

## GROWING AN AVOCADO TREE

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The germination of an avocado seed and the growing of a fine young seedling tree from it is such a simple, easy and interesting process that it has seemed the subsequent steps necessary to produce a budded tree must be equally simple. This, perhaps, is one reason for many of the efforts among amateurs to propagate budded stock for their own use.

And lured by the seemingly high price of trees, nearly all of the nurserymen of Southern California have, during the past five years, also undertaken to propagate the avocado. Not only have practically all of the amateurs failed, but now many of the nurserymen have retired from the field, leaving the work to a few who have devoted their entire time and much study to the business, and who, through such larger experience, have acquired a sufficient knowledge to enable them to go ahead.

Propagating the avocado is a work for the specialist. The many disappointments and the costly failures of the intelligent amateurs and the most skilful nurserymen referred to, fully confirm this. A history of avocado budding in California, including all efforts, would possibly reveal a ten per cent success. This seems a startling statement but with positive knowledge of numerous instances where nursery rows of seeding stocks reveal from four to seven scars on each tree, showing that many repeated efforts, and then only an occasional budded tree in a row as the result, I believe this statement of a ten per cent success for first bud insertions is ample. Moreover, the successes are largely based upon the use of buds from strong growing, easily worked varieties such as Harman, while the propagation of the more difficult Lyon and Sharpless may be said to be a practical impossibility for the beginner.

I do not hesitate to say, therefore, that the amateur, unless he has rare and exceptional skill, will only meet with discouragement and failure in his efforts along this line. Knowledge to be gained by experience, of the necessary conditions of buds, (which varies greatly with the different varieties), the method of budding and the details of subsequent treatment, are all so vital that one lacking a considerable experience may well take this warning and leave the field open to those who have earned a more enlightened understanding through having traveled the long and costly road leading to a fairly successful effort.

So costly has been the work on account of the difficulties referred to and the many failures in consequence thereof, that I believe it is entirely within the bounds of accuracy to say that no avocado nurseryman has realized a sufficient income during the five or six years in which budded trees have been grown, to equal his expense account.

## Seeds and Seedlings

Seeds from the thin skinned Mexican highland fruits grow stocks that are at once vigorous and hardy. If the seeds selected are of good size, weighing from two to three ounces each, they will produce stocks large enough to take the bud in six months, while a tree grown from a seed weighing one ounce or less requires about two months longer to reach this stage of growth. Taken from a fully ripened fruit and planted immediately—the correct practice—germination begins at once (it is assumed that the seed is taken from a fall ripened fruit) but is retarded by the cool weather of winter and does not assume activity until April or May.

With many of the hardy Mexican trees in bearing, an adequate supply of seeds is now obtainable in California for the development of the industry. Such seeds may be purchased for \$2 or \$3 per hundred, but with the naturally increasing supply each year this price will tend downward. It ought to be a matter of honor with every nurseryman to use only seeds of the hardy character referred to, avoiding those from Tahiti or other tropical regions.

Germination is carried forward in a lathouse for frost, heat and wind protection. The seeds may be planted either collectively in deep flats, or individually in four-inch pots.

Planting in flats is the most economical method, but has the drawback of some difficulties when the young plants are transferred to nursery rows in the open field, as they must then be planted with bare roots. If a hot spell is encountered the plants suffer somewhat before they become established. It may even be necessary to shade each plant with a shingle for the first two or three weeks after planting.

A box six inches deep of convenient size for handling, filled with a mixture of three-quarters clean, sharp sand and one-quarter soil, will afford a suitable receptacle. Set the seeds an inch apart with the pointed end up and just slightly showing above the ground. A few holes in the bottom of the box must be provided for drainage. Keep this mixture of sand and soil moist, not wet. When the young trees are eight or ten inches tall the boxes may be taken to the field, one side knocked off, and the young plants easily removed by breaking up the loose mixture with the fingers. They should, of course, be planted as rapidly as taken out, with no opportunity for the roots to become dry.

The method of starting the seeds in four-inch pots is perhaps the most efficient and satisfactory. The unfilled pots may be set in beds and a mixture of sand and dirt thrown on with a shovel. Thus the spaces between the pots are also filled, which is desirable, as this tends to an even degree of moisture. Level off the soil and plant, a seed in each pot, water thoroughly and keep moist. Little loss is realized in transferring plants so grown to the nursery rows in the field. An objection to this method has been made and much discussion has resulted there from on the ground that the roots are curled by the pot and the tree on that account is not so thrifty or desirable. This objection has been overrated. The curled roots may remain so, but they are immediately replaced by others, which grow naturally and form the real root basis of the tree. True, a plant or tree may become stunted or pot bound by long growth in a pot, and a long time be required for its recovery. But the process of starting seeds in pots and planting them in the field early is in my judgment the ideal one, with no disadvantage whatever attending it.

## **The Budding Process**

While propagation has been accomplished by the rooting of cuttings and by grafting, experiment reveals many objections to each of these methods, and shield budding is the accepted practice.

The young trees should be set eighteen or twenty inches apart to allow for an adequate sized ball of earth at transplanting season. When the plants are as large as a lead pencil (or preferably slightly larger) budding may begin. This may be at any time from the first of May to the first of January, the season not being so important as the condition of the stocks, which must be in vigorous growth, with an abundance of sap running. A copious irrigation three or four days before the budding work begins is an advantage. A shield bud averaging one inch in length cut to include a thin, small slice of the wood itself, is used. The knife should have a keen, razor-like edge, and be kept so. Insert the bud in a T or inverted T incision—it makes no difference which—and wrap fairly tight with a strip of cotton cloth one-half inch wide and ten inches long.

