

1982

## EC82-1239 Inlay Bark Grafting : Grafting Technique for Large Trees

William A. Gustafson

*University of Nebraska-Lincoln*, [wgustafson1@unl.edu](mailto:wgustafson1@unl.edu)

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# INLAY BARK GRAFTING: Grafting Technique for Large Trees

William A. Gustafson, Jr.  
Extension Horticulturist



Introduction

The inlay bark grafting technique often is used to change an obsolete tree to a superior cultivar (variety) or to adapt a cultivar to an already existing seedling tree. For example, an established large seedling black walnut tree could be improved by grafting it with a cultivar such as the 'Thomas' black walnut.

Grafting is the technique which joins a stem from a desired tree to a branch or root of a less desirable tree of the same species. The grafted union unites the two (scion and stock) and growth continues.

Inlay grafting (a type of bark grafting) is one of the best techniques for grafting large nut and hardwood trees. It is considered superior to other types of bark grafts because of the union's superior strength. This

minimizes loss to wind, an important factor to consider in Nebraska. This technique requires no special equipment and can be performed on trunks or branches ranging from 1 inch (2.54 cm) up to 3 1/2 inches (8.88 cm) or more in diameter.

The inlay grafting technique depends on the bark separating (slips freely) from the wood, and can be done only after active growth has started in the spring. It is necessary to gather the scions from the species to be grafted during the winter and hold under refrigeration until grafting in the spring.

Stock should not be over 3 1/2 inches (8.88 cm) in diameter and scions should be 3/8 to 1/2 inches (.95 to 1.3 cm) in diameter. The scion is the stem collected from the desired cultivar which will become the upper portion of the tree (Figure 1). The stock is the root and trunk portion of the tree upon which the scion is grafted (Figure 1). A stock, sometimes called the rootstock, may be a young seedling tree or a large tree.

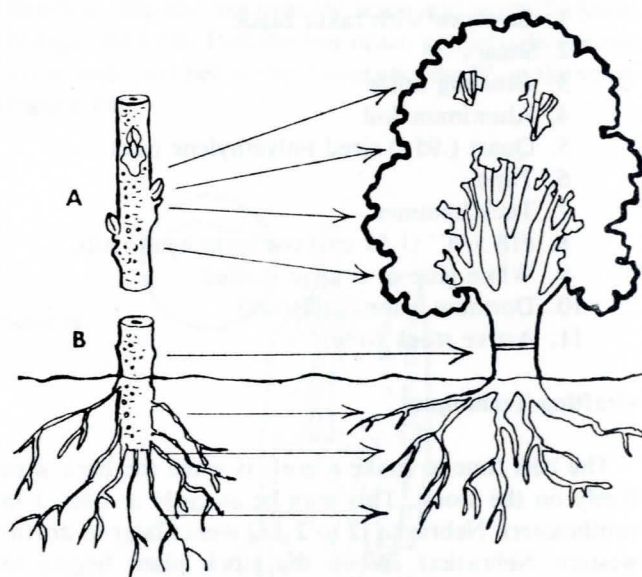


Figure 1. A. Scion - The twig or bud which will become the upper portion of the plant. B. Stock - The root or rooted part of the plant upon which the scion is grafted. A stock may be a young seedling plant or a large tree.





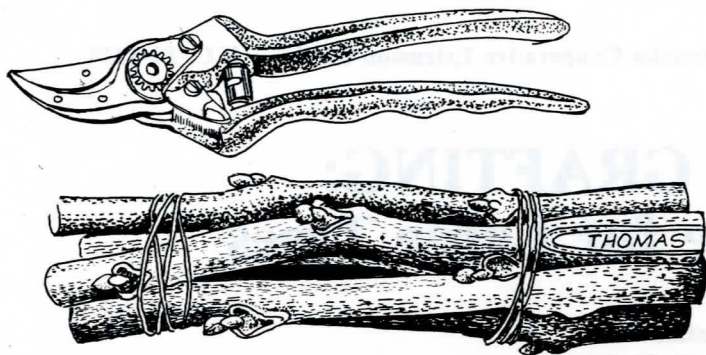


Figure 2. Optimum budwood diameter is 3/8 to 3/4 inch (1.5 to 1.9 cm); 1-inch (2.54 cm) diameter is maximum. Select 1-year wood that is round and mature. Avoid wood with green tender bark and flat sides.

