

# Citrus Notes



**Chris Oswalt**  
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for  
Polk &  
Hillsborough  
Counties

## IMPORTANT DATES

**OCTOBER 18, 2023**  
**OCTOBER OJ BREAK**  
Lake Alfred, FL

**NOVEMBER 2, 2023**  
**CITRUS EMPLOYEE SAFETY TRAINING & TRACTOR RODEO**  
Bartow, FL

**NOVEMBER 15, 2023**  
**NOVEMBER OJ BREAK**  
Lake Alfred, FL

**DECEMBER 20, 2023**  
**DECEMBER OJ BREAK & NEW VARIETY DISPLAY**  
Lake Alfred, FL

## CONTACT INFO

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**HILLSBOROUGH COUNTY EXTENSION SERVICE**

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Ext. 541231

## Florida Citrus the 2023-2024 Season Edition

### October OJ Break

Several educational events will kick off the 2023-24 citrus season.



Our first of the season will be the October OJ Break, to be held on Wednesday, October 18, 2023. It will begin at 10:00 a.m. at Lake Alfred's UF/IFAS Citrus Research and Education Center. The agenda will include Dr. Megan Dewdney, UF/IFAS CREC Extension Citrus Pathologist, and Dr. Matthew Mattia from the Ft. Pierce USDA, ARS.

Program and registration information will be forthcoming in next month's issue of the newsletter.

### Citrus Employee Safety Training & Tractor Rodeo

Please mark your calendars for our annual Citrus Employee Safety Training



and Tractor Rodeo program on Thursday, November 2, 2023. The program provides EPA-approved annual WPS Handler Training and other safety

topics. Look for specifics on the program and registration information in our next issue of Citrus Notes. The program is at the Stuart Conference Center at our Bartow Office, 1710 US Hwy 17 S.

### November OJ Break

The November OJ Break will be held on Wednesday, November 15, 2023, beginning at 10:00 a.m. at the UF/IFAS Citrus Research and Education Center in Lake Alfred.



This month we have on schedule Dr. Lauren Diepenbrock, UF/IFAS CREC Citrus Extension Entomologist, and Dr. Nian Wang, J. R. (Rip) Graves Eminent Scholar Endowed Chair UF/IFAS CREC.

Program information and registration information will be forthcoming in a subsequent issue of the newsletter.

