UNIVERSITY OF FLORIDA
EXTENSION
Institute of Food and Agricultural Sciences

HS 884

Your Florida Dooryard Citrus Guide - Introduction[1]

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Citrus in Florida

Our citrus industry developed from 16th-century Spanish introductions of sour orange, sweet orange, lemon, lime, and citron from either seeds or seedlings (plants grown from seed). Many wild citrus groves [3] originated from these seeds and seedlings.

Citrus was spread further by Indians and by pioneers who settled the hammocks, rivers and lakes of north Florida and the eastern Florida seaboard. These wild plantings were cultivated on a limited scale. It was not until better transportation stimulated demand that growers improved horticultural practices to increase fruit yield.

In the 1830s, citrus trees were first grafted or budded on sour orange rootstock in order to raise citrus for the commercial, fresh market. Budding allowed growers to readily propagate and increase their better-producing trees while encouraging interest in additional rootstocks. Budding soon became the accepted practice in citrus nurseries, eventually eliminating seedling trees.

Seedling Trees and Budded Trees

Citrus is unusual in that most citrus cultivars can produce seed, trees, and fruit with the same genetic composition as the parent plant. **(Note: some hybrid cultivars like Robinson and Fallglow tangerines or mandarins and Ambersweet orange may be exceptions to this rule so avoid these cultivars if you plan to grow a seedling tree. Chances are they won't produce the same fruit as the parent tree.)**

Even though you can grow citrus from seeds, budding works best for most citrus enthusiasts. Here's how it works.

Budding

You've probably heard of surgery involving skin or organ transplants where living tissue is transplanted or grafted from one part of a person to another part, or from one compatible individual to another. A successful transplant union then results in growth of replacement tissue. The same procedure has been done with plants for years.

Budding is one type of grafting that involves removing a small, rectangular or oval patch of bark, including a bud, from the donor plant (the scion).

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That patch with its bud is then carefully inserted beneath the bark of the recipient plant (the rootstock). The intention is that the bud will unite with the rootstock and grow there.

The type of budding most commonly used by citrus nurseries in Florida is called the inverted T-bud (Figure 1, Figure 2, Figure 3, Figure 4, Figure 5, Figure 6). T-budding is best done when the rootstock bark is "slipping" (loose) because the plant is actively growing, producing new leaves and shoots.

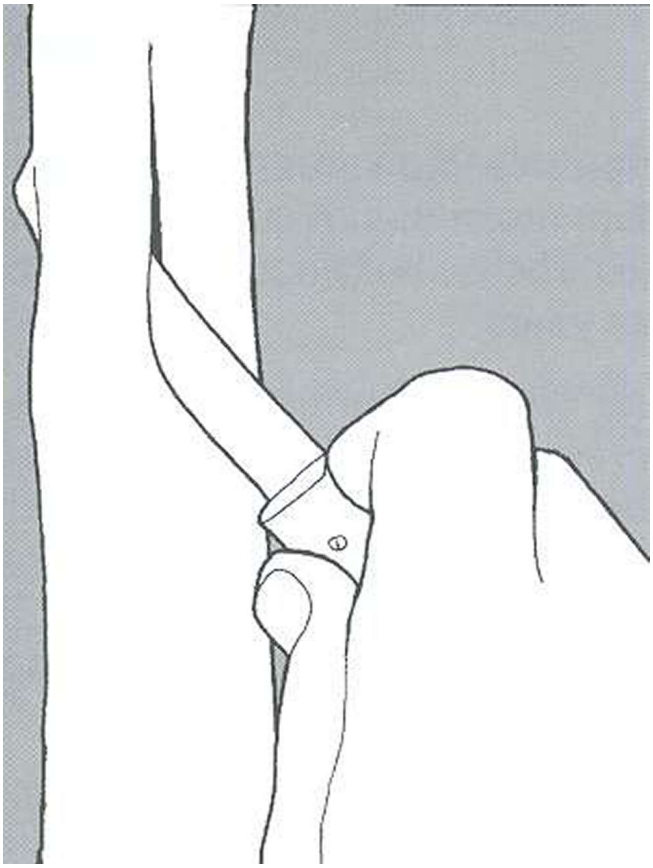

Figure 1. Using a very sharp knife, make a vertical cut in a smooth area of the rootstock 6 to 8 inches above the soil level, make the cut 1 1/2 inches long, and deep enough to cut through to the wood beneath the bark.