### Collecting and Storing Propagation Wood

Collect scion wood from the desirable tree in late winter (February) during dormancy and store until spring. Optimum scion wood diameter is 3/8 to 3/4 inch (.95 to 1.9 cm); 1 inch (2.54 cm) diameter is a maximum (Figure 2). Select healthy one-year-old wood with prominent and well developed vegetative buds (not flower buds). Label all propagation wood with its cultivar name, and place it in a container provided with a moist material such as sphagnum moss, damp paper, etc. Polyethylene bags make excellent storage containers. Store scion wood in the refrigerator within a temperature range of 30° to 38° (-1 to 3° C) until ready to use.

### Procedure

#### Equipment needed:

1. Bow saw with raker blade
2. Shears
3. Grafting knife
4. Aluminum foil
5. Quart (.95 l) sized polyethylene bags
6. Tape
7. Tack hammer
8. #18 5/8" (1.57 cm) common head nails
9. White glue or orange shellac
10. Dormant scions (cultivar)
11. Active stock (tree)

### Grafting Technique<sup>1/</sup>

The best time to make a graft is when the bark slips freely on the stock. This may be as early as May 1 in southeastern Nebraska (2 to 2 1/2 weeks later in northwestern Nebraska). When the stock plant begins to break dormancy in the spring, and the leaves are the size of a squirrel's ear (1/2 to 3/4 inch, 1/3 to 1.9 cm) take the scion wood from cold storage and use it immediately while the bark is tight and the scion wood is dormant.

Following are the step-by-step procedures involved in making the inlay bark graft.

1. Use tree trunks or side branches 1 1/2 to 3 1/2 inches (3.8 to 8.88 cm) in diameter. Leave one or two side branches below the cut on the stock to keep the tree vigorous, to protect from sunscald and to keep graft (scion) from overgrowing (Figure 3).

Cut straight across (90° angle) trunk or branch with a sharp saw (bow saw is excellent) at a point above section where the trunk or branch is to be grafted and at a point on the trunk or branch which is straight. The recommended procedure to remove a large branch in two steps involving three cuts is shown in Figure 3. Make a cut 7 or 8 feet (2.1 to 2.4 m) above ground if cattle or horses are grazing in and around the tree(s).

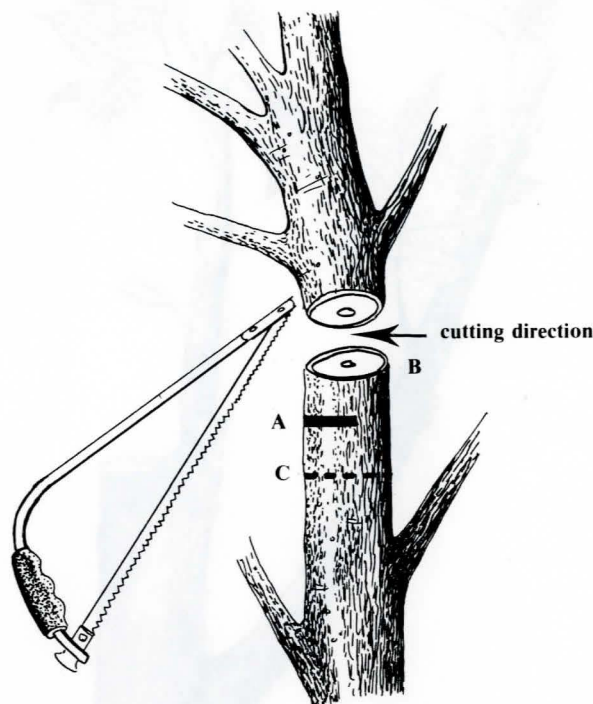
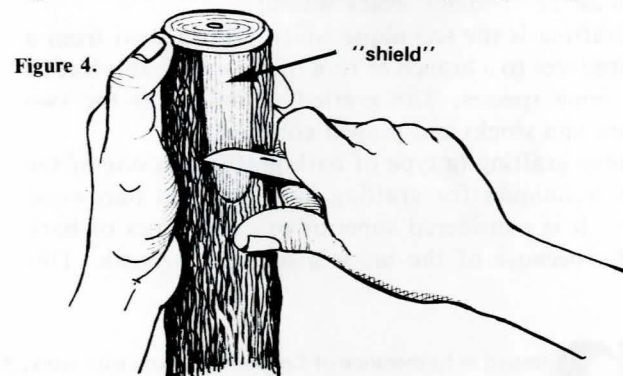


Figure 3. To remove large branch: first cut at point "A" halfway through the branch, second cut at point "B" completely through the branch. Make final cut at point "C" where grafting will be performed.

