

Planning and Planting the Avocado Orchard in Los Angeles County

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Avocado Districts in Los Angeles County:

Avocados are grown commercially in nearly all parts of Los Angeles County south of the Sierra Madre Mountains, but especially in the following locations: In the hill section from Santa Monica to the Santa Monica Mountains; in the Foothill district of the Sierra Madre Mountains along the north fringe of the San Gabriel Valley; in the Whittier district, especially in the higher lands; and particularly in the Puente hills on the northern and southern slopes. Some commercial orchards are located in the San Fernando Valley, also a small acreage in the southern part of the county at Lomita. Avocados may be grown in any part of Los Angeles City where the climatic condition is favorable and the soil type suitable and of sufficient depth.

Climatic Requirements:

The avocado is a tender, evergreen subtropical fruit tree; therefore its commercial culture is limited to localities where the winters are mild and the summer weather not excessively hot and dry, and where prevalent or violent winds do not occur. The three races of avocados grown in this country are the Mexican, Guatemalan, and West Indian. However, most of the trees are of either the Guatemalan or Mexican races. Varieties of the West Indian are the most susceptible to low temperatures, the Guatemalan coming next, with the Mexican the least affected by cold. The varieties of the Mexican race appear to have about the same range of climatic adaptation as the orange.

Considerable difference in varietal resistance exists, some standing lower temperatures than others, while some varieties exhibit less sensitivity to hot and dry weather conditions than others. Rainfall is not of great importance, as the avocado in Los Angeles County can be grown only under irrigation; therefore, it is only necessary to be sure of an adequate supply of good quality irrigation water. Soils:

A desirable soil for the avocado is a well-drained soil, at least three feet in depth for the best development of the root system. While commercial plantings are found producing quite satisfactorily on all types of soils, the consensus of opinion is that a medium sand-loam soil is probably the best from the standpoint of growth and efficiency of production.

Propagation:

Rootstocks: The West Indian, Guatemalan, and Mexican races have been used in obtaining rootstocks in the early years of the industry. The seeds have been large,

small, mature, or immature; therefore, many nursery trees have failed to make satisfactory growth, which has resulted in non-uniform orchards. West Indian seedlings have been discarded, as far as Los Angeles County is concerned, because of their tenderness to frost. Mexican varieties have been much more available during recent years for use as rootstock. have been used because of their greater frost resistance. Guatemalan varieties

Seedlings from Guatemalan stock are without doubt vigorous and thrifty, but are more susceptible to frost than the Mexican seedling. The Mexican stock is therefore preferred to the Guatemalan because of the frost hazard. There is some evidence pointing to the fact that where Guatemalan is used there may be greater compatibility between stock and scion. In the case of Mexican seedlings, there has been an evident wide variation, which is laid to the fact that many of the seeds represent natural hybrids, resulting from cross pollination with Guatemalan trees. Through careful selection, however, it may be possible to eliminate many of these hybrid variations, because of characteristics such as leaf and coloration. Selection of seeds from isolated trees or solid plantings of Mexican varieties may provide the solution to this problem.

Some very good seedling trees have been grown for the purpose of stock from Fuerte seeds, but owing to the fact that the Fuerte is a hybrid there is some variation. However, if rigid selection is practiced, very good trees can be obtained with this rootstock.

Among the Mexican varieties used for rootstock, both the Harmon and Ganter have been recommended. In obtaining seed for rootstock from the Mexican variety, a seed should be selected which is medium in size, has a smooth surface, and is from a vigorous, healthy-growing tree.

In relation to sunblotch, experimental work is being carried on to determine whether or not sunblotch can be transmitted through the seed. Results up to this time have been negative.

Growing Seedlings: Seed for rootstock growing is generally obtained from dealers, the names of whom can be obtained from the Farm Advisor's Office.