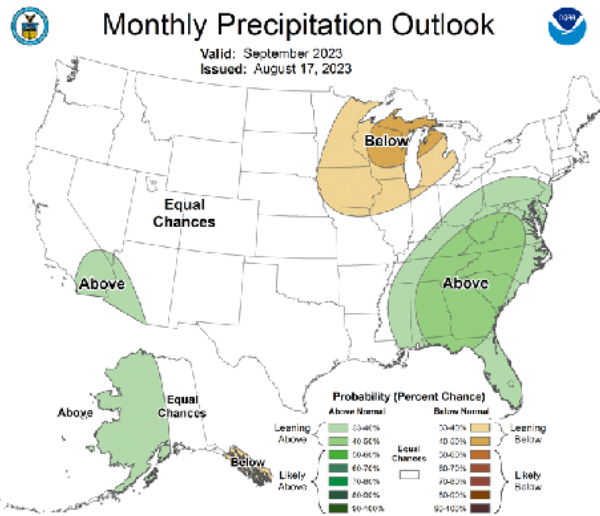
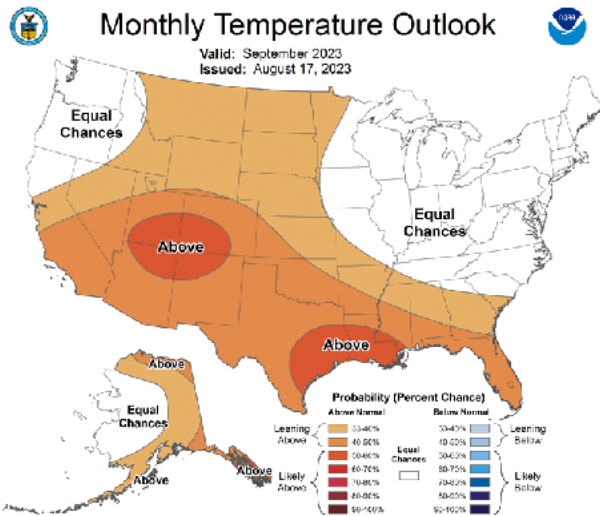
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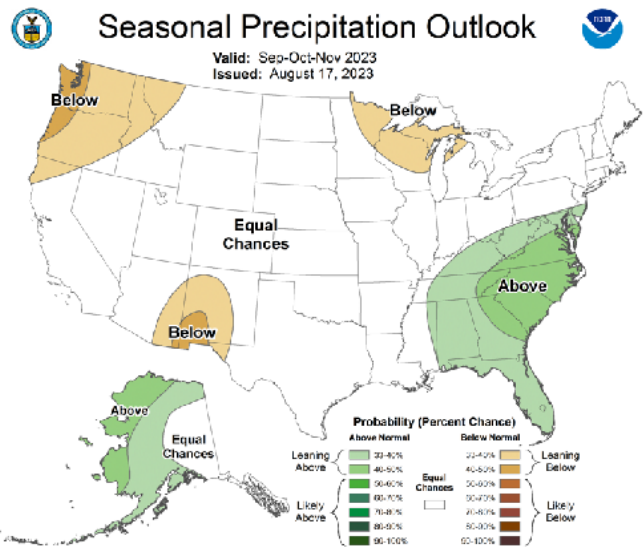
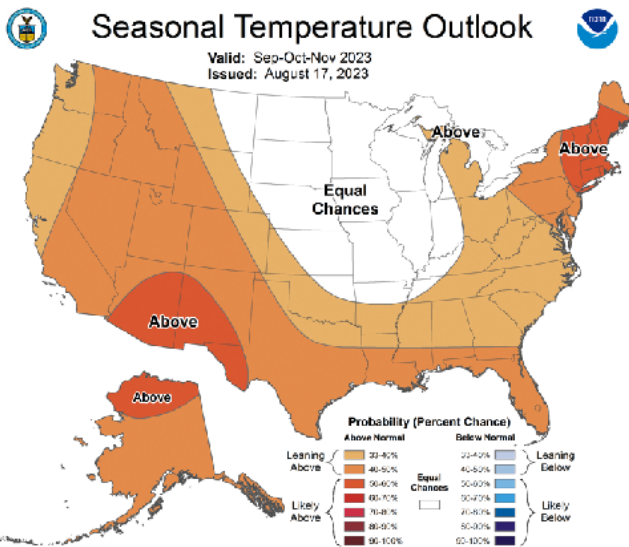
# WEATHER OUTLOOK

## MONTHLY OUTLOOK FOR SEPTEMBER 2023 - TEMPERATURE AND PRECIPITATION



# WEATHER OUTLOOK

## MONTHLY OUTLOOK FOR SEPT/OCT/NOV 2023 - TEMPERATURE AND PRECIPITATION



### 2023 Fall Outlook

As I finish up this issue of Citrus Notes, it's hard to believe that fall is on the way. It has undoubtedly been hot and dry this summer, and based on the forecast, it looks like rain may be on the horizon.

To get a better understanding of what to expect this fall, one of the primary sources would be the National Weather Service Climate Prediction Center (CPC) and the El Niño Southern Oscillation (ENSO) forecast. According to the CPC, there is a 95% chance of El Niño ENSO conditions continuing to develop this winter (Dec 2023 - Feb

2024), with a 67% (2 in 3 odds) probability of El Niño developing into a “strong” type (>1.5°C).

Heading into winter, this generally results in a more zonal flow of upper-level winds, leading to more clouds, lower average temperatures, and a wetter winter based on the above-average forecast for rainfall.

## The 2023-24 Florida Citrus Production Guide

The new 2023-2024 Florida Citrus Production Guide is available for pickup at your local UF/IFAS Extension Offices. The beginning section of the production guide covers general information that growers will find helpful, including pesticide resistance and management, PPE statements on pesticide labels, WPS reference information, plus much more. The guide is also divided into the following sections:

- Horticultural Practices
- Mites, Insects, and Nematodes
- Diseases
- Weeds
- Pesticides

Each section gives detailed information relating to the individual topics. Growers are given important information they can use in the field, such as symptoms to look for in the grove, monitoring techniques, and the current UF/IFAS management and control recommendations.

Please let us know if you would like a copy of the new Florida Citrus Production Guide!

