Citrus Nutrition Management Program

Dr. Tripti Vashisth
UF/IFAS Citrus Research and Education Center
October 2019
Program Rationale

• Good nutrition practices can help HLB-affected trees
• No one size fits all!
• HLB-affected trees respond to intensive fertilizer management
  • Healthy trees could withstand stress better but HLB-affected trees decline faster with any stress
• HLB-affected trees benefit from spoon-feeding
• Regular nutrient sampling helps in assessing trees nutritional needs
• With regular sampling, the fertilizer program can be tweaked to ensure that trees demands are being met
Program Purpose

• Good fertilizer program can be effective in managing HLB-affected trees
• Provide a resource to commercial citrus growers
• Assist in developing a customized nutrition management program
Requirements

• Commercial citrus grower
• Must have a minimum of 5 acres
• Grove must be located in Florida
• Sample collection must come from the same grove for the entire duration of the program
• One box per person

Photo Credit: Tyler Jones, UF/IFAS
Requirements-Multiple Representatives

- Multiple representatives from the same company
  - One box per person, but each box must be a separate grove site
  - Three box limit per company
- Preferred locations be in different counties; if not, must be 10-15 miles apart
- Not a continuous block or adjacent block
- Boxes will be numbered for each location based on information provided on form, please **do not** mix samples
  - Consistency is key to creating the individualized nutrient management program for each site.

By having distance between the grove sampling sites, it will show the effectiveness of the program.
How does the program work?

- Collaboration between growers and UF
- Program operates from October 2019-November 2020
- Lab services are provided at no charge to the grower
- Only cost for the grower is the shipping cost
  - Samples may be dropped off in person to the lab, however, still use the labeled envelopes
    - Central Florida Soil Laboratory, Bartow
How does the program work?

• Growers
  • Growers receive a nutrition box kit with a unique identifying number
  • Growers will collect samples and mail to lab

• UF
  • Will receive results from lab
  • Twice a month UF faculty and Extension agents will meet to make recommendations
  • Will send results and recommendation to grower for the next quarter
  • Will send collection sample reminders every 3 months
Getting Started

• Complete form
  • Contact information must be grower or grove manager
• Receive box with your unique ID number
• Within the next week, you will receive an email confirming your participation in the program
Grove Selection

• Uniform scion/rootstock
• Bearing age trees, preferred
• Don’t select severely declined trees
What’s in the box?

- Nutrient Testing Program Overview
- Sampling Calendar
- Resources
What’s in the box?

• Four brown paper bags for leaf sample (L1, L2, L3, L4)
• Four shipping envelopes for leaf samples
• Zip top bag for soil collection (S)
• Shipping box for soil sample
What’s in the box?

• Citrus Leaf Sampling for Nutrient Analysis
• Soil Sampling Procedures for Nutrient Analysis
Leaf Sampling Instructions

- Place leaves into brown paper bag
  - L1: November 2019
  - L2: March 2020
  - L3: July 2020
  - L4: November 2020
- Insert brown paper bag into pre-addressed padded envelope
- Mail package as soon as possible
Soil Sampling Instructions

- Place soil into clear zip top bag
  - S: November 2019
- Insert zip top bag into pre-addressed box
- Mail package as soon as possible

Photo Credit: Tonya Weeks, UF/IFAS CREC (soil)
**Results**

- Results will be sent via email
  - citrusnutrition@ifas.ufl.edu

### LEAF ANALYSIS

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>Mg</th>
<th>Ca</th>
<th>B</th>
<th>Zn</th>
<th>Mn</th>
<th>Fe</th>
<th>Cu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Results</td>
<td>1.93</td>
<td>0.13</td>
<td>1.35</td>
<td>0.23</td>
<td>2.92</td>
<td>51.52</td>
<td>50.54</td>
<td>54.14</td>
<td>49.92</td>
<td>10.41</td>
</tr>
</tbody>
</table>

### SOIL ANALYSIS

<table>
<thead>
<tr>
<th></th>
<th>P</th>
<th>K</th>
<th>Mg</th>
<th>Ca</th>
<th>S</th>
<th>B</th>
<th>Zn</th>
<th>Mn</th>
<th>Fe</th>
<th>Cu</th>
<th>CEC</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Results</td>
<td>83</td>
<td>72</td>
<td>423</td>
<td>1910</td>
<td>72</td>
<td>0.48</td>
<td>19.82</td>
<td>7</td>
<td>17</td>
<td>10.59</td>
<td>7.42</td>
<td>7</td>
</tr>
</tbody>
</table>

### Recommendation for next quarter per acre

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>P</th>
<th>K</th>
<th>Mg</th>
<th>Ca</th>
<th>B</th>
<th>Zn</th>
<th>Mn</th>
<th>Fe</th>
<th>Cu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add 50lb/acre</td>
<td>Add 50lb/acre</td>
<td>no change</td>
<td>Add 10lb/acre</td>
<td>Add 20lb/acre</td>
<td>Add 1/3lb per acre</td>
<td>Add 3 lb/acre</td>
<td>Add 3 lb/acre</td>
<td>Add 1.5 lb/acre</td>
<td>no change</td>
<td></td>
</tr>
</tbody>
</table>
Goal