Avocado seeds are usually sprouted before planting in the nursery. Some nurserymen plant seeds directly in the nursery row. When the seeds are planted in nursery rows, it is necessary to irrigate by sprinkling in order to maintain favorable moisture conditions. The percentage of stand is greatly improved if the seeds are sprouted before planting. Where the seeds are planted direct, there is the likelihood of a considerable number of spaces where they will fail to grow satisfactorily. Regardless of the method used, some seedlings will indicate weakness and should therefore be weeded out and discarded.

Seed Bed: The following two paragraphs on seed bed are taken from Agricultural Extension Service Circular No. 43 by R. W. Hodgson:

"Sprouting is now accomplished almost entirely in beds containing a mixture of sand and soil. A mixture of equal parts of clean sand and loam is commonly used. The beds are usually six to eight inches deep and are sometimes made over a hotbed, though usually not. The seeds are planted with the base or largest end downward and the pointed end or apex barely protruding above the soil. The soil should be kept moist by frequent sprinkling, but should not be kept soaked. During hot weather, muslin or lath

screens are placed over the beds during the hottest part of the day. It is best to plant the seeds as soon as possible after removal from the fruit, but they may be kept several months if not permitted to dry out. Since the Mexican varieties normally ripen in the fall or winter, most of the seeds are planted at that time of the year. If weather conditions are favorable, germination starts within a few weeks and proceeds slowly until early spring, when the advent of warmer weather hastens it. The seedlings are usually ready to be transplanted in March or April, by which time they have attained a height of four to eight inches.

"When danger of frost is over and the seedlings have reached the height mentioned, they are usually transplanted directly to the nursery rows and set out, fourteen to eighteen inches apart in the row, the rows being thirty to thirty-six inches apart. It is considered good practice to clip off about two-thirds of each expanded leaf at the time of transplanting. Irrigation should immediately follow planting to prevent drying out. If the weather is unusually warm, temporary protection from the sun is necessary and is usually provided by placing a shingle on the south side of each seedling. Frequent watering is necessary until they become established; after that, irrigation every two weeks should be sufficient excepting in extremely hot weather."

Budding: Some budders claim they can get better results with all varieties of avocados if several weeks prior to the cutting of the wood the leaves subtending the buds to be used are removed or cut back. Success of the budding operation and subsequent growth depends in a large measure on the proper selection of budwood. New growth that is well mature, with plump buds, furnishes a very desirable type of budwood. Not all of the buds on a green shoot used as budwood are equally suitable. The buds on a given piece of budwood which will probably furnish the best developing buds will be found in the mid-section between the nodes. Greater success has been obtained by storing bud-wood for several weeks. This is done by packing it in moist sphagnum moss, sawdust, or sand, which should be kept moist but not wet and stored in a cool place.

Seedlings which are to be used for budding should be kept in a thrifty, growing condition. They may be budded any time during the season when the sap is flowing freely, after they have attained a diameter of half an inch. Budwood should be selected from wood which is well-matured from the previous season's growth. After March or April, it may be difficult to find a satisfactory growth until the latter part of July, at which time budding can again be commenced.

The following on budding is taken from Agricultural Extension Service Circular No. 43 by B. W. Hodgson:

"Shield budding, such as is used in the propagation of citrus and deciduous fruits, is the common nursery practice. A "T"-shaped incision is made within two or three inches of the ground, preferably on the north side of the seedling. The bud is cut with a shield not less than 1 1/4 inches in length, and is pushed gently into the incision. The stock should be in such condition of growth that the bark will slip readily, and will not require lifting by the knife blade, otherwise it is too dry to be used successfully.

"The knife blade used for cutting buds should be thin and should be kept at a razor edge. The cut should be made parallel to the surface of the stick with a single, sliding motion; much of the success of budding depends on having the cut uniform, smooth, and straight.

"After insertion, the bud is immediately wrapped, the usual practice being to leave the eye uncovered. Various materials are used: raffia, cotton twine, rubber bands, muslin, and budding cloth. Budding cloth is recommended, provided a hard wax is used in its manufacture which will not melt and injure the bud in hot weather. A wax composed of one pound of beeswax and one-fourth pound of rosin is satisfactory. Cheap grades of muslin are made up into rolls six inches wide and one inch thick, and boiled in the wax for fifteen minutes.