### Leaf Sampling: Selecting the Right Leaf Make a Difference

**Researchers:** Tripti Vashisth  
**Contact:** Tripti Vashisth,  
[tvashisth@ufl.edu](mailto:tvashisth@ufl.edu) UF/IFAS CREC

#### Take Home Message:

- Although fruiting branches are lower in the macronutrients year-round, leaf sampling from non-fruiting branches should continue for management decisions.
- Currently suggested to perform multiple leaf nutrient analysis in a year, more research is needed to solidify leaf nutrient sampling methods and timing.

- A final year of leaf collection and analysis is in progress.

**Effort Statement:** For two years, nutrient analysis continues to be generally consistent — macro nutrients are lower in fruiting branches than nonfruiting branches whereas Ca and Mg are the opposite. The presence of fruit on a branch influences nutrient concentrations, counterintuitively the differences are observed in the later stages of fruit development than early.

**Summary:** Leaf nutrient concentrations vary between nonfruiting and fruiting branches. When leaf sampling methods were established, many factors went into where leaf samples should be collected from on the tree. One key factor was samples should be consistently collected from either nonfruiting or fruiting branches. Methods and interpretations were created based on consistency and the ease of leaf collection. UF/IFAS recommendations are based on leaf nutrient concentrations from nonfruiting branches. When sampling, all leaves should be from nonfruiting branches. Due to the variability of leaf nutrient concentration between branch types, consistency is key to obtaining an accurate analysis. It is also critical to not collect leaf samples from both nonfruiting and fruiting branches. Mixing leaf samples can skew the leaf analysis and lead to inadequate fertilization. Recently, there have been questions about the leaf sampling methods on HLB-affected trees. Since the current recommendations are based on healthy trees, should the sampling methods be different for HLB-affected trees? Two years of research has indicated macro nutrients (nitrogen (N), phosphorus (P), potassium (K)) in HLB-affected trees follow the same pattern of healthy trees with lower nutrient concentrations in fruiting branches than in nonfruiting branches. Secondary macro nutrients (Calcium (Ca), Magnesium (Mg)) leaf nutrient

concentrations in HLB-affected trees are generally higher in fruiting branches than nonfruiting branches, the same as healthy trees. The continuation of this citrus nutrition research project on HLB-affected trees will help to solidify how nutrient concentrations vary between nonfruiting and fruiting trees and aid in determining leaf sampling recommendations for HLB-affected trees. Collecting leaves from both nonfruiting and fruiting branches or only fruiting branches can skew the nutrient results and lead to unnecessary fertilizer purchases. Consistent leaf sampling from nonfruiting branches will provide the most accurate leaf analysis and aid in making appropriate fertilizer decisions.  
*Source: Keeping Florida Citrus Growers Informed. UF/IFAS. Gainesville, FL. Aug 2023. pg 11.*





# Q&A

## Factors Affecting Mineral Concentration of Citrus Leaves

Chris Oswalt

From time to time, growers may have some compelling reason to collect and analyze citrus leaf samples at different times of the year. Current tables that allow growers to interpret the results of their citrus leaf analysis is based on the collection and analysis of 4 to 6 month-old leaves from non-fruiting twigs. This begs the question as to the potential consequences of interpreting samples taken from leaves other than those recommended. The following questions and answers will help you understand the possible implications of leaf sampling outside of the current recommendations.

### **What is the effect on leaf age and the mineral concentration in citrus leaf samples?**

Nitrogen is less consistent and variable based on nitrogen fertilization timing, specifically on sandy soils with low nitrogen reserves. Nitrogen uptake and mobility are relatively fast, and samples taken immediately after fertilizer applications will likely be higher. Leaf nitrogen levels will decrease with leaf age. The levels are relatively stable in the 4 to 6 month period when taken from non-fruiting twigs.

Phosphorus and potassium decrease with leaf age. Calcium, boron, iron, and manganese increase with leaf age. Magnesium initially increases with leaf age to about 6-month timeframe then decreases. Copper and zinc remain stable with increasing leaf age.

### **What about within tree mobility of citrus mineral concentrations?**

Minerals that are considered mobile in plants are nitrogen, phosphorus, potassium, magnesium, molybdenum, and chlorine. These will depend on the time of year, and source/sink relationship within the tree, will move from older leaves into newly developing flush leaves.

