

Grafting and Budding Procedures

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What is Grafting and Why Is It Practiced?

Cloning, a term that can be used nearly synonymously with grafting provides an exact copy of a desirable woody plant for use in the landscape or orchard. This can be replicated across desirable root stocks to provide the best of all possible combinations for specific climatic and soil conditions with respect to desired production imperatives. Nearly all ornamental and fruit varieties purchased at a nursery will represent a desirable tree variety grafted to a specific and highly vigorous root stock. Other uses can be the practice of bud or scion grafting to mate production and pollination into a single tree, provide for several varieties of a fruit or ornamental features in a single plant, repair damage or girdling of a tree, and improve cold hardiness or resistance to disease and insect problems.

The Language of Grafting: Several terms are used in grafting and should be understood by anyone who is attempting to practice the art of grafting. Rootstock – The root used as the basis for bud or scion grafting. Scion – A developed stem or shoot that will become the top growth when grafted to a suitable rootstock. Cambium - a cylindrical layer of cells in plant roots and stems that produces new tissue responsible for increased girth, sap-conducting tissues, xylem, phloem, and bark¹. Callus - plant tissue that forms at the site of a wound, or that develops during tissue culture or grafting of plant parts, giving rise to new plantlets or top growth¹.

Sap - a watery liquid containing mineral salts, sugars, and other nutrients that circulates through the conductive tissues (xylem and phloem) of a plant¹. Topworking - Topworking is the name given to the technique of converting old fruit trees to different varieties through budding or grafting. This is sometimes necessary if the existing topgrowth has been damaged extensively or requires rejuvenation². Bridge Grafting - A bridge graft is used to supply nutrients to the rootstock of a woody perennial when the bark, and therefore the conductive phloem tissues, has been removed from all or part of the central stem of the tree or shrub².

Tools and Materials: These will be varied, depending on the type of grafting required, the basics are: Budding & Grafting Knives – Knives designed to make very clean cuts for matching buds and/or scions to rootstock³. Small bypass pruning shears – Used to make initial cuts required to match the diameter of scion to root stock. Grafting/Budding Strips – Materials used to tie and cover the graft union once it is completed. Rubber bands, manufactured strips, electrician tape, sealing compounds, and grafting wax are all suitable for securing and protecting the graft. If sealing tapes are used properly waxing will not be necessary³. Dormant scions and rootstock – Desired scions must be provided along with a compatible rootstock³.

Scion/Rootstock Grafting Procedure: Figure 1. Provides a graphic illustration of the process used for grafting desirable scions to a vigorous rootstock. This type of graft provides simplicity and a high expectation of success. It is critical to that xylem and cambium sections match up with each to ensure success. Finally, the importance of securing the graft union, sealing against air and moisture, while providing stability for the supportive callus development cannot be stressed enough.

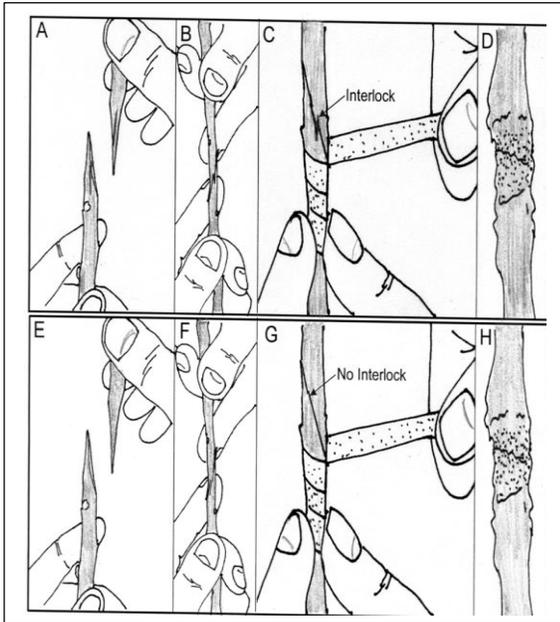


Fig. 1 Whip and tongue (A–D) and splice (E–H) methods of grafting. The whip and tongue method ensures the interlocking of stock and scion to facilitate a better graft union⁴.

Bud Grafting: Bud grafting, or “budding” is another method used to combine one plant with another. It is especially useful when top working grafts into an older tree. Several grafts can be fixed into the upper branches with a minimum of disruption for the rest of the tree. Instead of a shoot or slender branch, a single bud is used as the scion. A single bud, or several, can be removed from the donor plant and attached to one or more places in the recipient plant. Figure 2, illustrates a viable bud that has been removed from a donor plant.



(Fig. 2.)⁵ In bud grafting the individual vegetative buds on the stem can be excised as shown here and grafted into another tree as a scion,

Bridge Grafting: Essentially, bark from elsewhere on the tree is used to bridge a gap in the cambium due to girdling of the bark around the circumference of the tree. Girdling prevents phloem from carrying photosynthetic products and being transported to the roots for storage and other activities. Girdling will result in the death of a tree if it is not properly addressed.

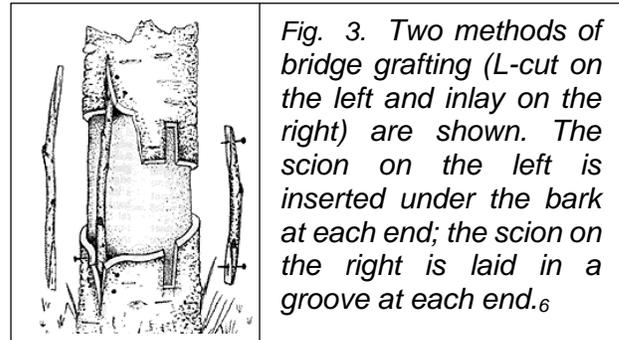


Fig. 3. Two methods of bridge grafting (L-cut on the left and inlay on the right) are shown. The scion on the left is inserted under the bark at each end; the scion on the right is laid in a groove at each end.⁶

Bridge Grafting is Both Science and Art: As in any grafting exercise the phloem wood must be properly lined up with active phloem in the damaged tree. Wait until the tree is breaking dormancy and use one of the two methods above. Clean the wound and trim all edges carefully. Galvanized nails are used to attach the bridging bark. Do not crush the bark with the hammer. Dress the treated area with grafting wax or sealing compound to prevent moisture loss and drying of the repaired area.

Summary: Before attempting any grafting exercise ensure that a feasible plan is in place. Have all tools and materials on hand before beginning. Ensure that all tools are clean, sharp and in good repair. Wrap or tape the graft carefully, and if it is not completely closed coat the entire area with grafting wax. When top working, be especially careful prune out all conflicting branches securing the graft against wind and weather. Do not be afraid to ask for assistance from knowledgeable sources!

1. Encarta English (North America) Dictionary
2. Wikipedia, Free encyclopedia
3. Kumar, G.N.M.; 2011, Propagation of Plants by Grafting and Budding; Pp. 6-7, Pacific NW Extension Publication.
4. Ibid: P. 8.
5. Ibid: P. 1.
6. Hertz, Leonard B.; 2002, Grafting and Budding Fruit Trees; p. 8. On Line Publication.