If at the end of three weeks the bud is green and healthy, take the wrap off, and using the same strip, rewrap. This loosens the tie so that it will not cut the growing stock. At the end of three weeks more, repeat this process, and if the bud is still in healthy condition, cut back the top of the seedling tree two or three inches, to start the bud into growth.

From now on great care should be exercised to keep the young seedling in healthy, vigorous condition, and to remove from time to time any suckers or branches thrown out before they have made much growth. When the bud is six inches long, draw it up to the seedling tree with a raffia tie, in order to train it to a straight upward growth. When it has grown to a height of twelve or fifteen inches, stake it and cut the seedling top back to within six inches of the bud. In this condition it may be allowed to continue to grow until the bud is three feet high, when the remaining seedling top should be "stubbed back" to a point just above the bud, slightly tapering to the opposite side of the seedling tree. This junction or union point will subsequently heal over and the tree have a tendency to become straighter each year.

Given seedlings in vigorous growth, and a budder with skill and judgment, still a large factor in successful work is the selection of the bud for insertion. This should not be from tender, sappy growth at the end of a limb, but usually from a partially matured wood further back, averaging roughly speaking four to six months of age. Here experience alone is a sufficient guide. Broadly speaking a plump, fat bud not yet leaved out should be selected. However, the variation is so great that buds of this character are never available on trees of some varieties, and the closest approach must then be taken. A thin, peaked bud is to be avoided where possible. If the bud growth is too far advanced the eye will usually drop off and the result is a blind bud of no value, even though the shield may have properly affixed itself to the stock.

## **The Young Tree**

As the young budded tree advances in growth, great care should be taken to keep it properly staked with a light stake that will not interfere with balanced leaf or branch

development. Low branches that assume too great prominence should be removed, the object being to gain a straight, symmetrical growth with light side branches beginning about a foot from the ground, and a well branched top, commencing say two feet above the ground, retaining its main stalk or leader.

During the period of active summer growth, irrigation every seven to ten days is not too much. Be prepared to turn on the water at a time of excessive heat, to prevent the burning of tender tips. Check the irrigation work sharply by October 1 to harden leaf and branch growth, watering only enough to keep the trees in good condition.

By the first of January the most dormant period of the young tree has been reached, and balling may be begun. Here again great care and the work of skilful men only should be employed. The balls should weigh forty or fifty pounds each. Handle carefully and as few times as possible, and place in the lathhouse with slightly moistened shavings filling the spaces between the balls. Water lightly from time to time, and thus hold until the trees are removed for orchard planting.

### **Orchard Planting**

This work should take place preferably in March. At this time the young tree is practically a one year old bud on a two year old root, and should average four feet in height. A tree smaller than this size is quite as likely to be desirable as one larger.

In general it may be said that any good soil is satisfactory for avocado growing. If tight, close or hard, take the proper means of loosening and preparing, always providing good drainage. Money spent on advance preparation for orchard planting is an investment that pays big returns. Large holes dug in the fall and dynamited if the ground requires it, then two thirds filled with a mixture of one-half rotted manure and one-half top soil, allowing all to weather until March, is the ideal preparation. In planting, mix in more top soil, and after setting in the ball to about its previous depth, and two-thirds filling in the hole, lay back the burlap covering, fill in more dirt, leaving a top basin, then water thoroughly and subsequently level off with loose soil.

Probably there is no better cultural treatment for the first or second year than that afforded by the basin system, with a heavy mulch of loose stable manure.

Orchard trees may be spaced 25 or 30 feet apart if of the low spreading type such as Fuerte or Taft; but it is not too close to space Lyon, Perfecto, Sharpless and upright types 20 or 22½ feet apart.

A stake with rounded edges and sufficiently strong and high to act as an adequate support for the first two years growth should be provided. And a lean-to shade made of a piece of burlap 4x4 feet, tacked to two five foot stakes placed to protect the young tree from 10 to 4 o'clock during the first summer, is highly desirable. (See fig. 35 for illustration of similar method.—Editor.)

Irrigation the first summer should average fortnightly, with extra irrigations in hot spells. Much of course depends upon the nature of the soil, and the specification mentioned is a general one, to be varied with good judgment according to circumstances.

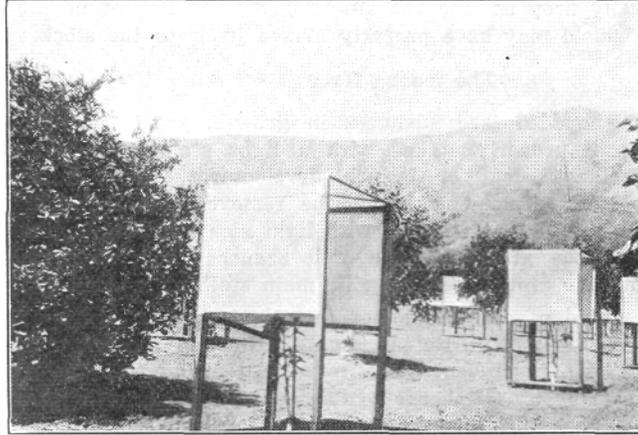


Figure 35.—Newly set avocado trees, protected from wind and sun injury by cloth covers. Judge Silent place, Glendora, Cal. (Photo by H. J. Webber)

## Pruning

Unquestionably the avocado tree should be kept low, with branches touching the ground, thus affording necessary shade to the trunk and keeping the ground cool. These lower branches should be kept secondary in size. Frequently these lower branches will assume too great a growth and importance, detracting from the symmetry and desirable frame development of the tree. In such cases they should be trimmed back, the purpose always being kept in mind to have a broad, low, stocky tree, capable of withstanding wind and from which the fruit may be easily picked.

Certain upright growing types do not readily lend themselves to this treatment, and with them some latitude must be allowed.

Pruning for avocado fruit wood is to a great extent an unexplored field, and only general principles can be applied.