EXTENSION CONNECTION

By Mongi Zekri

Proper leaf and soil sampling improves fertilizer programs

Optimum growth and yield of high-quality fruit cannot be obtained without adequate nutrition. The most successful fertilizer programs should be based on tissue analysis and knowledge of soil nutrient status combined with University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) recommendations. The deficiency or excess of an element will cause disturbance in plant metabolism and lead to poor performance.

PLANT ANALYSIS

Tissue analysis aids in evaluating the nutrient elements of the soil-plant system. It has proven useful in confirming nutritional deficiencies, toxicities or imbalances, identifying "hidden" toxicities and deficiencies where visible symptoms are not manifested, and evaluating the effectiveness of fertilizer programs.

LEAF SAMPLING

For reliable results and useful interpretation of lab analysis reports, proper procedures for leaf sampling and handling must be followed. Improperly collected leaf samples will provide misleading information about the nutritional status of trees and their fertilizer programs.

Leaf samples must also be taken at the proper time because nutrient levels within leaves are continually changing. However, leaf mineral concentrations of most nutrients are relatively stable within four to six months after emergence of the spring flush. Therefore, for mature tree blocks, the best time to collect leaves is in July and August. If taken later in the season, the summer flush is likely to be confused with the spring flush.

Each leaf sample should consist of about 100 leaves taken from non-fruiting twigs of 15 to 20 uniform trees of the same variety and rootstock, and under the same fertilizer program.

Tips and Techniques

- Immature leaves should be avoided because of their rapidly changing composition.
- Abnormal-appearing trees, trees at the edge of the block and trees at the end of rows should not be sampled because they may be coated with soil particles and dust or have other problems.
- Do not include diseased, insect-damaged or dead leaves in a sample. Use good judgment.
- Select only one leaf from a shoot and remove it with its petiole (leaf stem).

Diagnosing Growth Disorders

- Collect samples from both affected trees as well as normal trees.
- Trees selected for sampling should be at a similar stage of development and age.
- Whenever possible, confine the sampling area to trees near each other.

Handle With Care

- Samples should be collected in clean brown paper bags and clearly identified.
- Samples should be protected from heat, kept dry and cool (stored in portable ice chests) and placed in a refrigerator for overnight storage if they cannot be washed and oven-dried the same day of collection.
- For macronutrient analysis, leaves

usually do not need to be washed.
- Leaves should be dried in a ventilated oven at 140-158° F.

SOIL ANALYSIS

Soil analysis is an important method for gaining basic information regarding the chemical status of the soil. Soil analysis is particularly useful when conducted over several years, so that trends can be seen.

In Florida, soil tests for the relatively mobile and readily leached nutrients, such as nitrogen and potassium, are of no value. Soil tests are mainly important for pH, phosphorus, magnesium, calcium and copper.

SOIL SAMPLING

Soil sampling may be conducted at the same time as leaf sampling to save time and money. Each soil sample should consist of 15 to 20 soil cores taken at the dripline of 15 to 20 trees within the area wetted by the irrigation system to a depth of 6 inches.

The area sampled should be uniform in terms of soil and tree characteristics and correspond to the area from which the leaf samples were taken. Individual cores should be mixed thoroughly in a plastic bucket to form a composite sample. A subsample of appropriate size should be taken from the composite mixture and put into labeled paper bags supplied by the lab. Soil samples should be air-dried but not oven-dried before shipping to the laboratory for analysis.

CONCLUSION

Tissue and soil analyses are powerful tools for confirming nutrient deficiencies, toxicities and imbalances, identifying "hidden hunger," evaluating fertilizer programs and studying nutrient interactions. However, if initial plant and soil sampling, handling and analysis are faulty, results will be misleading. If properly done, tissue and soil analyses can point the way toward more economical and efficient use of fertilizer materials, avoiding excessive or inadequate application rates.

Consult edis.ifas.ufl.edu/pdffiles/SS/SS47800.pdf for more details.

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