

Avocado Topworking

Elwood E. Trask

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THE subject of topworking is one which can be most easily handled in the field with actual demonstrations of methods and practices. Although the avocado tree is rather exacting in respect to climate, water, soil, and general orchard practices, yet it can easily be topworked by budding or grafting to any of the commercial varieties.

Cambium Layer: Aside from the mechanics of grafting or budding, the most important thing to know about the tree is the growing-tissue or cambium layer. The cambium layer is that thin layer of watery looking tissue between the bark and the wood from which all growth springs. From this layer both wood and bark is formed. In budding or grafting, the cambium layer of the shield cut with the bud, or the cambium layer of the scion (graft stick), must come in direct contact with the cambium layer of the stock (tree being grafted or budded), in order that growth may take place between the two.

Budwood and Graft wood: Budwood is generally selected from the vigorous tips of branches, using well matured buds from such full round wood as it is possible to select. Graftwood, or the scion, is selected from older wood which can generally be had between the first and second group of branches from the tip of a branch. On this part of the branch are generally found several well formed buds in the axils of the leaves. In varieties which do not generally retain axillary buds on this part of the branch it will be necessary to select nodes of growth or "knuckles" which carry many small buds in the tiny leaf scars. Great care must be exercised in selecting budwood or graft-wood from healthy trees of known productivity which are not infected with sun-blotch, as this disease is transferred to the stock through the budwood or graftwood. Parent trees should not be diseased, or infested with pests such as the scales or red spider.

Budding: In the avocado nursery varieties are propagated by budding into seedlings of six months to a year of age. A "T"-shaped cut is made in the bark of the stock and the bud cut with a shield shaped piece of the budwood, is inserted under the bark of the stock, then tied firmly in place with a wrap of budding cloth. This method may also be used with larger trees, but it is difficult to get buds to grow on the older wood, so it is generally necessary to severely cut back the top of the tree to force suckers from the main limbs or the trunk. These suckers are budded whenever the wood has sufficiently matured, and the new top is built from one or more of these buds. The disadvantage of this method is the time required to produce the new top. Generally it takes a year after the topping before the suckers have developed sufficiently to bud. If good luck is had and the first buds grow in this sappy growth it will require eighteen months to two years of care to develop the new top.

Grafting: Grafting has been found to be the quickest and surest way of producing a new

top on a tree which has passed the nursery age and size. Within two years from time of grafting, trees will usually be producing fruit. In grafting simply remove the top of the tree with the exception of a limb having a small amount of leaf surface which is retained as a nurse limb to help maintain the roots while the grafts are starting.

Equipment and materials: The necessary equipment for grafting consists of a sharp knife and a stiff bladed saw; while it is convenient to include pruning shears and a light mallet or tack hammer. Materials needed other than the scions are a waterproofing material such as grafting wax or asphalt emulsion paint,, bags or paper for protecting the newly set grafts, and burlap or paper strips to be used as wraps for the exposed trunks and limbs to prevent sunburn.

Grafting wax is made from beeswax and tallow or parafine and must be kept in a melted state by use of a portable lamp or stove, which is rather unhandy aside from the fact that it does not make an entirely satisfactory contact with the damp wood of the avocado.

Asphalt emulsion, also known by the trade names of Tree Seal and Tree Heal, are excellent pruning compound, which can be kept to the desired consistency by the addition of water. When dry the asphalt becomes a waterproof coating and is particularly adapted to use on avocado trees due to its ability to adhere readily to the moist wood and bark. The topworker should carry a bottle of gasoline or kerosene and a cloth with which he can remove the asphalt from his hands.

The trunks and limbs of avocado trees which have been shaded by the foliage are very susceptible to sunburn and where they are exposed by topping, must be protected, preferably by wrapping with burlap as soon as the grafting has been completed.

There are many forms of grafting which are used with varying success by commercial topworkers. Most commonly used are the side graft, bark graft, and the cleft graft.