"About three weeks are required for the buds to unite with the stock, during which period they should be examined and the wrapping loosened to prevent binding. The top should be pinched back at this time in order to start the bud into growth. From six to eight weeks after budding, the wraps may be safely removed. It is a mistake, however, to remove the wrapping from the point of insertion until the bark flaps are healed and there is no further danger of their spreading open. After another month of growth, the seedling should be cut back still further, leaving some foliage to take care of the sap flow. When the bud has made a growth of four to six inches, it should be tied up to the stock with raffia; staking should be done when it has reached a height of sixteen to eighteen inches. The seeding top should not be cut off until the bud has grown at least two feet; this operation is best done when the top has become somewhat hardened. A sloping, smooth cut close to the bud union should be made and the wound painted over with grafting wax."

Balling: Trees are usually taken from the nursery and planted with the roots balled. The customary practice is to ball the trees prior to the start of growth in the spring, holding them in the lath house until planting time. Some nurserymen, however, prefer to delay the balling until about ten days to two weeks before they are planted. A few days before balling, the trees are cut back or partially defoliated to balance the root system. While the balls are kept in the lath house, they should be moist but not wet. The practice of planting avocado trees with bare roots, as is sometimes done with citrus trees, has not been general.

Planting: Special care must be exercised in handling the trees after they have been balled, as breaking the contact between roots and soil in the ball will cause delay in starting growth. The trees are planted from twenty-five to forty feet apart, depending upon the variety. In many of the plantings in the past, the trees have been too close together.

Terracing: In planting on terraces, the grade contour will vary from one to two and a half per cent, and the width of the terraces from seven to sixteen feet. Wider terraces enable the grower to more easily handle the soil and care for the trees. Trees are planted from two to five feet inside the edge of the terraces in order to run the water on both sides of the tree. Terraces should be made and tried out with running water before planting takes place to thoroughly test them and get the soil well settled. The tree rows

should be approximately thirty feet apart, which vary, of course, according to the slope and contour of the hills.

Digging Holes: In digging a hole for trees in a more fertile, deep soil, it is only necessary to dig it large enough for the tree. It has been found advisable under some conditions, however, to dig a large hole and fill it in with top soil in order to have greater fertility for the young tree while it is becoming established. It might also be advisable under certain conditions to add some well-rotted manure or organic matter to the top soil in filling in this large hole, after which it should be settled with water unless a heavy rain takes place.

After the soil in the large hole is well settled, a smaller hole just large enough for the tree at planting time should then be dug. The soil should be well firmed around the ball after setting in place. The burlap should then be pulled back to expose the surface of the soil in the ball.

Training Young Trees: Watering should be done immediately after planting, as the young trees should never lack for moisture. If necessary, some precaution should be taken against sunburn. The trunks, if exposed, should be well covered or whitewashed. Some think that damage has occurred where whitewash has been applied, but there is not sufficient evidence to support this belief.

Many growers water young trees during the first few years by means of a permanent basin which is kept filled with organic material of some kind such as well-rotted manure, bean straw, alfalfa hay, or leaves.

Staking has been generally practiced in order to produce a desirable shape and prevent the trees from being blown over by wind. However, there is much evidence to support the belief that a better framework can be developed by training without staking. In developing the framework of a tree, some pruning is necessary. In any event, the trees should be carefully gone over each year. Growth of weeds around young trees should be prevented, since weeds compete with the trees both for moisture and plant food elements.

In some instances, fertilization of young trees should be practiced, especially with a soil type where there is danger of leaching as a result of irrigation. Some growers fertilize early, and not only add organics but also a small amount of nitrogenous fertilizer. In most cases, however, a small application of manure each year for the first three or four years should suffice.