

KEY IRRIGATION AND NUTRIENT MANAGEMENT BMPS FOR HLB-AFFECTED GROVES

Davie Kadyampakeni

Assistant Professor UF/IFAS CREC

Lake Alfred, FL.

E-mail: dkadyampakeni@ufl.edu

Status of current BMP's

- Yield-based
- Developed for citrus before HLB
- HLB-trees are less efficient in nutrient uptake
- Studies are underway to revise the citrus BMPs for N & P
- Today's presentation will focus on what you should be doing now in your irrigation and nutrient management programs

Key Takeaways: Irrigation Applications

- FAWN weather stations can be used along with irrigation apps to schedule irrigation and reduce nutrient leaching.
- Irrigation decisions should be based on use of soil moisture sensors recommended for Florida sandy soils to minimize nutrient leaching.

Key Takeaways: Nutrient Applications

- Current data suggests the need to update secondary macronutrient and micronutrient guidelines for HLB-affected trees: improved yield, improved canopy size.
- It is good to note the lag time for nutrient applications to show effect in yield, canopy and trunk size.
- Aim to keep leaf macronutrients and micronutrients at optimum to high ranges.
- With macronutrients and micronutrients we observed reduced root dieback and increased root growth because root density was increased by foliar nutrient application and the tree was more efficient in soil nutrient applied uptake.
- Use of bi-weekly fertigation kept soil nitrate in the top 6 inches.
- More work on N and P is needed to establish optimal thresholds for HLB affected citrus.

Irrigation: Helpful tools to meet BMP standards

- FAWN weather stations can be used along with irrigation apps to schedule irrigation and reduce nutrient leaching.
- FAWN-based irrigation scheduling prevented soil N₃ leaching below 15 cm (6 inches)

[https:// fawn.ifas.ufl.edu](https://fawn.ifas.ufl.edu)





Factors impacting irrigation decisions

- Irrigation decisions should be based on use of soil moisture sensors recommended for Florida sandy soils to minimize nutrient leaching.
- It is good to also use soil moisture sensors to help determine if enough water is maintained in the root zone.

Soil Water Sensors (pros/cons)

Tensiometer



Granular matrix



Capacitance



TDT



TDR



Soil water sensor type	Measured soil volume	Sensitivity to air gaps/loose soil	Sensitivity to salinity	Suitability for sandy soils	Accuracy	Calibration for different soils	Maintenance
Tensiometer	large	high	low	low	high	no	high
Granular matrix	large	high	medium-high	low	low	no	high
Capacitance	medium	high	medium-high	medium	medium	yes	low
TDT	large	medium-low	low	high	high	no	low
TDR	large	medium-low	low	high	high	no	low

Nutrient Management

- Root density of diseased trees decreases when soil applied micronutrients are used because the roots can not efficiently uptake those micros
- HLB affected trees need both foliar and soil applied nutrients
- Note the lag time (~1.5 years) for nutrient applications to show effect in yield, canopy and trunk size

Foliar Applications of Nutrients

- We observed improved canopy volumes and fruit yields with foliar applications of essential nutrients on 'Valencia' sweet orange with 3x current recommendation.
 - Mn 15 lbs / A
 - Zn 15 Lbs / A
 - B 0.75 lbs / A
- The key was to keep Mn, and Zn in the optimum or high range of leaf nutrient concentration.

Soil Application of Nutrients

- Improved fruit yield and canopy volume between 2018 and 2020 as a results of Ca (40lbs/ac), Mg (40lbs/ac) and (Ca, 20lbs/ac + Mg, 20 lbs/ac) fertilization.
- Fertigation of N was a more efficient way to improve Leaf N
 - You can use lower rates of N
 - Use FAWN irrigation scheduling to prevent leaching
 - Use of bi-weekly fertigation kept soil nitrate in the top 6 inches

In Summary...

- FAWN weather stations can be used along with irrigation apps to schedule irrigation and reduce nutrient leaching.
- Irrigation decisions should be based on use of soil moisture sensors recommended for Florida sandy soils to minimize nutrient leaching.
- Current data suggests the need to update secondary macronutrient and micronutrient guidelines for HLB-affected trees: improved yield, improved canopy size.
- With macronutrients and micronutrients we observed reduced root dieback and increased root growth because root density was increased by foliar nutrient application and the tree was more efficient in soil nutrient applied uptake.

In Summary...

- It is good to note the lag time for nutrient applications to show effect in yield, canopy and trunk size.
- Aim to keep leaf macronutrients and micronutrients at optimum to high ranges.
- Use of bi-weekly fertigation kept soil nitrate in the top 6 inches.
- More work on N and P is needed to establish optimal thresholds for HLB-affected citrus.

Acknowledgements

- Drs. K. Morgan and A. Atta (SWFREC)
- Drs. T. Vashisth and E. Johnson (CREC)
- Funding from UF/IFAS Citrus Initiative, USDA MAC APHIS
- Soil and Water Science Labs in Immokalee and Lake Alfred; Root Pathology Lab in Lake Alfred