Exposing the rootstocks leaves to direct light will maximize bud growth. Six to eight weeks later, when the bud has grown, remove the rootstock stem with a sloping cut about 1/2 inch above the bud union. As the bud grows, stake and tie the bud at regular intervals to prevent breakage. Remove all other buds from the rootstock as they appear.

The purpose of budding is to incorporate the most desirable characteristics of the scion plant and

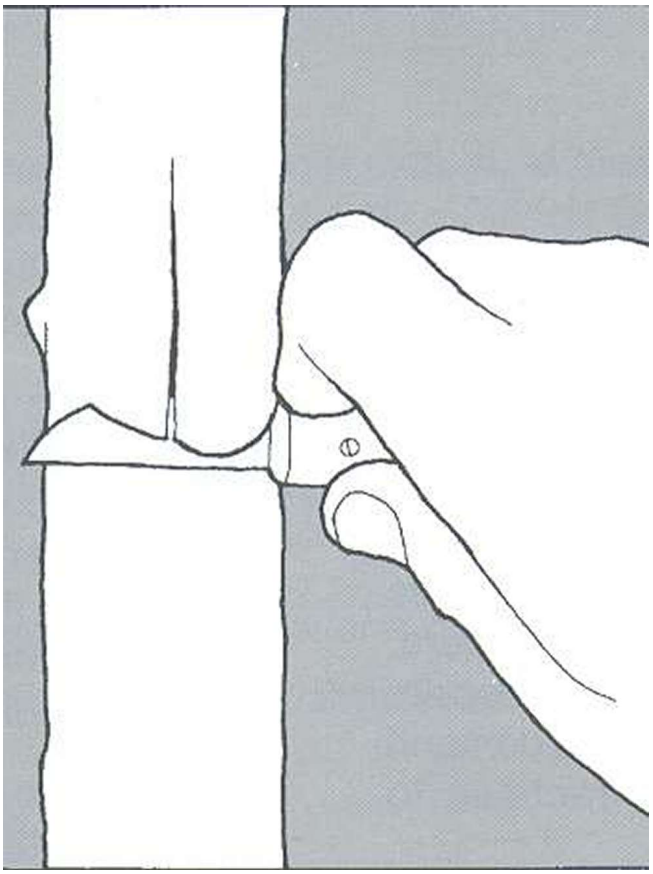

Figure 2. To complete the inverted T, make a horizontal cut 1/2 inch long through the bark at the bottom of your vertical cut.

the rootstock plant into a single tree. These characteristics include tolerance to unfavorable soils, pests, diseases, cold, and greater yields of high quality fruit for juice or fresh fruit. Budded trees also bear fruit earlier than seedling trees.

For example, if you plant the seed from an especially tasty orange and nurture that tree for better or worse, you may have to wait 8 to 15 years for that seedling tree to bear fruit. Your seedling tree may grow straight up without much branching and may be very thorny. (Even budded Meyer lemon, Bearss lemon, and grapefruit trees can be thorny too.) In most cases, your seedling tree will produce fruit similar to that of the parent plant. Even then, fruit quality from the seedling tree may not be as good as that from the parent tree for several years after fruit is first produced. And you'll never get the added, beneficial effects from a carefully chosen rootstock.