Calcium, sulfur, boron, copper, iron, manganese, and zinc are concerned non-mobile mineral, and thus movement out from older leaves to other parts of the tree is significantly reduced. This information will be useful in our subsequent discussion with interpreting citrus leaf analysis.

### **What are the consequences of sampling fruiting twigs versus non-fruit twigs?**

Fruiting twig leaves will contain high levels of calcium and magnesium and lower levels of nitrogen, phosphorus, potassium, zinc, copper, iron, and boron.

### **What about leaves collected from actively flushing shoots?**

Leaves from flushing shoots have slightly lower levels of nitrogen, potassium, and magnesium. These lower levels are likely due to the mobility (as mentioned previously) of these minerals within the tree.

### **What about the size of the leaf and the location on the tree?**

Although differences do exist, larger leaves have higher potassium levels, so the collection of normal/average size leaves is adequate.

The location on the tree does affect the mineral concentration of citrus leaves. Examples would be potassium (in Valencia orange) significantly higher at the 0 to 6-foot height than at a height greater than 6 feet. Potassium was also more elevated on inside canopy leaves versus outer canopy leaves, while magnesium was lower inside the canopy. So it would be best to collect samples randomly from around the tree canopy and not just one location on all trees.

### **What about the tree to tree variation or variations due to rootstock and scion?**

Samples should be collected from uniformed and representative trees. This methodology should minimize any sample variation.

Significant differences can occur between trees on different rootstocks and scions. This becomes somewhat problematic if the trees are interplanted. If they are in separate blocks or interplanted, one could sample each combination to determine if there are significant differences in mineral nutrition of the trees. Once this is done, a decision on how to best handle this variation can be made.

### **How does irrigation potentially affect mineral nutrition?**

Excessive irrigation can lead to the leaching of plant nutrients resulting in potentially deficient levels of mineral concentration in leaves.

### **What is the effect of fruit load on nutrition?**

In "on" years magnesium levels could be lower in seedy citrus varieties, especially grapefruit. Heavy crops during "on" years can result in a decrease in leaf nitrogen, phosphorus, and potassium and an increase in leaf calcium levels.

# Development, Evaluation, and Delivery of Citrus Huanglongbing Management Approaches by Targeting its Nature as a Pathogen-Triggered Immune Disease

**Researchers:** Nian Wang, Jude Grosser, Chooa El-Mohtar, Zhengfei Guan, Davie Kadyampakeni, Chris Oswalt, Tripti Vashisth, Yu Wang

**Contact:** Nian Wang, [nianwang@ufl.edu](mailto:nianwang@ufl.edu) UF/IFAS CREC

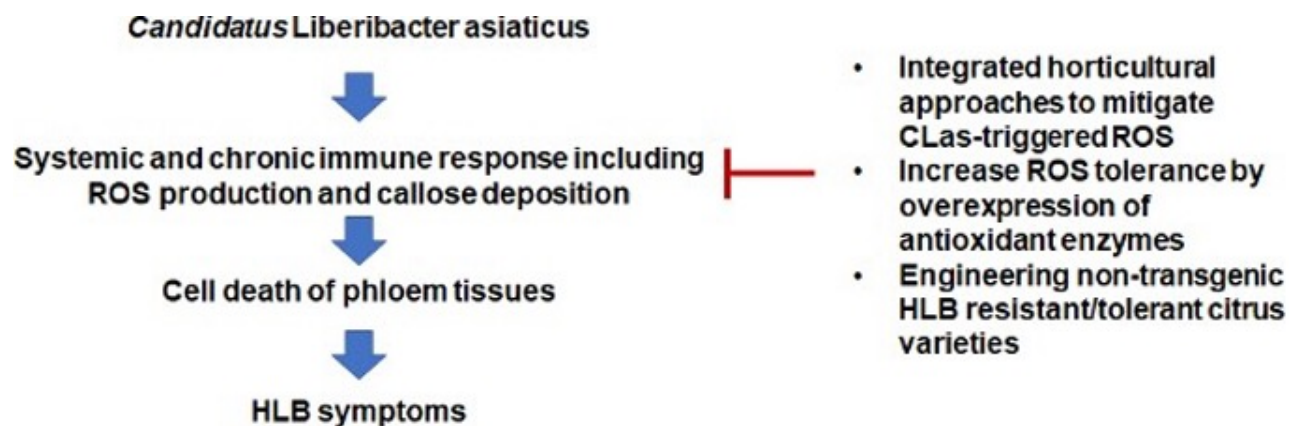
## Take Home Message:

- Field trials of testing different horticultural approaches to manipulate oxidative stress are ongoing.
- At least 14 different transgenic lines overexpressing antioxidant enzymes were generated and will be tested in the field starting in 2023.
- Multiple transgene-free genome editing tools were developed and are being used to generate transgene-free HLB resistant or tolerant citrus varieties.

