

Nutritional needs of Fruit Trees

indicated by leaf analysis

Deficiencies and excesses of essential elements occur in various California orchards. A major research project is aimed at detecting those faults and restoring the fruit trees to healthy and profitable condition.

Soil analysis has been used for detecting deficiencies, but too many variable factors prevent accurate diagnosis by this method. Knowledge obtained in the

laboratory can not always be applied to the complex tree-root-soil relationship in the orchard. Soil analysis for the so-called trace elements—zinc, iron, manganese, and boron—has generally proved unsatisfactory. These elements are deficient in important amounts in California orchards, and methods other than soil analysis must be used to detect such deficiency.

Leaf analysis has proved to be an accurate approach to the study of nutritional deficiencies in fruit trees, and has solved several nutritional problems on widespread acreage throughout the state. Certain soil and root conditions can not be measured accurately by chemical examination of the soil. For example, a dense, heavy soil, although well supplied with nutrients, frequently limits root extension and sufficient nutrient absorption for normal growth. These and other conditions which produce a poor root environment are not easily measured individually, but their over-all effect is frequently reflected through the leaves.

The outlook for continued progress in detecting nutritional deficiencies through leaf analysis appears promising.

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ACORN

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was confined in a separate pen and fed nine pounds of acorns daily with harvested dry range grasses mixed with some barley straw. The acorns seemed to be palatable and were eaten readily. At the close of the test one animal had lost 17 pounds and the other had gained 20 pounds. Both cows subsequently dropped normal calves.

In the fourth feeding test, blue oak acorns were fed to two-year old heifers for 37 days to see if they would consume sufficient quantities to cause digestive difficulties. The heifers were pastured on poor range until November 1 when they were placed in separate pens. Each animal was given a daily roughage ration of about 1.3 pounds each, of oat hay, barley straw and cottonseed hulls. The amount of roughage fed was kept low as an inducement to greater acorn consumption. A supply of acorns—changed daily—was kept before the heifers at all times.

One heifer had an average daily acorn consumption of 5.14 pounds that reached a maximum of 13.5 pounds the fourth day. After the fourth day's maximum she vomited some intact or coarsely cracked acorns with previously eaten roughage. She displayed no other ill effects except a mild diarrhea the 23rd day of the test.

The second heifer had an average daily consumption of 5.92 pounds of acorns with a maximum of 21.5 pounds,

also on the fourth day. The fifth day she showed little interest in her feed and ate only about a pound of acorns. The sixth day she was slightly ill, gaunted and still not interested in eating but in a few days she returned to normal.

Blue Oak Leaves

A 62-day test was designed to study the effects of feeding mature blue oak leaves—no acorns—to pregnant cows subsisting on dry range forage. Each animal was about 60 days pregnant at the start of the feeding trial. The animals were confined to individual stalls a few hours each day and each one given 2½ pounds of blue oak leaves. When not in their stalls the cattle had access to natural dry range forage.

Shortly after the start of the test there was a rain that was sufficient to leach the forage of some of its palatability and nutritive value but not enough to start a new forage crop. Half way through the test heavy rains started good germination and the new forage was well established when the trial was stopped.

For the test, fully mature leaves were harvested daily and only from trees with the greener leaves. The leaves were quite leathery and seemed to be of low palatability. The cattle would not eat the leaves from some trees so the daily feedings were mixtures from several trees, but even then the average daily consumption per head seldom reached two pounds. The use of feed flavors did not increase consumption.

There was no indication of illness during the test period. However, there was a marked average weight loss of 2.0 pounds per head daily. Such weight loss was excessive for dry cows under the existing forage conditions but all the cows subsequently dropped normal calves.

In a late spring trial two heifers were fed blue oak leaves for a 23-day period to learn whether a staggering condition—sometimes known as the jimmys—would result. In the late spring of certain years staggering cattle are troublesome when they are being driven some distance from one pasture to another.

The two test heifers were confined together in one lot and received no feed other than the blue oak leaves, except a little oat hay in mid-trial. At the start of the test the leaves from the initial bud opening had reached full size and stem growth was active. This new growth was collected daily and fed in amounts greater than consumed. The leaves seemed to be palatable and were eaten readily. Average daily consumption was 11.5 pounds with a maximum of 20 pounds. No ill effects were noted during the feeding period and none developed at the end of the trial when the animals were driven some distance on a warm afternoon. The cause of the staggering condition remains unknown.

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