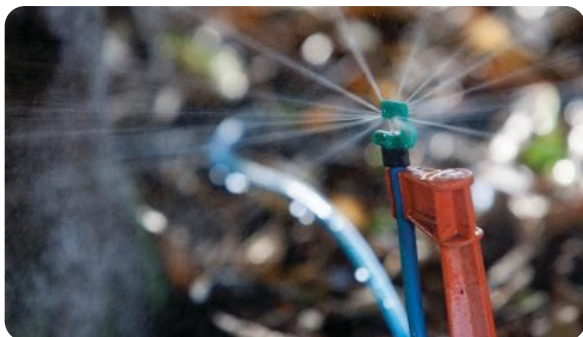


Nutrition and HLB-Affected Tree Facts

- It is highly unlikely once a tree becomes *Candidatus Liberibacter* (CLAs) positive that it can become free of CLAs.
- Good nutrition and irrigation programs can improve the productivity of HLB-affected trees and improve tree health, potentially making citrus production profitable under HLB-prevalent conditions.
- When considering rejuvenating HLB-affected trees with intensive nutrition and irrigation programs, tree age and disease severity should be considered.
- No one fertilizer program can be suitable for all groves.

Why Different Management Programs

- Each grove is unique due to a number of factors alone or in combination, such as:
 - Soil type
 - Method of fertilization
 - Soil pH
 - Irrigation scheduling
 - Location
 - Tree nutrient status
 - Irrigation water quality
 - Tree age
 - Organic matter in soil
 - Variety and vigor
- Nutrition and irrigation programs should be customized to address these unique situations.



Credit: T. Jones, UF/IFAS

Goal

- To improve production of HLB-affected trees, nutrition, irrigation, and soil pH should be considered together, because each can influence the efficacy of the others in overcoming the effects of HLB on tree performance.



CLas-positive Valencia trees in central (A) and southwest (B) Florida (high psyllid pressure) under an intensive nutrition and irrigation program. These trees yielded more than 2.5 boxes per tree.

Credit: T. Vashisth, UF/IFAS CREC

Irrigation Program

- HLB-affected trees have a compromised, debilitated root system; therefore, their water uptake potential is limited.
- The canopy of HLB-affected trees is often small; therefore, the water requirement is less than that of a full-canopy healthy tree.
- Increase frequency of irrigation applications and decrease duration.
 - Because a small root system can only take up a small amount of water at a time, excess water is likely to leach out of the root zone.
 - Frequent irrigation scheduling helps ensure that the tree is not undergoing any water deficit/drought stress.



Microsprinkler Irrigation



Drip Irrigation

Soil and Irrigation Water pH

- Soil pH determines the solubility and bioavailability of nutrients essential for citrus growth and yield.
- Low soil pH exacerbates nutrient leaching problems.
- High soil pH makes micronutrients unavailable.
- For optimal performance, keep soil pH in the 5.8–6.5 range.
- Management of soil pH and nutrients should include annual soil and water quality testing.
- Irrigation water acidification, elemental sulfur application, or use of acidifying fertilizers are recommended to reduce soil pH into the acceptable range.
- Too low or too high soil pH can cause additional stress on the root systems.
- Frequent soil pH testing should be an indispensable component of irrigation and nutrition management.

Nutrition Program

- The goal of a nutrition program should be **continuous availability of all nutrients** to the tree year-round.
- HLB-affected trees have a small root system, resulting in limited water and nutrient uptake; therefore, making nutrients continuously available to the tree is beneficial.
- A nutrition program should be a combination of soil- and foliar-applied nutrients. However, do not rely solely on foliar application for any nutrient.
- Soil-applied nutrients are taken up by the plant with the water uptake; therefore, irrigation scheduling is important.
- The placement of fertilizer (right place) is critical; it should be placed in the wetted zone as the uptake of nutrients occurs in solution.
- Frequent leaf nutrient analysis is essential for an effective nutrition program because it helps growers assess if the fertilizer program is meeting tree requirements.
- The focus of the nutrition program should be on leaf nutrient concentrations and not on the rate of nutrient applied.
- Fertilizer programs should have all nutrients in the right balance.
- Optimal soil pH is critical for making nutrients available to the tree; the soil pH needs to be in the right range at the time of nutrient application.
- If soil pH adjustments are made periodically, the fertilizer application should be coordinated to occur after the pH adjustment.



Fertilizer should be applied in the wetted zone of the soil where the irrigation water falls.