**Summary:** Citrus huanglongbing (HLB) is a pathogen-triggered immune disease similar to sepsis in humans. Recent work led by project director Wang demonstrated that CLas stimulates a systemic and chronic immune response in citrus phloem including

reactive oxygen species (ROS) production and callose deposition, which causes systemic phloem cell death and subsequent HLB disease symptoms. Our central hypothesis is that HLB can be controlled by managing CLas-triggered systemic and chronic immune responses including ROS production. We will control HLB with three approaches: develop integrated horticultural approaches to mitigate CLas-triggered ROS; conduct optimization of combined applications of micronutrients, gibberellic acid (GA), and antioxidants to mitigate CLas-triggered ROS production, phloem cell death and HLB symptoms; protect citrus plants from CLas-triggered ROS via citrus tristeza virus (CTV)-mediated expression of antioxidant enzymes and silencing of key genes involved in CLas-triggered ROS production; and generate non-transgenic HLB resistant or tolerant citrus varieties. We will conduct genome editing of key genes required for HLB disease development to generate non-transgenic genome edited citrus varieties.

*Source: Keeping Florida Citrus Growers Informed. UF/IFAS. Gainesville, FL. Aug 2023. pg 59.*





# PRIVATE / ROW CROP APPLICATOR + CORE PESTICIDE PREP. TRAINING

**Location:**

- UF/IFAS Extension Polk County (1702 S Holland Pkwy, Bartow, FL 33830)

**Hours:**

- 8:00am-5:00pm (Testing is from 1:30 pm – 5:00 pm)

**Date:**

- September 15, 2023

**Phone:**

- 863-519-1049 or 863-519-1041

**Cost:**

- \$15.00 (Lunch included)

**CEUs:**

- 2 CORE 487 or 482
- 2 Private applicators, 2 Ag Row Crop, or 2 Ag Tree

**Registration at:**



**or**

<https://www.eventbrite.com/e/private-row-crop-applicator-core-pesticide-prep-training-tickets-694808690497?aff=oddtcreator>



Photo courtesy Lourdes Pérez Cordero

# PRIVATE APPLICATOR EXAM REVIEW

**Lourdes Pérez Cordero , UF/IFAS  
Extension Highlands County**

Photo credits: Tyler Jones, UF/IFAS



The UF/IFAS Extension Highlands County in collaboration with the UF/IFAS Extension Polk County presents “Private Applicator Exam Review.” Course presenters will be Lourdes Pérez: UF/IFAS Agriculture & Natural Resources Agent of Highlands County and Luis Rodríguez: UF/IFAS Small Farms & Pesticide Education Agent of Polk County.

This presentation is will be conducted on September 28, 2023 beginning at 8:30 AM. This training is designed to prepare students for the Ch. 487 pesticide licensing exam which will be offered that afternoon. Applicators will learn about pest and pest control strategies in agricultural settings, Worker Protection Standards, application equipment, calculations, and other topics..

The University of Florida is committed to providing universal access to our events. For disability accommodations, please contact Lourdes Pérez Cordero at least 2 weeks in advance. Advance notice is necessary to arrange for some accessibility needs.

**September 28, 2023**

8:30 AM – 12:30 PM

**Location:**

Bet J Harris Jr. Agricultural Center  
Conference Room 2, 4509 George  
Blvd, Sebring, FL 33825

Pre-registration required.

<https://privateapplicator.eventbrite.com/>

Cost: \$15 per person



CEUs Available:

4 Private, Ag Row, Ag Tree

For more information contact:

Lourdes Pérez Cordero,  
[lperezcordero@ufl.edu](mailto:lperezcordero@ufl.edu)  
863-402-6540

<http://highlands.ifas.ufl.edu>





2023

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