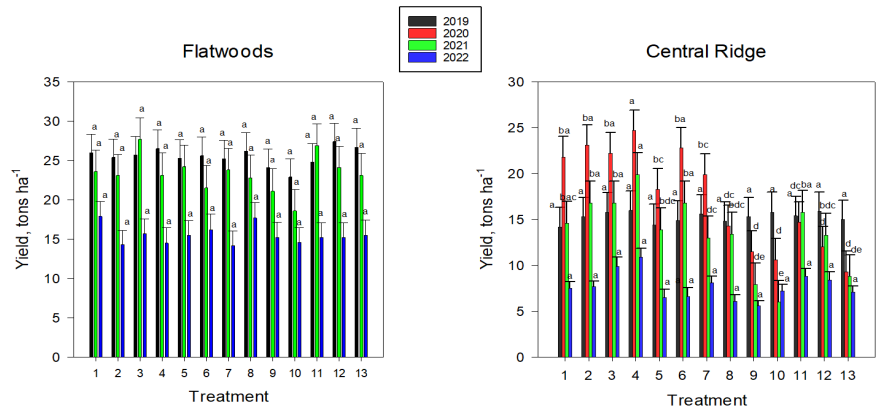


# Development of Root Nutrient and Fertilization Guidelines for Huanglongbing-affected Orange and Grapefruit Trees

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Fruit yield (ton ha<sup>-1</sup>) of 'Valencia' orange (*Citrus sinensis*) trees at the Flatwoods and Central Ridge sites as a function of variable fertilizer rates. Treatment 1 (Standard rate-control), treatments 2 to 4 are standard rate + 1x macro + 1x-, 2x-, and 4x-micronutrient (soil applied), treatment 5 to 7 are standard rate + 2x macro + 1x-, 2x-, and 4x-micronutrient (soil applied), treatments 8 to 10 are standard rate + 1x macro + 1x-, 2x-, and 4x-micronutrient (foliar applied), and treatments 11 to 13 are standard rate + 2x macro + 1x-, 2x-, and 4x-micronutrient (foliar applied). Error bars with the same letter are not significantly different according to Tukey's HSD test at  $p = 0.05$ .

## Take Home Message:

- Higher macronutrient and micronutrient fertilization rates led to higher fruit yields and faster root growth.
- Soil fertilizer application for micronutrients was more effective in increased canopy size and root growth than foliar fertilization.

**Effort Statement:** This project is now completed.

**Summary:** Huanglongbing (HLB) disease lowers tree performance by reducing water and nutrient uptake as a result of root loss. HLB-affected trees have a fibrous root loss of about 30 to 80%, which increases

as HLB symptoms develop in the canopy. Investigating optimal nutrient concentrations in citrus roots thus improves our understanding of HLB dynamics concerning root nutrition and fertilizer application methods. This study sought to evaluate nutrient uptake of HLB-affected orange trees via soil fertilizer applications for 5- to 6-year-old 'Valencia' orange trees on Swingle rootstock at Ridge and Flatwoods sites. Macronutrients and micronutrients were applied at varying fertilization rates of standard fertilization via fertigation according to UF/IFAS guidelines. We compared the standard fertilizer program with elevated macro- and micronutrient fertilization programs. Soil and leaf

samples were collected for nutrient concentration analysis in spring and fall 2019 and summer 2020. No significant differences among treatments were observed for tissue and soil nutrient concentrations due to nutrient interactions. Fruit yield between 2019 and 2020 harvest seasons increased with increased nutrient availability. Therefore, at higher fertilization rates of (standard fertilization + 40 lbs/acre Ca + 40 lbs/acre Mg + 220 lbs/acre K + 20 lbs/acre Fe, 20 lbs/acre Mn + 20 lbs/acre Zn + 4 lbs/acre B), HLB-affected trees showed increased nutrient uptake and root growth, improving overall tree performance.

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