2. Select a section of stock (tree trunk or branch) with a flat smooth surface so that the flat cut surface of the scion will fit securely. Choose a spot on the south or southwestern side so prevailing wind will blow the growing scion into the tree instead of away (Figure 4).



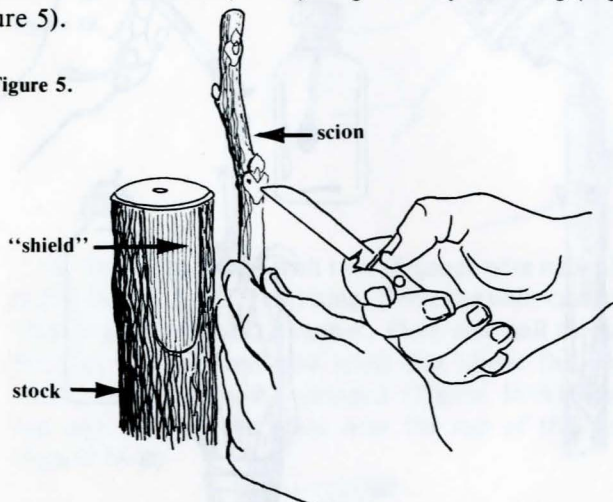
<sup>1/</sup>Some of the artwork and technique is reproduced by permission from the *Pecan Quarterly*.



Cut a clean "shield" by removing a thin layer of the rough outer bark if the tree has thick ruff bark, but leave the bark as thick as possible. This will create a smooth area to lay the scion up against to make cuts (Figure 4).

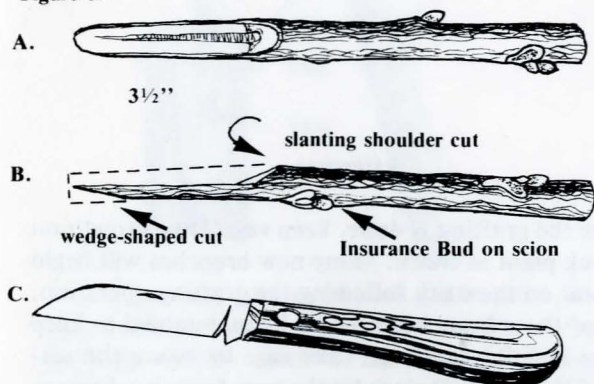
3. Take the scion wood of the desired cultivar from cold storage. Select a scion stick with 2 or 3 strong buds and at least 6 inches (15 cm) long for easy handling (Figure 5).

Figure 5.



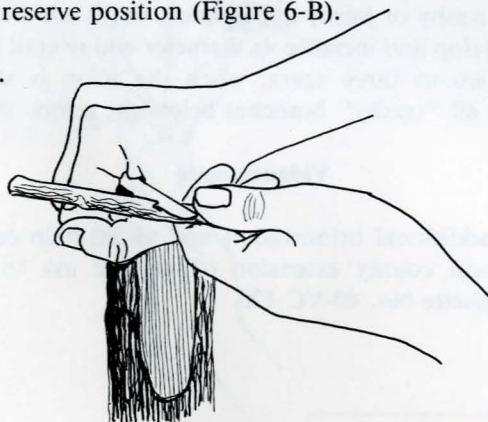
4 & 5. Use a knife with a *sharp*, straight edged grafting blade (Figure 6-C). Hold knife firmly, with a level trajectory and make a smooth, straight cut 2 1/2 to 3 1/2 inches (5.1 to 8.88 cm) long (Figure 6A & 6B).

Figure 6.



Start the cut about 3 inches (7.62 cm) from the bottom of the scion stick on the opposite side and a little below the lowest bud (Figure 7). This "insurance bud" is in a reserve position (Figure 6-B).

Figure 7.