The side graft is a glorified method of budding. As in budding, the stock must be in such growing condition that the bark will readily "slip" or lift without tearing. A heart-shaped piece of bark is removed from the trunk or main limbs of the stock and down from this two parallel cuts are made through the bark the width of the scion to be used. The scion is then cut on opposite sides to form a long sloping wedge. This wedge is inserted under the piece of bark on the stock that is lifted between the parallel cuts. A small nail driven through the bark and the scion into the wood of the stock holds the scion firmly in place and assures firm contact with the cambium layer of stock and scion. Exposed surfaces must be covered with asphaltum emulsion or grafting wax. The stock is not cut until the scion has united and started to grow. Several of these grafts should be placed in the tree as it is difficult to get them to start. When the grafts are united with the stock the top of the tree is partially removed to force growth and the care of the graft goes on as in other methods of grafting which are described later. The difficulty of getting the scions to unite with the stock in this side graft has caused most commercial topworkers to discontinue its use.

The bark graft is commonly used on smaller trees, but can only be done when the bark will slip as in budding or side grafting. In this method the top of the tree is removed above a good nurse limb, using a cut at right angles to the trunk. The scion in this case

may be of the younger growth as used in budding. A cut is made through the bark straight down from the cut trunk, and into this is inserted the scion which has been cut sloping leaving a shoulder to butt against the wood of the stock. The scion is held firmly in place by a small nail, all cut surfaces are painted and the stub is protected with a paper bag in which two or more holes have been cut for ventilation. Several of these scions should be placed in the cut-off trunk to increase the chances of producing the new top.

The cleft graft is the most commonly used at present by commercial topworkers on avocado trees. This method is being used on trees of any size or age. In this method the top is removed as with the bark graft, although when it is not possible to leave a nurse limb the entire top may be removed near the ground. Where the entire top is removed great care must be exercised in the after care of the tree to prevent drowning of the roots, especially where there is no vegetation on the ground to remove moisture which has previously been used by the tree through its leaves. Cleft grafting may be successfully done any month of the year, although the most satisfactory time is in the fall months of October and November, where there is no danger of frost, and in the spring months of February,, March and April after danger of frost is past.

Scions are inserted in sawed clefts in the end of the sawed-off trunk. In small trees the sawed cut may be made across the end of the trunk and to a depth of two or three inches depending on the size of the scions used. The sawed cleft is then trimmed out with the knife to a "V"-shape having straight smooth edges. The scion is now cut wedge shaped to fit the cut in the trunk, and, using care to see that the cambium of the scion coincides with the cambium of the stock, the scion is driven firmly into place with the small mallet. The scion when grafting is completed should be about four inches long over all and have three good buds, or when this type of graftwood is not available the node or knuckle of small buds should be just at the top of the stock. Two or more scions should be used on the stock, with a space of not to exceed six inches between the scions around the trunk.

Care of Grafts: All cut surfaces must be painted and the spaces behind the scion should be filled to prevent collection of moisture. The asphalt emulsion is the most satisfactory for this purpose. The grafts are now protected by covering with a paper bag with holes for ventilation, and the trunk below the graft protected by burlap, and also the nurse limb protected two or three feet out from the trunk.

After Care: Depending on the season, the grafts will start growing within six to eight weeks from time of grafting,, and in two or three months the growth has reached the top of the sack. At that time the paper sacks should be removed and placed directly on the surface of the stump to completely cover the asphaltum paint, shielding it from the heat of the sun. All buds are allowed to grow until one of them reaches a growth of a foot to eighteen inches, at which time the best one is selected and the tips pinched out of all others. By the time the new shoot is eighteen inches to two feet long it will need some support. A one-by-two stake which can be driven into the ground and tied to the trunk of the stock extending four or five feet above the union is sufficient support. The new top is tied loosely to this stake, ties being necessary about every eighteen inches to prevent the rapidly growing top bending down of its own weight. The nurse limb may be removed any time after a considerable portion of the leaves of the new growth mature

as evidenced by their dark green color. Six months from time of grafting the tree should have sufficient growth to permit removal of the nurse limb and stubbing the stock. At this time a cut should be made on the stock running at an angle of forty-five degrees up to the base of the selected graft shoot, removing all other grafts and any suckers that may have started. This cut surface must be painted and protected from the sun by covering with burlap. The burlap wraps should remain until the trunk is again shaded by the foliage of the new top.