Bottom line: unless you're adventuresome, totally patient and have a bright green thumb, buy a

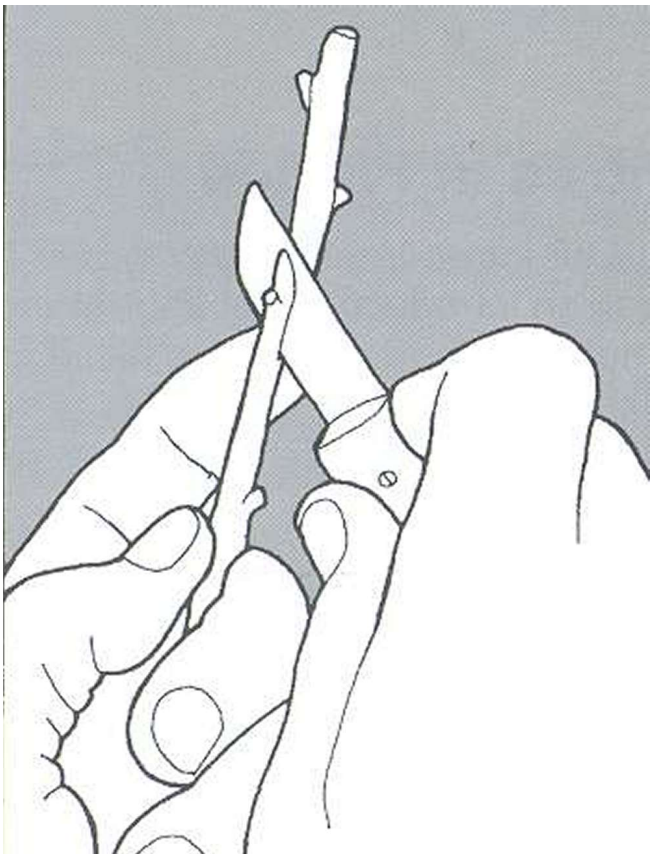

Figure 3. Holding the budstick away from you (with buds pointing up), remove a bud by cutting 1/2 inch above the bud and 1/4 inch below it. Holding your knife at a right angle, cut out your bud.

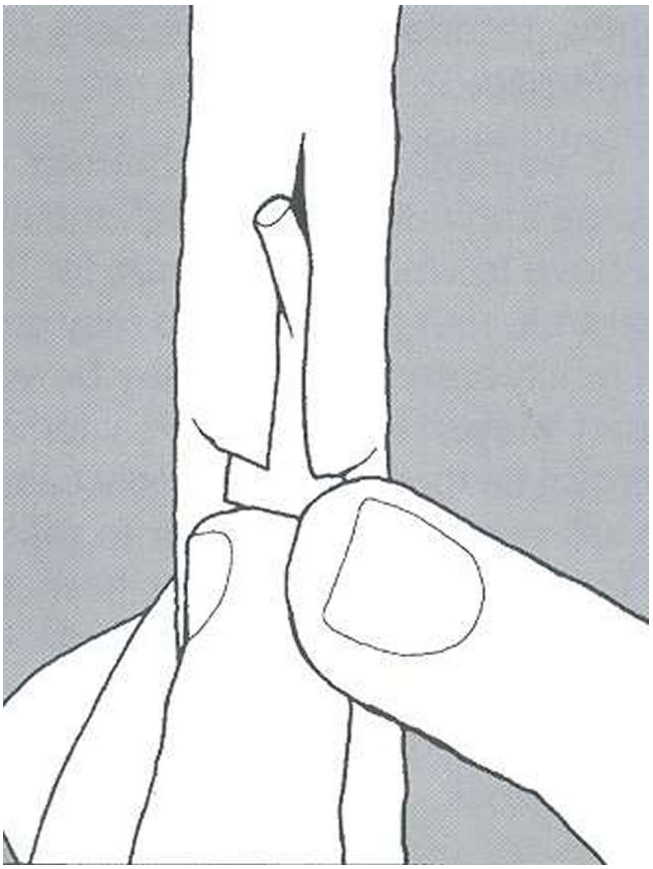

Figure 4. Insert the bud into your vertical cut until the bottom of it is even with the bottom of your T.

budded tree with an identifiable scion/rootstock label (e.g., Hamlin orange/ Swingle citrumelo) from a reputable nursery in your area.

