EXTENSION CONNECTION

By Chris Oswalt

Evaluating your citrus nutrition program

Summer is the time of year Florida growers need to collect citrus leaf samples for nutritional analysis.

University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) current guidance on evaluating the nutritional status of citrus trees is based on a specific sampling methodology. The process requires that 100 four- to six-month-old spring flush leaves off non-fruiting twigs be collected from 15 to 20 uniform citrus trees within the sample site. The number of samples collected is determined by the area of grove to be managed for nutrition.

If you use fertigation as a delivery method for fertilizer, and the system runs the entire grove at one time, you are somewhat limited in what you can do differently within the fertigated zone based on a collection of multiple nutritional leaf samples. In this case, the analysis would represent the entire block. If there are differences in soil types that you are willing to address by changing nutrition practices, then separating these areas would allow you to fine-tune your nutrition program.

Now, let's talk about the analysis you get back from the lab. Macro (nitrogen, phosphorus and potassium) and secondary nutrients (calcium, magnesium, sulfur, chlorine and sodium) are typically reported in percentages and represent the lion's share of the nutrients found in citrus leaves.

The interpretation of leaf nutrient levels is based on years of research done on citrus trees.

Micronutrients (manganese, zinc, copper, iron, boron and molybdenum) generally are reported in parts per million (ppm) or milligrams per kilogram (mg/kg). So, if your leaf nitrogen is reported as 2.75%, that would be 27,500 ppm. If your zinc level is 200 ppm, that would be 0.02%.

The interpretation of leaf nutrient levels is based on years of research done on citrus trees. In Florida, the standard guideline table presents ranges for deficient, low, optimum, high and excessive nutrient levels for any given sample. If sample values fall in the deficient or low range, your fertilizer program should be modified to address tree needs. It's pretty straightforward, but what if you have multiple instances where you need to determine the order in which the deficiencies are most limiting? That is where something like the Diagnosis and Recommendation Integrated System (DRIS) can help you sort out the order of need.

The DRIS program (see www.makecitrusgreatagain.com) allows

Table 1. Typical leaf analysis and the resulting Diagnosis and Recommendation Integrated System analysis.

	% N	% P	% K	% Mg	% Ca	% S	B (ppm)	Zn (ppm)	Mn (ppm)	Fe (ppm)	Cu (ppm)		
Lab Analysis	3	0.15	1.9	0.37	2.8	0.23	98	47	13	47	5		
Recommended*	2.5-2.7	0.12-0.16	1.2-1.7	0.30-0.49	3.0-4.9		36-100	25-100	25-100	60-120	5-16		
	N	P	K	Mg	Ca	S	B	Zn	Mn	Fe	Cu	DM	NBI
DRIS Analysis	29	144	25	-36	-28	-55	82	267	-272	-39	-146	29	1122
DRIS Diagnosis	DEFICIENT: Mn LOW: Fe<Ca HIGH: K EXCESS: N												
Color Key	Deficient	Low	Optimum	Excess/ High									

*Recommended ranges from Nutrition of Florida Citrus Trees, 3rd Edition (edis.ifas.ufl.edu/pdf%5CSS%5CSS47800.pdf)

you to enter the results of your nutritional leaf analysis. This program was optimized for Florida oranges and related varieties before the onset of citrus greening. It was not optimized for lower-nitrogen-requiring varieties like grapefruit. The DRIS analysis uses a nutrient index approach to interpret citrus leaf nutrition based on the dry mass of the leaves. This seems most appropriate for greening-infected citrus leaves in Florida since it considers the increased weight (due to starch accumulation) of these infected citrus leaves.

Table 1 shows a typical citrus leaf nutrient analysis and the corresponding DRIS output using that analysis data. From this example, the evaluation of the analysis doesn't differ from the typical lab analysis of the results. Still, it does provide the ranking of the severity of the deficient and low nutrient values (manganese, iron, then calcium) as well as the ranking of excess/high values (nitrogen higher than potassium).

Chris Oswalt is a UF/IFAS citrus Extension agent for Polk and Hillsborough counties.