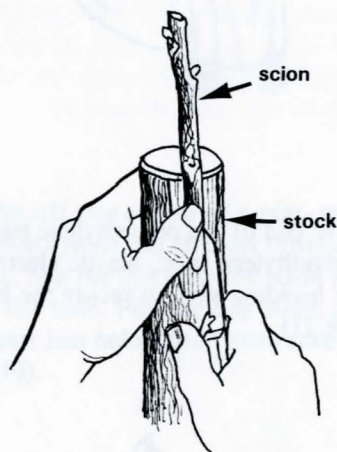
A slanting shoulder 1/4 to 1/2 inch (.95 to 1.3 cm) long will allow the scion to be set in an upright position (Figure 6-B). The shoulder or slanting cut extends about half the distance through the scion stick; the remaining level cut is the same thickness from the edge of the shoulder to the end of the scion stick (Figure 6-B).

Make the entire surface of the cut smooth and level. Avoid a wavy surface. Turn the scion stick over and make a wedge-shaped cut about 1/4 to 1/2 inch (.95 to 1.3 cm) long on the back side of the lower end (Figure 6-B). This makes it easier to insert the graft and provides more uniting surface.

6. Place cut surface of scion stick against shaved shield on stock. Allow 1/4 to 1/2 inch (.95 to 1.3 cm) cut surface shoulder to extend above the stock. Hold the scion firmly upright with left thumb. Begin the cut at the top of the stock on the right side of the scion. Cut through the bark on the stock down to the wood (Figure 8).

Draw the knife blade straight down the right side to within 1/4 to 3/4 inch (.95 to 1.9 cm) of the bottom portion of the scion. Make a cut straight into the bark. Do not angle the cut inward (Figure 8).

Figure 8.



7. Hold the scion firmly in position with the thumb of your right hand. Do not allow scion to move after first side cut is made. Bring the left hand around back of stock. Catch the scion with the first three fingers of the left hand and hold it in position (Figure 9).

Figure 9.



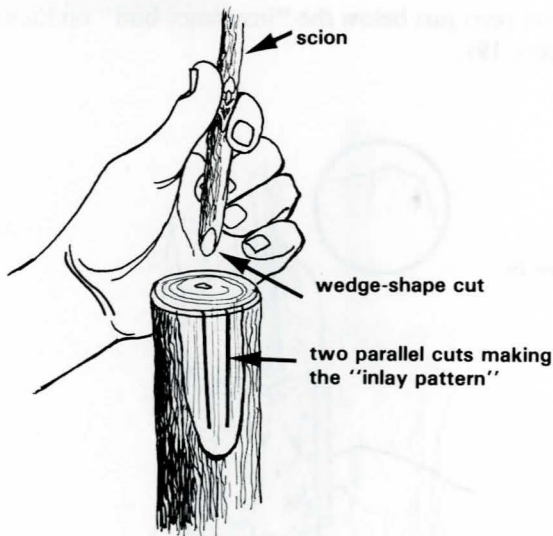
8. Make the cut on the left side of the graft identical to the cut on the right side (Figure 10).

Figure 10.



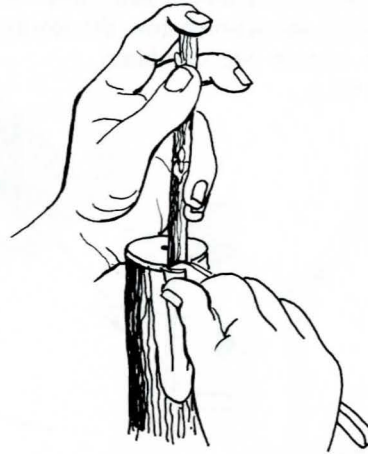
9. Two parallel cuts through bark form an inlay pattern giving the name to the inlay bark grafting technique. This inlay pattern should be exactly the same size as the lower section of the scion (Figure 11).

Figure 11.



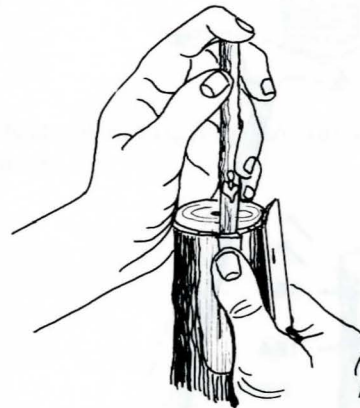
10. Peel back the inlay flap of bark 1/2 to 1-inch deep (1.3 to 2.54 cm) between the two parallel cuts. Start the wedge-shaped cut end of the scion (basal end) into slot with the level cut flat against wood of the stock (Figure 12).

Figure 12.