Citrus Seed

If you insist on growing your own tree from seed, plant seed from a Mexican or Key lime (small, round fruit), which should bear fruit within two to three years, or an Orlando tangelo or Dancy tangerine, which will bear fruit within four to six years. Seedlings of these cultivars grow vigorously and bear fruit earlier than less vigorous cultivars.

If you want to go the whole route, planting seed from a rootstock cultivar (See Appendix B, Rootstock Characteristics) and then budding that rootstock seedling with buds from the desired scion cultivar, read on.

Unless you purchase your citrus rootstock seed from a citrus nursery, you should extract your seeds from mature fruit harvested directly from a known rootstock cultivar. Avoid fruit that has fallen on the ground because it may be infected with soil-borne fungi that can rot the seeds and kill young seedlings. After extracting seeds, rinse them thoroughly in water and plant them as soon as possible. If you cannot plant these extracted seeds immediately after rinsing, spread them evenly on absorbent paper, away from direct sunlight for drying. After the seeds have dried, store them in marked polyethylene bags at 40°-45° F in the vegetable drawer of your refrigerator.

When planting, place seeds 1/4 to 1/2 inch deep in pots or flats containing a well-drained potting medium or soil and be sure the seeds get enough sunlight, warm soil temperatures, and moisture. Under ideal conditions, seeds will take about two weeks to germinate. Removing the outer layer of the seed (the seedcoat) prior to planting reduces germination time.

When the plants are about 4 inches tall, repot them into larger containers or plant them in the

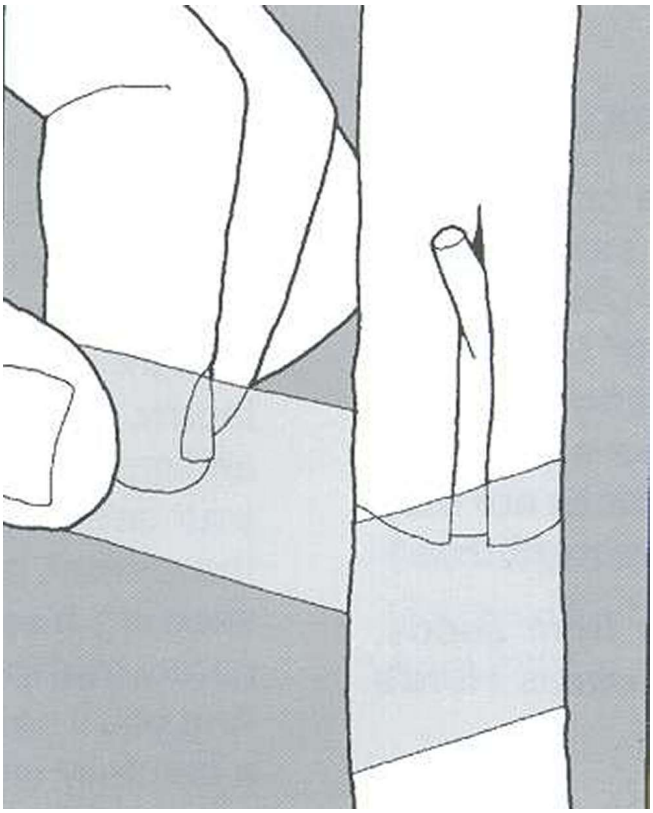

Figure 5. Wrap 1/2 inch polyethylene tape, firmly but not too tightly, securing the end of the tape with the last turn of the wrap.

