



Zinc deficiency symptoms



Manganese deficiency symptoms

Photos by Moring Zahri, UF/IFAS

Updates for citrus nutrient best management practices

By Kelly T. Morgan, Davie Kadyampakeni and Tripti Vashisth

This article reviews current University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) citrus fertilizer recommendations and provides updated information about recently approved recommendations for secondary macronutrients and micronutrients.

Citrus growers have been very concerned about fertilizer applications and nutrient management since citrus greening (huanglongbing or HLB) was found in Florida. Lately, citrus growers have become more concerned with nutrient management because of increased inspections and scrutiny of adherence to best management practices (BMPs).

Unfortunately, HLB has resulted in reduced citrus yields over the past 17 years, and no cure has been developed. Nutrient management appears to be key for maintaining tree production until that silver bullet is found.

The current UF/IFAS citrus recommendations for fertilizer nitrogen (N) and potassium (K) are

based on grove-specific yields which indicate that applications of these nutrients should be reduced as yields decrease. No one at UF/IFAS feels that reduced fertilizer applications are the answer to “living with” HLB. However, BMP verification by the Florida Department of Agriculture and Consumer Services (FDACS) uses UF/IFAS recommendations to evaluate producer fertilizer practices. FDACS found that citrus growers have been applying more fertilizers [particularly phosphorus (P)] than UF/IFAS recommendations would indicate, given the reduced yields and tree health experienced by most commercial citrus growers.

MORE MICRONUTRIENTS AND MACRONUTRIENTS

Researchers at UF/IFAS have been conducting field trials since shortly after HLB was discovered in Florida to evaluate the effect of citrus tree health and yields. Initially, research efforts evaluated deficient micronutrients including manganese (Mn),



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Table 1. Recent changes in UF/IFAS citrus secondary macronutrient and micronutrient fertilizer recommendations

Nutrient	Annual Foliar Applications		Annual Soil Applications	
	Pounds Metallic per Acre			
	Previously Recommended Fertilizer Rates Prior to 2022	Recently Approved Fertilizer Recommended Rates	Previously Recommended Fertilizer Rates Prior to 2022	Recently Approved Fertilizer Recommended Rates
Calcium	No recommendation	No recommendation	As needed for pH moderation	40
Magnesium	No recommendation	No recommendation	As needed for pH moderation	40
Manganese	3-5	15	7-10	20-25
Zinc	3-5	15	No recommendation	20-25
Boron	1/4	1/4	1	No recommendation change

zinc (Zn) and boron (B) in leaves of HLB-affected trees. These micronutrients are also seen as potential nutrients that could improve citrus tree productivity. Since those early experiments, researchers found that secondary macronutrients calcium (Ca) and magnesium (Mg) are also often deficient in leaves of HLB-affected trees. Research was conducted on improving recommendations of those nutrients for HLB-affected trees.

Improved and revised recommendations will appear in the 2023 Citrus Production Guide.

The UF/IFAS committee that approves fertilizer recommendations recently approved increasing micronutrients and secondary macronutrients recommendations for HLB-affected trees based on these research results (Table 1). The micronutrient applications were found to be more effective

if applied in split applications of three to five times per year to leaves, or three to six times per year to the soil. These improved and revised recommendations will appear in the 2023 Citrus Production Guide.

SITE-SPECIFIC FERTILIZATION

One criticism of the current UF/IFAS recommendations, and therefore BMP requirements, is that they do not reflect field conditions that vary from grove to grove. Senate Bill 1000 was passed in the 2022 Florida legislative session to address this. The new law allows citrus growers to apply site-specific fertilizers and/or rates recommended by Certified Crop Advisors based on research results.

ADDITIONAL RESEARCH IN THE WORKS

Currently, research on fertilizer application rates of N and P is continuing with the goal of improving UF/IFAS recommendations for HLB-affected trees.

Coordinated research on improved fertilizer recommendations was initiated by UF/IFAS in 2021–22 with \$1.7 million in legislative support for

farm-scale fertilizer research on tomatoes and potatoes. This support was increased to \$8.7 million for 2022–23 and will be used to update UF/IFAS’s capacity to conduct fertilizer research that was lacking in the past, continue work on tomatoes and potatoes, and start N and P fertilizer rate research on other crops, including citrus.

The research plan for citrus is to conduct fertilizer application trials at multiple locations (including Satsuma mandarins in North Florida) for five years if the legislative support continues. Results from research using soluble fertilizer, fertigation and controlled-release fertilizers will provide data that will be added to research done over the past three years. Improved N and P recommendations should be available well before the end of the research projects. 🍊

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