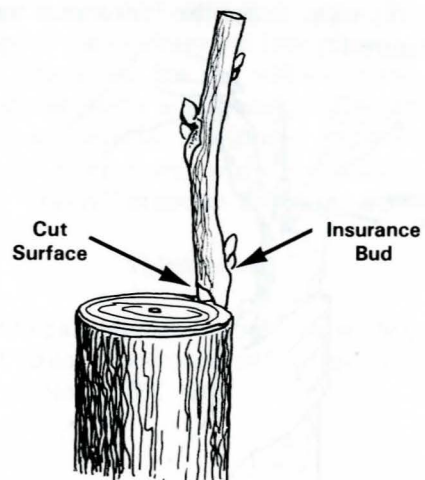
11. Press the flap of bark against the scion with the thumb of the right hand to hold scion firmly in the inlay slot. Apply firm pressure on top of the scion to force it into the inlay slot (Figure 13).

Figure 13.



12. Push the scion into the inlay slot until the 1/4 to 1/2 inch (.95 to 1.3 cm) cut surface of the shoulder is above the top of the stock (Figure 14). The cambium around the bark of cut surface will form a callus roll that will cover the top of the stock and anchor the graft securely to the stock (Figure 14).

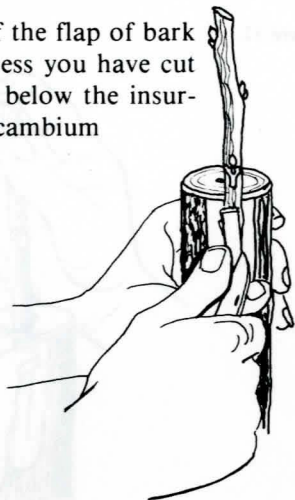
Figure 14.





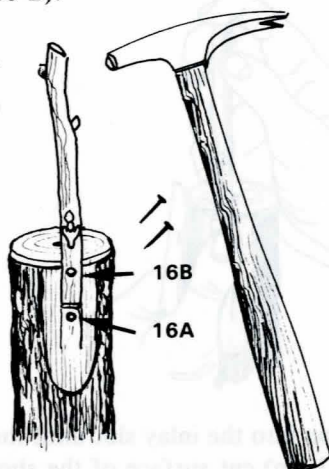
13. Remove about half of the flap of bark with the grafting knife unless you have cut the back side of the scion below the insurance bud to expose the cambium layer (Figure 15.).

Figure 15.



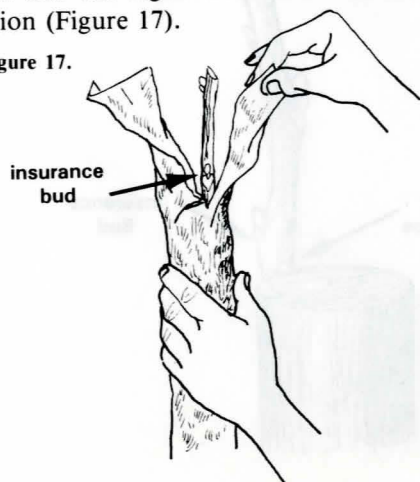
14. Secure the scion with two 18-gauge wire nails, 1/2 to 3/4 inch (1.3 to 1.9 cm) long. Drive the nails carefully with a tack (or small) hammer. Place one nail through the flap of bark and into scion just above the point where wedge-shape cut stopped (Figure 16-A). Place one nail through the scion near the top of the stock (Figure 16-B).

Figure 16.



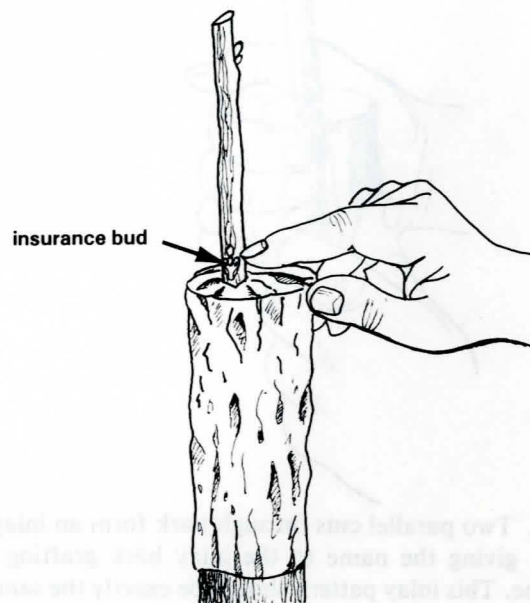
15. Take an 8-, 10- or 12-inch (20.08, 25.4, or 30 cm) square of aluminum foil (regular household); tear or cut a line down to the center of the square. Fold the aluminum foil square around the stock so that the bottom of the tear fits right under the "insurance bud" on the scion (Figure 17).