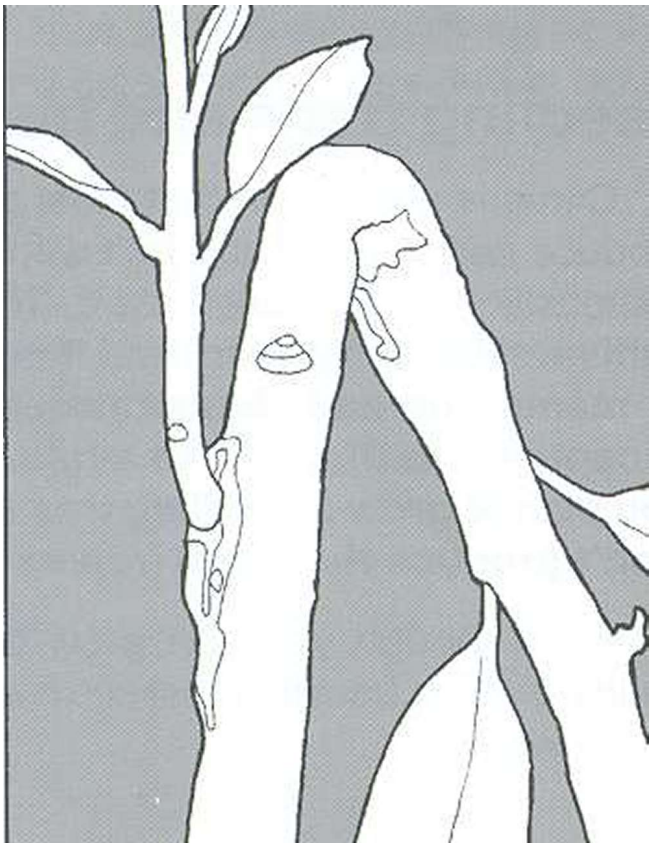

Figure 6. Remove the wrap 2 to 3 weeks later when union should have occurred. Force bud growth by bending the rootstock stem above the bud union and tie it down.

ground in your "field nursery." Train the repotted seedlings to a single stem - with no branches - within 6 to 8 inches of the soil. You can bud these rootstock seedlings when their stems are 1/4 to 3/8 inch in diameter, about the diameter of a pencil.

Follow the budding procedure in Figures 1-6. As the bud you grafted continues to grow, tie it to a metal or a treated bamboo stake to prevent breakage. Continue to remove all other buds and unwanted sprouts from the rootstock to encourage growth of the main shoot.

Budwood Selection: Choose budwood from vigorous, disease-free trees of the desired cultivar for your locale, using Appendix A as a reference.

Since citrus trees usually flush or grow new leaves and twigs three to four times per year (spring, summer, and fall), collect budwood from the next-to-last growth flush or from the current growth flush after it has begun to harden. Choose round budwood, not angular, with longitudinal gray lines on the green bark (Figure 7, 8). For a good fit, choose budwood that has about the same diameter as the rootstock stem. After budwood is cut, remove unneeded wood and leaves (Figure 7, 8, 9) and trim the remaining budwood to 8-to-10 inch lengths. When leaves are removed, be careful to leave a section of the leaf petiole or stem, about 1/8 inch long, to protect the bud. Use the trimmed budstick immediately or store the labeled, trimmed budsticks, if necessary, in a polyethylene bag at 40°-45°F for no longer than 2 to 3 months.

Air Layering: After a branch or stem has been girdled (its bark cut away in a ring) and that ring enclosed in a moist rooting medium at the cut, roots will form on a branch. This is called air layering or marcottage. In Florida, lychees and Persian or Tahiti limes are propagated commercially by air layering. Tahiti limes propagated in this way generally fruit earlier than grafted trees, primarily because air layering is done with twigs or branches about 1/2 to 1 inch in diameter. Such plants are larger than grafted trees and produce fruit earlier. The trade-off here is that they tend to be less long-lived than budded trees.

Figure 7. Comparison of budwood stages: Current (fall) flush.

Figure 8. Comparison of budwood stages: Previous (summer) flush.

Air layers are usually made in the spring on wood of the previous seasons growth or in late summer with partially hardened shoots. Wood older than one year can be used but rooting is less satisfactory, and the larger plants produced are more difficult to handle after rooting.

The first step in air layering is to girdle (cut) the bark of the stem at 6 to 12 inches or more from the tip end of the wood from the previous seasons growth. You may also girdle the stem in late summer when shoots are partially hardened.

Figure 9. Comparison of budwood stages: Oldest (spring) flush.

