

PROPAGATION OF WALNUTS, ALMONDS AND PISTACHIOS IN CALIFORNIA

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Walnut Propagation. Our walnuts are started from seed, using the Northern California black (*Juglans hindsii*) or 'Paradox' hybrid (*J. hindsii* × *J. regia*). The latter is an F₁ hybrid from the black walnut naturally crossing with the English walnut.

In selecting our seed we start with vigorous trees which produce seed which grows into a rootstock which is compatible and will give us a high percentage of bud "take". This takes some time in determining these factors because our walnut production takes two years from the time seed is planted until the tree is dug in the nursery and delivered. So our "roughing out" effort of a good seed source takes some time.

We plant our seed in October, by hand, 1½ inches deep, 6 inches apart. We then cover the seeds with 6 to 8 inches of soil where they lay through the winter and stratify naturally.

The following spring, about March 1, when the seed has cracked and the root is about 4 inches long, we take the soil off the top of the seed with an Illiston cultivator, being careful not to go too deep. This cultivator takes off about 6 inches of soil, mulching the soil above the seed and cultivating the weeds out all at the same time.

Four to 6 weeks later, when the seedlings are 4 to 6 inches tall, we undercut the seedlings 8 to 10 inches deep with a sharp blade mounted on a tractor. This operation requires a cool, cloudy, day and irrigation immediately after to prevent wilting. In doing this undercutting we produce a branched root system rather than a "carrot root." The seedlings grow through the summer and about August 20th we start our fall budding.

We are using a large T-bud rather than the patch bud. The T-bud has given 15% to 20% better stand than the patch bud. We prefer budding over grafting because of the labor costs and it makes a much nicer union and cleaner looking tree.

In the process of budding we like to have the seedlings irrigated 6 days before budding and immediately after budding. We also like to have the budwood trees irrigated 6 days prior to collecting the wood. In collecting the budwood, we use the current summer's growth from the desired cultivar of English walnut, trim the leaves off, and store the wood in a cold box at about 38°F. We don't like the budwood to get more than 4 days old before using.

Figure 1 shows the five steps we use with a large T-bud when budding walnuts:

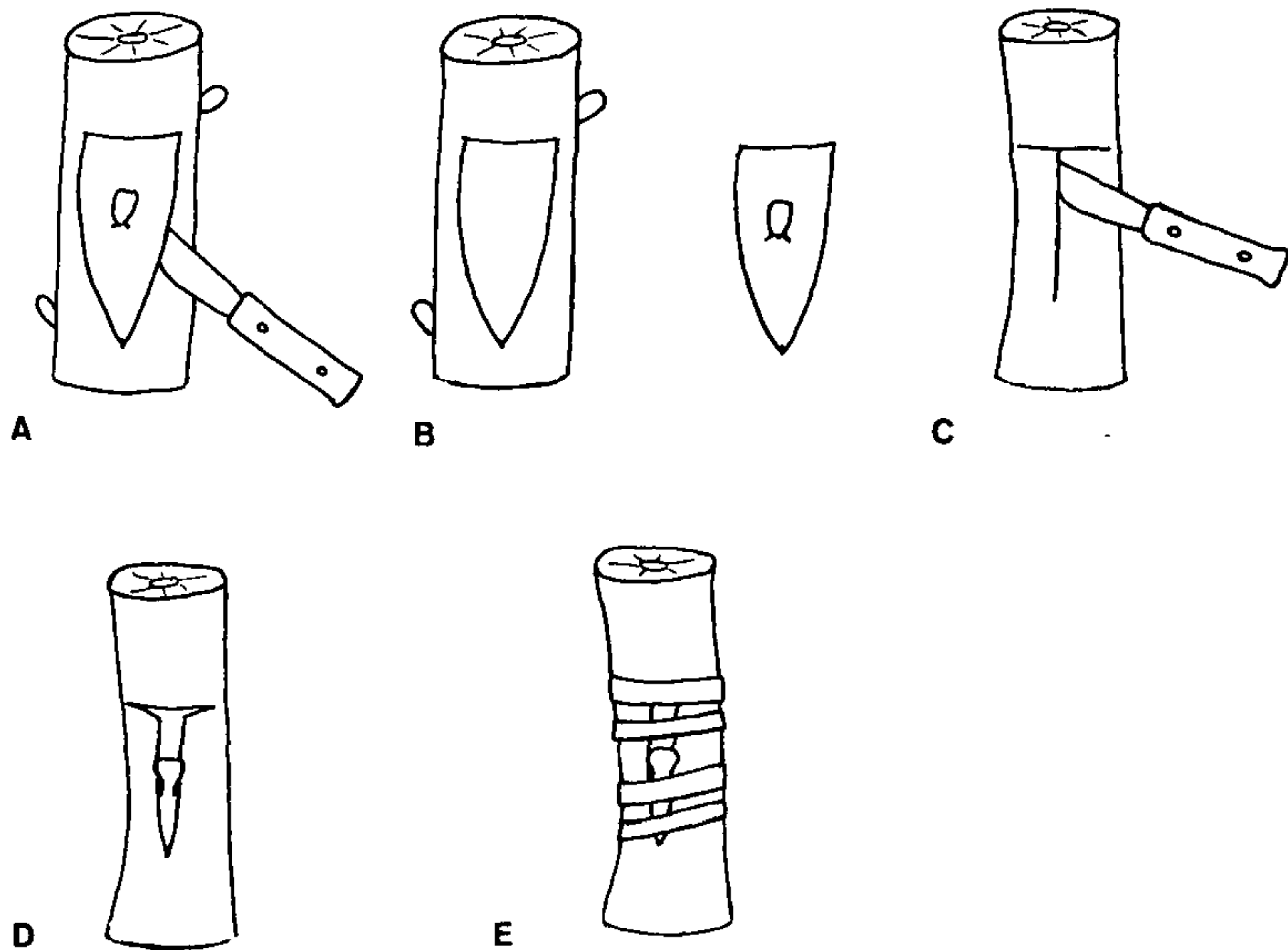


Figure 1. **A.** Make the horizontal cut $\frac{3}{4}$ " above the bud. Make one cut on each side of the bud and bring the cut to a point $1\frac{1}{2}$ " below the bud. **B.** By pushing from one side of the previously cut bud piece with the thumb, snap the bud off, being careful not to lose the "eye" of the bud. **C.** On the rootstock make the usual "T" cut with the budding knife. **D.** Push the shield piece with the bud down into the "T"-cut, making sure the horizontal cut at the top of the bud matches the horizontal cut on the rootstock. **E.** Tie the bud in tightly with an $8 \times \frac{3}{8} \times 0.02$ budding rubber, leaving a small opening at the bottom of the bud for possible sap drainage.

Nothing else is done to the seedling or bud until the following spring. When the bud starts to push about April 1 we cut the seedling back to about 8 inches above the bud. The extra height gives us something to tie the bud to while it is very tender in order to get the maximum amount of straightness started with the new shoot.

When the bud has grown to 8 inches we cut the seedling back to the bud and stake the new shoot for the remainder of the season.

We also graft in the spring for follow-up work and for additional orders we take during the winter months.

When grafting we use the whip graft. We have found one important thing in the past two years of propagation which has proven to be very successful. Because the bark of the scion is thinner

than that of the rootstock we do not match the wood of the two pieces perfectly together. We match the two in such a manner that the cambiums match, but the outside barks do not so, in effect, the scion is a little smaller than that of the rootstock, as shown in Figure 2.

