

A Fertilizer Program

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Any material added to the soil to produce crops and maintain the soil strength may be termed a fertilizer. This being the case any real fertilizer program for our groves and farms has a double purpose to fulfill: (1) To retain and add to the soil reserves, and (2) produce the maximum of crops.

Soil reserves. At all times during the production of the crop (and in a citrus grove this means twelve months every year), there must be sufficient plant food to properly feed the tree. This plant food should not be too readily soluble, for during periods of wet weather the absorption by the trees together with leaching, would remove too much plant food from the soil. Then would follow a period when the trees could not secure sufficient food to continue operations.

The grove man, following a system of fertilizing at stated intervals, is often at a loss to understand why his trees do not always maintain their usual healthy condition. I have in mind a number of groves that, two years ago this summer, illustrate this very condition. At that time we had all through June, July, and during the most of August a rainy season such as I have heard the old settlers tell about. By the first of September the rains shut off and two months of dry weather followed. By the middle

of July these groves were seriously affected by withertip as evidenced by a considerable dropping of fruit. By October the situation was really serious, with from 25 to 50 per cent of the fruit on the ground and the trees full of dead wood. Groves that had been fed a less readily soluble fertilizer weathered this trying period in safety. In these latter instances the soil had sufficient stocks of food in reserve to carry the trees along.

Soil reserve should be maintained; or in other words, keep food before the tree at all times. No bank can do business without capital. Add to this, for as your capital increases so grows your ability to transact business. With the citrus grower this spells bigger crops and better fruit.

The trees require certain kinds of food from the soil and these should be supplied by the fertilizer in proportion to the needs of the tree, the fruit and the deficiencies of the soil. There should be provided for the trees the food they need to produce complete growth and fruit.

A complete fertilizer is so termed when it contains ammonia, phosphoric acid, and potash. These three are named because they are the three elements of which a Florida soil is usually deficient. They are also regarded as the most active in fostering growth and production of crops. The other elements that are necessary

but are found in the soil in sufficient, though small quantities are sulphur, lime, magnesium, iron, etc.

Ammonia is the element that produces growth. The spring and early summer is the best time to apply fertilizers having relatively high percentages of ammonia. It is best to wait for the removal of the fruit before applying high percentages of this element; yet I have seen growers apply four and even six per cent of ammonia in February and then wonder why their late fruit became course and green before the time for shipment arrived. It would have been better to wait until after the fruit was picked before using stimulating applications of ammonia.

Potash is necessary for the formation of sugars and wood and for the transfer of these compounds from one part of the tree to another. It is held that photosynthesis cannot take place without potash. It is commonly understood that potash produces a thin, tough peel, making a fruit better fitted to withstand the shocks of transportation.

Soil Conditions. Let us turn back to the soil again. Four things are requisite for a satisfactory fertilizer program: (1) Proper type of land; (2) Water; (3) Humus; and (4) Soil bacteria.

(1) *Type of Land.* The trees should be planted on land adapted to citrus trees. The high pine lands of the Winter Haven section are a good example. These lands are high, well drained, and well aerated. The sub-soil is clay located deep enough to provide space for the tree roots and moisture is easy to retain. Groves have been set on flat woods and sand scrub lands in this section but the returns are

not commensurate with the effort expended.

(2) *Water.* The citrus tree like all plants uses its food in solutions as dilute as the fraction of one per cent. The sap of the tree is very dilute, the only approach to concentration being found in the fruit and seed. There is a constant stream of water flowing through the tree day and night. Large quantities of water are required for a tree to carry on its vital functions. When the amount of water in the soil gets low, or in other words, when the solutions of food in the soil become too concentrated, the trees wilt. They are unable to get sufficient raw materials for their requirements.

(3). *Humus* is decayed vegetable matter thoroughly incorporated into the soil. Its presence in the soil makes it easier to retain moisture and encourages the growth of living agents. There are two ten-acre groves in our section that were planted side by side on the same kind of land seven years ago last winter. One grove man has kept his land virtually clean the year round. The other man has not. His grove is clean during the dry season and full of grasses and beggarweed during the rainy season. Today the trees in the grove where clean cultivation has been practiced the year round are fifty per cent smaller than those in the other grove. The amounts and quality of fruit bear no comparison. The grove kept clean during the dry season only has produced three times as much fruit.

(4). *Soil Bacteria.* Last but not least, are the soil bacteria. These are the agents that convert the crude materials of the soil

into forms that are soluble and beneficial. The helpful soil bacteria cannot do their work unless they have plenty of humus and an abundant supply of fresh air and water. Conversely land that has no soil bacteria is dead and will not produce satisfied grove owners.

The soil may be compared to a factory in which the: Building is the inert particles of soil; labor, the bacteria; raw materials, the water, air, solvents and humus; capital, the fertilizer; finished products, the products absorbed by the tree roots.

A good fertilizer program requires a

consideration of all these factors. Nor is the case as simple as this presentation might lead one to think. These factors are entirely dependent upon each other for the absence of any one interferes with the health of the trees.

Let us sum up briefly:

Apply fertilizers to the soil that are congenial to the tree and sufficient to build up the soil reserves, and see to it that the soil bacteria have a chance to flourish. I know this is not always an easy thing to do, that there is danger in straying from the straight road.