Then, remove a strip of bark about 1/2 to 1 inch wide and scrape the exposed wood surface slightly (Figure 10). Apply indolebutyric acid (sold as a rooting hormone in garden stores) to the cut surface. Then wrap about two handfuls of slightly moistened sphagnum moss around the stem, enclosing the cut surfaces (Figure 11). Wrap the moss and stem with a piece of polyor aluminum foil so the sphagnum moss is completely covered. Twist the ends of the wrap and secure the entire wrapping with waterproof tape (Figure 12).

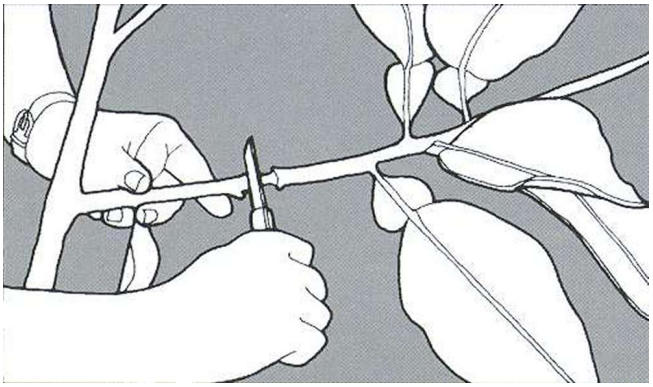

Figure 10. Remove a strip of bark 1/2 to 1 inch wide and scrape the exposed surface slightly. Apply indolebutyric acid to the cut surface.

Within 2 to 3 months roots should grow from within the wrap. When they do, carefully remove the rooted branch from the tree. Then prune the top back to a reasonable size and pot the new plant with frequent, light watering to aid growth while avoiding moisture stress.

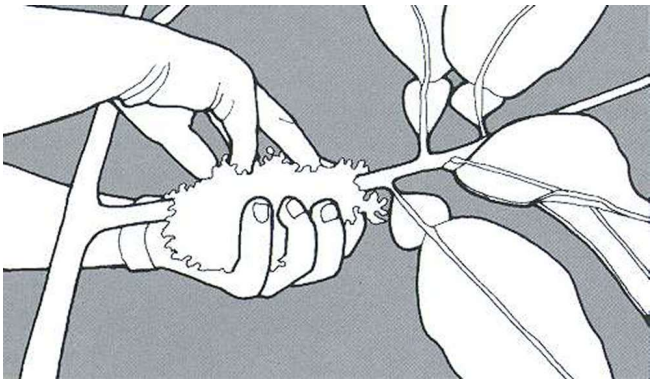

Figure 11. Wrap about two handfuls of slightly moistened sphagnum moss around the stem, enclosing the cut surface.

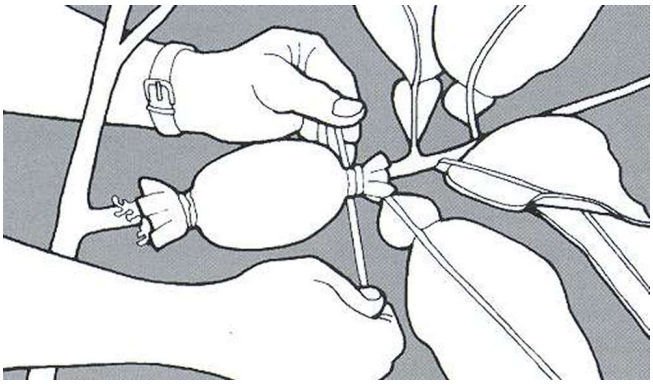

Figure 12. Wrap the moss and stem with a piece of polyethylene or aluminum foil so the moss is completely covered. Twist ends of the wrap and secure the entire wrapping with waterproof tape.

Rooted Cuttings

Rooted stem cuttings, propagated under mist systems, have also been used for cultivars like Orlando tangelo. These cuttings have performed as well as budded trees and are preferred over seedling trees.

Additional Notes:

3. Grove originally referred to a group of randomly planted citrus trees, while orchard referred to a planting of specific citrus cultivars with uniform spacing between trees and between rows of trees. Today all commercial citrus trees are planted at uniform spacing but are still commonly called groves in Florida.