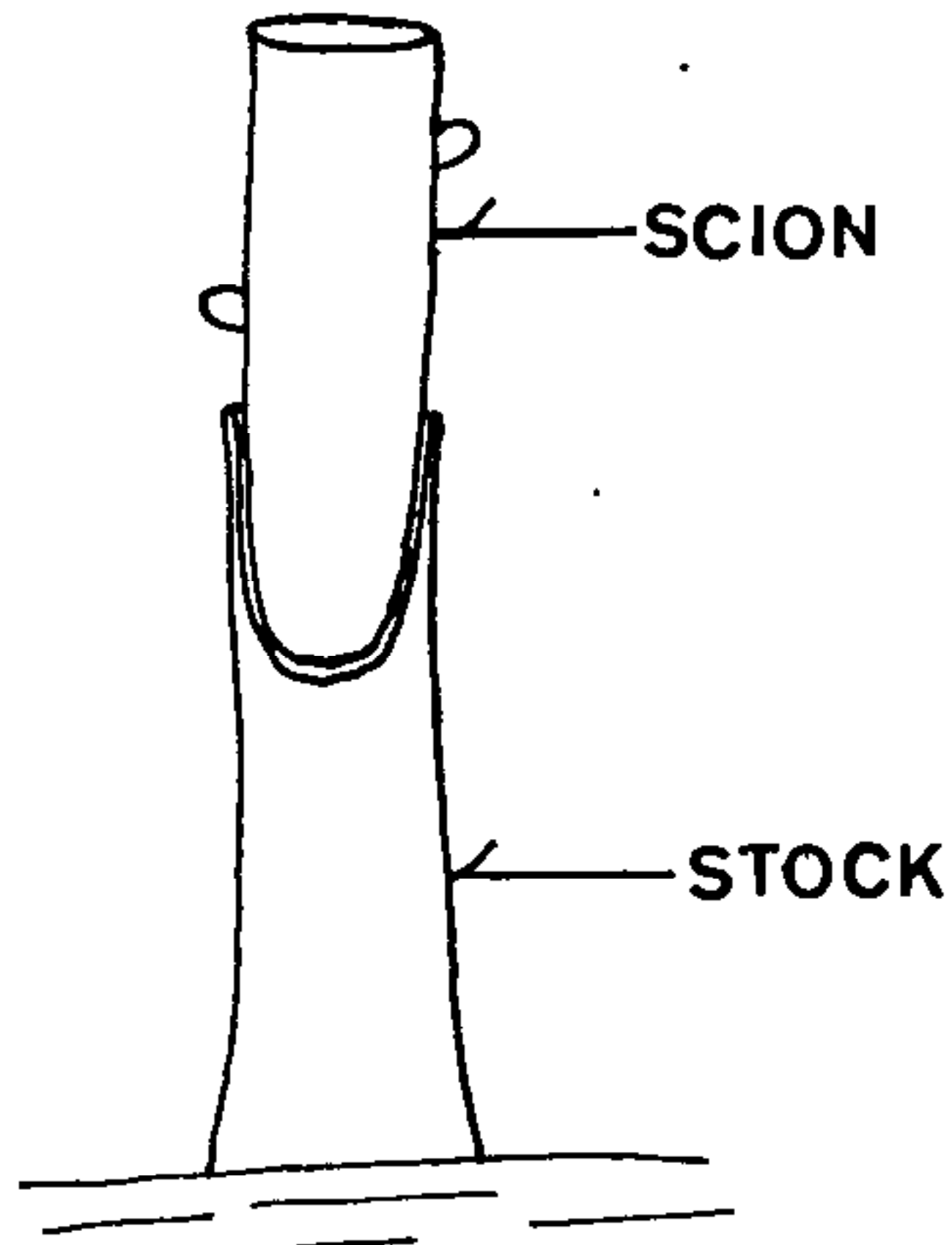


Figure 2. Appearance of completed walnut whip graft before taping. Note smaller size of scion in relation to the rootstock to permit matching of the cambium layers.

I think the most important thing in the propagation of walnuts is in the timing of water to all the plant material concerned and the air temperature difference during budding and grafting.

