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Avocado Fertilization

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In beginning this article, I wish to make the frank statement that I know very little about the fertilization of avocados. Furthermore, I do not know how to fertilize the Fuerte avocado to overcome its tendency toward alternate bearing. There are a few indications that I have observed, however, which may have some bearing upon the general problem of avocado fertilization.

Let us first analyze the conditions with regard to soil and soil fertility, under which we ordinarily find the avocado growing in California. Perhaps an analysis of these conditions and later a comparison of them with known favorable native conditions may bring to light some important discrepancies. It does not necessarily follow, however, that conditions under which plants are found growing in their native habitats are the most favorable, or that they could not be improved upon by man. It merely means that they were able to survive in these locations and here were able to overcome all obstacles imposed by nature under her law of survival of the fittest.

Most of our California orchards have been located on hillsides in an effort to seek out the warmer, more frostless locations. The soils in these locations, particularly those on the steeper slopes, have usually suffered serious losses of both organic matter and plant food through years of erosion, much of the plant food and organic matter having been carried to the lower lands which are located in areas ordinarily too cold for the production of avocados. Many of our orchards located climatically favorably are situated near the coast and for this reason, together with their organic deficiency, are usually either neutral or alkaline.

TROPICAL SOILS ORGANIC, ACID

Now let us consider some of the more important characteristics usually associated with soils of tropical countries such as those portions of Central, South America and Mexico, to which the two cultivated species of the avocado are native. The characteristics in which we are most interested are: (first) that these soils are usually high in organic matter. The reason for this is that the vegetation in these areas grows rank and plentiful due to ample rainfall and twelve months of favorable growing conditions throughout the year. The decomposition of this rank vegetation over a period of not a few, but hundreds of years has incorporated in these soils large quantities of organic matter. One of the characteristics of soils rich in organic matter is their ability to hold large quantities of water. This high water holding capacity enables soils to retain greater quantities of both moisture and plant food. This tendency toward high fertility is another characteristic of interest to us.

The third characteristic of these soils in which we are interested, is their tendency to be acid. This tendency toward acidity is also the product of ages of decomposition of organic matter. Soil samples secured by Harvey Lamb of Encinitas, California, from under thriving avocado trees growing wild in Guatemala, showed a pH range of from 5.6 to 6.3. All soils below 7 are considered to be acid and above 7 as alkaline, 7 being neutral. These determinations were made by the Citrus Experiment Station at Riverside.

Now let us consider some of the habits of the avocado in an effort to determine whether it is more suited to the soil types of California or of its native habitat.

The avocado tree is a succulent tree—or a large portion of its total weight is made up of water. It also has a large leaf surface, the leaves being quite large and numerous. A normal 7 year old Fuerte avocado tree dropped over 24,000 leaves in a single year (as determined by an actual count made by the author). Trees with such large leaf surfaces naturally require large quantities of water to supply their transpiration requirements. It would therefore seem that the native type of soil in which there is an abundance of organic matter would be more suited to this requirement. The production of 24,000 leaves per year naturally requires a lot of plant food. The blossoms also require large quantities of plant food to produce. Determinations made by the Citrus Experiment Station at Riverside showed the blossoms to be very high in nitrogen. The number of avocado blossoms is usually quite large as compared to the number of fruits, and, no doubt, the trees demand large quantities of nitrogen, particularly before and during the blooming season. The avocado being a tree which requires most of the qualities usually associated with acid soils and as it usually responds unfavorably to heavy applications or soil deposits of lime, it can perhaps be considered a little better suited to the acid soils, or at least not suited to those soils which are too alkaline.

It would appear from the foregoing analysis that the avocado is a little more suited to the conditions of its native habitat than to its adopted home in California. The question then resolves itself as to how we can best make our California soils more like those of the avocado's native land.

HOW TO MAKE OURS SIMILAR

The organic content of the soil can be increased by comparatively heavy applications of bean straw and barnyard manure. This is probably best applied in the fall of the year. The quantity of material supplied to the orchard can probably be decreased rather than increased after the trees become 7 or 8 years of age. The quantity of organic matter returned to the soil by falling leaves, blossoms, and twigs, together with decaying roots from trees of this age, should contribute substantially to the amount required. Since the plant food requirements are also high it would be well to supplement the fall application of organic material with commercial fertilizers, particularly those containing nitrogen. As the avocado tree is a comparatively shallow-rooted plant and since plant food below the depths of the feeding roots is not available to the plant, it would seem that small applications at regular intervals would be an economical method of application.

The avocados' apparent tendency to favor those soils which are acid would indicate that it would be better to apply as commercial fertilizers those which leave an acid rather

than an alkaline residue. As there are several fertilizer materials of this type, preference ordinarily should be given to those which are the most economical. The most economical fertilizer is not always the cheapest in price, as the analysis of fertilizer materials vary. The fertilizer which is the cheapest per unit of plant food can ordinarily be considered the most economical, providing it has no harmful impurities. There are several impurities found in some types of chemicals which are harmful to avocados. A notable example of this is chlorine which is a common impurity to be found in the muriate form of potash.

Trees which are out of condition from causes other than malnutrition cannot be expected to respond to heavy applications of plant food and oftentimes serious injury is done by too heavy feeding at this time. Providing, however, that avocado trees are in good physical condition, I know of no tree responding more satisfactorily to proper applications of plant food than does the avocado. The grower is usually rewarded by the same feeling of satisfaction experienced by a good cook upon watching the family wrap itself around a hearty meal.