- Goal is to have all nutrient levels within the suggested range

<table>
<thead>
<tr>
<th>Element</th>
<th>Unit of Measure</th>
<th>Deficient</th>
<th>Low</th>
<th>Optimum</th>
<th>High</th>
<th>Excess</th>
<th>Suggested Range for HLB³</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
<td>&lt;2.2</td>
<td>2.2 - 2.4</td>
<td>2.5 - 2.7</td>
<td>2.8 - 3.0</td>
<td>&gt;3.0</td>
<td>2.6 - 2.9</td>
</tr>
<tr>
<td>P</td>
<td>%</td>
<td>&lt;0.09</td>
<td>0.09 - 0.11</td>
<td>0.12 - 0.16</td>
<td>0.17 - 0.30</td>
<td>&gt;0.30</td>
<td>0.14 - 0.23</td>
</tr>
<tr>
<td>K</td>
<td>%</td>
<td>&lt;0.7</td>
<td>0.7 - 1.1</td>
<td>1.2 - 1.7</td>
<td>1.8 - 2.4</td>
<td>&gt;2.4</td>
<td>1.45 - 2.10</td>
</tr>
<tr>
<td>Ca</td>
<td>%</td>
<td>&lt;1.5</td>
<td>1.5 - 2.9</td>
<td>3.0 - 4.9</td>
<td>5.0 - 7.0</td>
<td>&gt;7.0</td>
<td>3.5 – 6.00</td>
</tr>
<tr>
<td>Mg</td>
<td>%</td>
<td>&lt;0.20</td>
<td>0.20 - 0.29</td>
<td>0.30 - 0.49</td>
<td>0.50 - 0.70</td>
<td>&gt;0.70</td>
<td>0.35 – 0.60</td>
</tr>
<tr>
<td>Mn</td>
<td>mg/kg or ppm</td>
<td>&lt;18</td>
<td>18 - 24</td>
<td>25 - 100</td>
<td>101 - 300</td>
<td>&gt;300</td>
<td>50 – 150</td>
</tr>
<tr>
<td>Zn</td>
<td>mg/kg or ppm</td>
<td>&lt;18</td>
<td>18 - 24</td>
<td>25 - 100</td>
<td>101 - 300</td>
<td>&gt;300</td>
<td>50 – 150</td>
</tr>
<tr>
<td>Cu</td>
<td>mg/kg or ppm</td>
<td>&lt;3</td>
<td>3 - 4</td>
<td>5 - 16</td>
<td>17 - 20</td>
<td>&gt;20</td>
<td>10 – 18</td>
</tr>
<tr>
<td>Fe</td>
<td>mg/kg or ppm</td>
<td>&lt;35</td>
<td>35 - 59</td>
<td>60 - 120</td>
<td>121 - 200</td>
<td>&gt;200</td>
<td>90 – 160</td>
</tr>
<tr>
<td>B</td>
<td>mg/kg or ppm</td>
<td>&lt;20</td>
<td>20 - 35</td>
<td>36 -100</td>
<td>101 - 200</td>
<td>&gt;200</td>
<td>68 – 150</td>
</tr>
</tbody>
</table>

These are suggestions for HLB-affected trees based on the field observations, these ranges have not been scientifically proven yet.

If you have questions about recommendations…

Your extension agent will be the point of contact

- Laurie Hurner lhurner@ufl.edu
- Chris Oswalt wcoswalt@ufl.edu
- Juanita Popenoe jpopenoe@ufl.edu
- Amir Rezazadeh amir2558@ufl.edu
- Matt Smith smith197@ufl.edu
- Mongi Zekri maz@ufl.edu
- citrusnutrition@ifas.ufl.edu
Value of the Program

• Personalized nutrition management plan for one year
• Demonstration of the effectiveness of regular leaf sampling and developing customized fertilizer program
• Intensive nutrient management should improve productivity
• Monetary value = 4 leaf nutrient test and 1 soil nutrient test > $ 120
Questions and Answers

• Can a consultant or sales rep get a box on behalf of a grower?
  • Yes, but the contact information on the form must be the grower’s contact information.
  • Number of boxes are limited; priority given to those who attend meetings

• Who will see my information?
  • The information you provide will be kept confidential within the University of Florida. Any information used to present data research will be anonymous.
Any questions?

Laurie Hurner lhurner@ufl.edu
Chris Oswalt wcowsalt@ufl.edu
Juanita Popenoe jipopenoe@ufl.edu
Amir Rezazadeh amir2558@ufl.edu
Matt Smith smith197@ufl.edu
Mongi Zekri maz@ufl.edu

Tripti Vashisth tvashisth@ufl.edu
Davie Kadyampakeni dkadyampakeni@ufl.edu