Almond Propagation. In California 95% of the almond trees are propagated on peach root. Peach, compared to almond roots, provides more vigor, earlier production and, in the case of the 'Nemaguard' peach, a rootstock resistant to nematodes.

Our peach seed is planted by hand with the apex end of the seed pointed down to produce a straight root.

The seeds are planted in October. We plant them 4 to 5 inches apart, 1 inch deep and cover them with 6 to 8 inches of soil, where they lay through the winter for natural stratification.

The following spring around March 1, we uncover the seeds with the same method described to uncover walnut seeds.

We hope to start budding around May 10th. The starting time is determined by the size of the seedling and the maturity of the budwood. For almonds we use June budding. With this method we use the T-bud technique. With this kind of propagation we can produce a salable almond tree from $\frac{5}{16}$ to $\frac{5}{8}$ inch caliper in 5 to 6 months for sale to commercial orchards.

When June budding, using the T-bud technique, we snap the

bud off the bud stick. In this way we can bud a very small seedling — as small as $\frac{3}{16}$ in diameter.

When collecting budwood for June budding one must be careful, because of the early growth, to watch for blank “eyes.” Also we have to watch the “eyes” on the budwood later, when the wood becomes over-mature and dryer. In this case the “eye” of the bud will remain on the wood when we snap the bud shield off. Generally we have about 40 days of ideal budding time.

If the budwood becomes too mature to snap the wood off, generally the seedlings will be large enough to slice the bud in, but at this point we generally will get a poorer stand.

Three days after we bud we cut the tops off the seedlings 8 to 10 inches above the bud with a mechanical mower mounted on a tractor. By doing this we stop the growth of the seedling and begin forcing out the inserted bud. During the summer training we sucker each tree 2 to 3 times to produce a good looking quality tree. In June budding it is very important to irrigate 3 to 4 days ahead of budding and 3 to 4 days behind budding.

Some of our budders can bud up to 4,000 seedlings per day with a tyer behind him. We should expect a 90% bud take with this kind of propagation of almond trees on peach root.

Pistachio Propagation. Of the nut trees we grow, pistachios are the most difficult to propagate. For commercial sale to orchards most pistachios are grown in a long tubular pot as seedlings, planted directly in the field, and budded later in the orchard.

We do have one program in our nursery which has been successful for the production of pistachios for backyard sale.

We plant our seed directly in the field, using either *Pistacia atlantica* or *P. terebinthus*, *Pistacia atlantica* being the easier of the two for propagation.

In planting seed directly in the nursery, a very light soil is needed so that there is no crusting during seed emergence; many times we have to sprinkle to get the seed up through the soil. We plant around May 1, after stratifying the seed for 30-40 days in damp peat moss at 35° to 40°F. The first summer we merely try to get the seedlings to grow large enough so that we can bud the following spring or fall.

The first winter after planting we undercut the seedlings about 8 inches deep to force a branched root system; otherwise we would have only one long tap root which is undesirable for replanting bareroot stock.

If the seedlings are large enough to take the large bud on the budwood we can bud the first spring after planting the seed. If not we have to bud the following fall.

In budding pistachios we use the T-bud technique. In collecting the budwood it is very important to collect the right kind of material. The wood should be from vigorous growth of a shoot having small buds. The hardier, more mature wood, has a problem of losing its buds because of the wood being drying and less vigorous. The bud itself, in most cases, is too large to insert into the seedling.

We have found that we can bud pistachios at any time during active growth. We get our highest percentage of bud take by budding in the fall, making sure we have plenty of active growth in the seedling. A pistachio will not "take" a bud if the seedling is too dry or the bark is too tight. When handling pistachios bareroot, it is very important not to let the roots get too dry or expose the roots to the air for any length of time.

We find it is cheaper to propagate in the field and plant the trees in a container when they are ready to dig. In some years we will get as high as a 30% loss from replanting, but normally it will run around 10%. We also find that the older the tree the higher the loss in replanting into a container.