chosen, it should be of good quality, light-weight and "feel good" in the hand of the user. A budding knife should be kept razor sharp at all times. A budder must take the time to learn how to sharpen his knife properly. This will help to insure good clean cuts that heal properly.

Budding is done in the field at the height of the growing season, usually during July or August. However, "T" budding can be done any time the bark is "slipping". At this time the bark will lift easily and be sappy or wet underneath.

Understocks used must be compatible with the scions to be budded. Understocks are started in the field from cuttings or seedlings 1 to 2 years before budding takes place. Pencil-sized ( $\frac{1}{4}$  in.) shoots are ideal for budding, although those up to 1-in. in diameter can be used. Only healthy, vigorous understocks should be selected. Two types of scions are used for budding, fresh and stored. Fresh scions or budwood are cut from mature current season's growth in July or August, just prior to their use. Leaves are removed, sometimes with the petiole remaining. Scions must be kept cool and moist to prevent drying out. They are most often wrapped in moist newspaper or burlap and placed in poly bags. Stored scions are cut in the fall from 1-year old mature growth. Leaves are completely stripped. They are then wrapped and placed in cold storage at 30° to 32°F until needed for budding, which can begin as early as May or June.

The vertical cut on the understock is made close to the ground and approximately 1 in. in length. The perpendicular or cross cut is made approximately  $\frac{1}{2}$  in. long and at the top of the vertical cut. Care must be taken to not cut too deeply especially with the cross cut.

To remove the bud the cut on the scion starts  $\frac{1}{2}$  in. below and cutting upward in one even stroke to  $\frac{1}{2}$  in. above. The bud can then be removed by a quick sharp cut or by pulling it off with a long "tail" of bark.

"Wooding" of the bud, that is removing the thin piece of wood from behind the bark, is sometimes performed before it is placed on the understock. Wooding of the buds will often help bud stands, particularly if the stock bark is not slipping well. Some budders insist on wooding; others say it makes no difference.

The bud is inserted under the bark of the understock by slipping it between the edges of the vertical cut, starting at the top and gently pushing the bud down. If the petiole is left attached to the scion, it can be used as a handle to push it into place. The bud can also be placed on the tip of the knife and pushed into the understock with the thumb. The tail or top of the bud shield is cut off flush at the top of the "T" cut. This ensures a snug fit and good cambial contact between the bud and understock.

Bud grafting is completed by tying or wrapping the inserted bud to hold the two components firmly together until heal-

ing is complete — about 2 to 3 weeks. Rubber strips, tape, raffia, budding patches, or Parafilm can be used. With rubber strips, the tie is started below the bud and is secured by overlapping so no open spaces are showing around the cuts. The bud itself is not covered, with the tie being completed above the top of the perpendicular cut.

In conclusion, these main points should always be kept in mind when “T” or shield budding:

1. Make smooth clean cuts by using a sharp knife.
2. Strive for good cambium contact between bud and understock.
3. Exclude air from around the bud by using a snug, overlapping tie.

### **Thursday Morning, December 8, 1983**

The Thursday morning session convened at 8:00 a.m. with Leonard Savella serving as moderator.

## **GIRDLING ROOTS, FACT OR FICTION**

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It has long been recognized that pot-bound plants are slow to establish after being transplanted. Unless their roots are disrupted from their circular habit of growth, the roots branch poorly and the plants often die from drought, despite being surrounded by moist soil. Close examination of pot-bound or near pot-bound plants that have been lifted, after having been in the ground for several months to several years, often reveals only a few roots originating from the bottom or from the top edge of the root balls. Generally, problems with transplanted container-grown plants occur within the first growing season. However, based on observations made in the Baltimore and Washington area over the past 5 years, it is becoming apparent that there could be long term problems with trees that originated in containers.

Approximately 10 to 20% of Norway maples (*Acer platanoides*) die as they approach 8 to 10 in. (20 to 25 cm) caliper from self-inflicted girdling roots. What causes these girdling roots to occur is unclear. However, in recent years there has been an increasing number of other tree species that have died