

Handling Avocado Orchard Soils

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Weather conditions and the relationship of the soil to the tree are both very important to the profitable production of the avocado fruit crop. However, the grower can do little with regard to the weather except to furnish protection from frost and dry winds of high velocity, and provide facilities for wet-weather drainage. Furthermore, the producer of avocados will not find it possible to develop a successful enterprise on a soil of poor structure which has an unsatisfactory physical condition.

The soil is made up of minerals, organic materials, bacteria, microscopic plants and animal life with space for air between particles, altogether providing an environment for the necessary processes.

While the larger percentage by weight of dry matter of plants is composed of carbon in combination with hydrogen and oxygen obtained from the air and water, the greater number of the chemical elements concerned with the building of tissues are obtained from the minerals and organic matter of the soil, being taken up in solution by the roots. In order that this process may continue without interruption, fertility and a satisfactory physical condition of the soil must necessarily be maintained so that roots may develop and remain in a healthy condition.

Let us analyze the factors which contribute in making up an ideal soil for avocados. Physically it is porous and should not contain too large a percentage of clay or silt but should be made up of quite a large proportion of sand or gravel. The moisture which reaches the soil should penetrate readily. This type of soil aerates satisfactorily and therefore roots are supplied with a sufficient amount of air. Avocado roots are very sensitive to a restricted air supply. Any soil management program should be directed toward satisfactory soil aeration and toward a physical condition necessary for the maximum development of all beneficial plant and animal life. An avocado orchard growing in a soil where these ideal conditions prevail will not suffer loss of trees because of decline, and if all the other factors concerned with good orchard management are taken care of, the trees should remain healthy and productive.

Soils with a comparatively loose upper stratum, but having a compact subsoil, may support trees for a short period of years but later inhibition of root growth may take place and finally death of roots, followed by decline of the tops, except when under a special management program. Also some soils with no apparent compact subsoil, either because of too fine a texture or some undesirable structure, do not drain satisfactorily and are not sufficiently aerated for optimum root growth.

Too much emphasis cannot be placed on keeping the root zone free from excessive moisture which prevents free access of air. A lack of aeration causes an unbalanced

condition within the soil, creating an ideal environment for the growth of fungi which may be parasitic on the roots. Other beneficial fauna and flora also may be adversely affected and undesirable chemical changes brought about.

A perched water table created by the presence of a hard-pan or any kind of a hard stratum just below or in the root zone must be avoided. Sometimes seepage from a leaky water pipe will accumulate in the soil, or water flowing in from a neighbor's orchard above ground or through the subsurface strata will saturate the soil. Seepage from higher land should be drained from the orchard as soon as possible. Provide for prompt runoff of heavy rainfall, especially in heavy soils and where there is danger of the water not percolating through the soil at a fairly rapid rate. All these precautions should be taken in a properly handled orchard.

In an ideal open-type soil, avocado roots are found at considerable depth, but the major portion of the small rootlets is to be found in the surface foot in masses with their growing tips working their way toward the surface.

The good orchardist will pay particular attention to conditions within the surface foot. Here the small feeding rootlets forage for those elements which are taken upward in solution into the tree, and here also the surface rootlets grow into the organic mulch as it becomes a satisfactory place for foraging.

This surface soil in bearing orchards teeming with growing roots needs to be protected. Protected from what? From being disturbed by cultivation, since plowing, discing or cultivating affects the root system in proportion to the depth.

There may be circumstances when cultivation is necessary but, if so, shallow cultivation is suggested. When furrow irrigation is practiced the surface soil may occasionally have to be disturbed. However, permanent furrows in an orchard may frequently be cleared of leaves by means of a hoe at no greater expense than if the orchard is disced and new furrows made.

When mulched basins are used, they can be made permanent. The leaves form a mulch on the surface, and are left to decay along with manure which is frequently applied to the surface of the basin. Nitrogenous fertilizers may also be applied to the surface in the basins prior to irrigation.

Spray or sprinkler irrigation may be used quite satisfactorily in avocado orchards on top of a heavy mulch of leaves and other organic materials. Soluble nitrogenous fertilizers are applied broadcast or are dissolved in the irrigation water.

While it is not the usual practice, sometimes covercrops are grown and disced under, maintaining a clean cultivated orchard during the irrigation season. This practice is not recommended except for special cases as the surface roots are disturbed by the constant cultivation.

Permanent covercrops are sometimes grown under the sprinkler system. A soluble nitrogenous fertilizer applied broadcast or dissolved in the irrigation water usually makes up the fertilizer program when permanent crops are grown. Whatever the crop started with, a Bermuda grass sod finally is the result.

The permanent covercrop should never be used on a soil with a compact subsoil. With

some types of the basin system and where the sprinklers are used only underneath the trees, such as at Fallbrook, the continuous crop plan is used. With this program a large part of the land in the orchard is not irrigated but receives only winter rains. Ordinarily this plan is only applicable to orchards while the trees are young.

A very satisfactory way to water a newly planted orchard is by the basin method. In young orchards, a small amount of fertilizer should be used, making several applications and increasing the amount of nitrogen each year.

SUMMARY

1. In a profitable orchard, good soil texture and structure must be maintained, making soil moisture regulation possible.

2. Free water in the soil should be kept moving downward.

3. It is necessary to have a fertile soil in the successful orchard. Better conditions appear to prevail when the surface soil contains an abundance of organic matter.

4. Cultivation when practiced should be shallow. Small feeding rootlets in the surface soil need to be protected.

5. A permanent covercrop should not be grown on a shallow soil with a clay subsoil or on any soil which is not easily penetrated by water.