

## HANDLING YOUR SOIL FOR AVOCADOS

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The soil in which your avocado trees are growing performs several things. Most important are that it acts as a storehouse for plant nutrients, serves as a reservoir for moisture, and provides anchorage for the tree.

To do these jobs effectively, the soil must have what is called good structure. In other words, it must be easy to manage, be friable, loose and mellow. Most important for avocado trees, it must allow for water percolation. Good internal drainage, the ability of a soil to allow water to pass through readily is absolutely necessary for a trouble free avocado soil. If the soil is shallow, because of a clay layer or impervious substratum, it can become a problem soil for avocados. It merits special attention for irrigation practices. All phases of soil management should be directed toward minimizing the root rot risk.

Methods of cultivation, tillage or weed control are practices which fall within the scope of soil management. Maintaining the soil's natural tilth and preventing erosion should be the guideposts for any soil management operation. Satisfactory penetration of water, maximum root development and growth of trees are end results of their effectiveness. A practice which retards moisture penetration or root development should be discarded and some other method adopted in its place. Practices best suited to a particular soil and slope are the ones to use. Any operation which involves traffic through an orchard should be kept to a minimum.

Conventional cultivation by discing can be satisfactory on deep soil which is level. Damage to soil structure can result from excessive tillage. It leads to formation of a plow-pan or cultivation-pan. Damage can be reduced by incorporating organic matter in the soil, by cultivating as little as possible, or better still, eliminating tillage entirely.

Non-tillage is a desirable method adapted to most soils and especially to hillside or terraced plantings. Under non-tillage, the physical structure of the soil returns to, or remains in its natural state and provides the most favorable conditions for root development and tree growth. As trees become older and shade a greater portion of the ground there remains little need for weed control.

With small trees planted on steep slopes, the natural grass cover can be allowed to fill the open spaces. Of course noxious grasses or weeds must not be allowed to establish themselves. Irrigation by sprinklers is most satisfactory for such a system. Some mowing or weed cutting may be necessary to assure good water distribution and decrease competition for moisture. The grass cover serves to reduce erosion losses. One precaution, however, it can be a fire hazard.

Weeds can be controlled or eliminated by chemical and oil sprays. These methods can be costly. Economics sometimes limits the practice to small areas; such as spot spraying for elimination of noxious weeds. The spraying must be timely to keep these weeds killed because its effect is lost if so much as a single plant reseeds this area.

The materials commonly used in soil management to maintain soil structure are bulky organics and certain mineral soil amendments. Most manures have value as fertilizers as well as soil conditioners. However, since avocados tend to keep a heavy leaf litter on the ground, the addition of organic matter for its own sake is of Questionable value. If the soil is dense or has been mismanaged by cultivation, the addition of 5 — 10 tons of barnyard or dairy manure per acre each year may improve the condition. It can be left on the surface or incorporated in the soil. The nitrogen loss from exposure is relatively unimportant when compared to the damage that can result from extra discing just to get it under.

Soil amendments or agricultural minerals such as gypsum, sulphur or sulphur compounds have little or limited value on most soils in the areas where avocados are grown. Unless a problem of excess sodium or black alkali exists, their general use is not recommended. In most cases their correct application involves some type of flushing or leaching which requires artificial drainage, like drain tiling.

If irrigation waters carry harmful amounts of sodium salts, gypsum can be effective in reducing possible damage. Again some drainage is necessary to prevent the salty materials remaining and building up in the soil.

Soil sulphur is sometimes used to acidify alkaline or calcareous soils. The normal quantity recommended, ½ ton per acre at \$65 per ton, does not merit the application in terms of beneficial results obtained. If a soil is slightly calcareous (contains lime) and irrigation aggravates or increases lime induced chlorosis (iron deficiency) the practice of irrigating alternate row middles usually helps to reduce the symptoms.

The best way to avoid chlorosis problems is to pick a neutral soil in the first place and choose rootstocks which are tolerant to small amounts of lime in the soil. A good way to do this is to get young trees grown in nursery soil which is naturally calcareous. Survival of the fittest will eliminate the ones which can't tolerate small amounts of lime.

Another special item to consider when selecting small trees is to match the soil texture of the nursery soil with the soil in the field. Planting nursery trees in heavy loams which have been grown in light sandy soil can result in irrigation problems.

When interplanting young trees in old cultivated orchard middles, dig the holes extra deep to break up any plow-pan or cultivation-pan which may exist. Back filling with crumbly soil will give better subsoil drainage and promote root growth.

In way of review, it should be stressed that soil management operations must keep tillage and orchard traffic to a minimum. Non-cultivation with either elimination of weeds by chemical means or allowing growth of permanent grass cover, controlled by mowing, are two methods readily adapted to conditions in avocado orchards.

Soil structure can be maintained under cultivation by the use of organic material, such as manures. Application of five to ten tons of dairy manure per acre can help improve conditions arising from mismanagement.