Figure 17.



16. Fold in each side of the divided end of the surface of aluminum foil. Cover all cut surfaces with the foil, including the overlap shoulder of the scion. Crimp the foil to form a loose mold around the stock (Figure 18).

Figure 18.



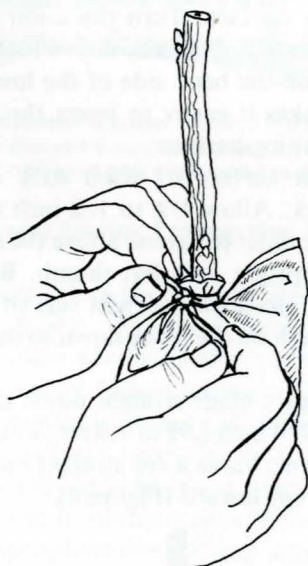
17. Cut off one corner of a pint- or quart-size (.47 to .95 l) polyethylene bag (freezer type) and make a hole at the point. Slip the bag over the scion and work the scion through the hole. Pull the bag down gently until the cut corner rests just below the "insurance bud" on the scion (Figure 19).

Figure 19.



18. Tie the polyethylene bag at the cut corner around the scion and just below the "insurance bud" and above the cut surface of the overlap shoulder. Tie with a rubber band, small rubber budding strip or polyethylene tape, so that the scion will not suffer girdling damage (Figure 20).

Figure 20.



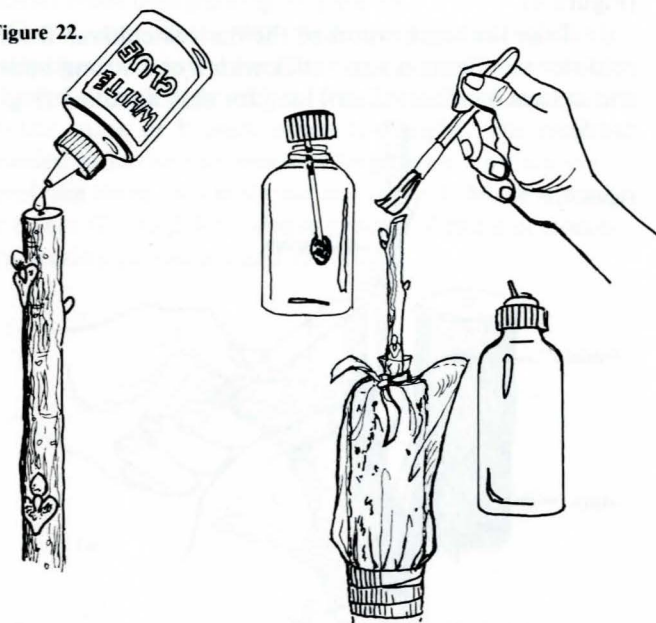
19. Tie the lower end of the polyethylene bag around the stock. Use polyethylene tape, plastic electrical tape or a larger rubber budding strip to secure the lower end of the bag (Figure 21).

Figure 21.



20. Coat the cut surface of the tip end of the scion with a protectant such as white glue, orange shellac or tree healing paint to prevent it from drying out (Figure 22).

Figure 22.



21. Remove all ties, foil, and polyethylene bag after 6 to 10 weeks.

### Aftercare

After the grafting is done, keep vegetative growth on the stock plant in check. Many new branches will begin to appear on the stock following the grafting operation. Some of these branches need to be maintained to keep the tree healthy; however, take care to insure the survival of the scion. Do not let the new branches become dominant or exceed the height of the scion. Remove the growing tips of the stock several times during the growing season. Removing the tips will cause the stock to have a trashy or bushy appearance, but it will help the tree develop and increase its diameter and overall vigor. After two to three years, when the scion is strong, remove all "trashy" branches below the scion.

### Videocassette

For additional information and visual help contact your local county extension office and ask to view videocassette No. 40-VC-120.