

# Development of Root Nutrient and Fertilization Guidelines for HLB-Affected Orange and Grapefruit Trees

**Researcher:** Davie Kadyampakeni  
**Contact:** [dkadyampakeni@ufl.edu](mailto:dkadyampakeni@ufl.edu)  
UF/IFAS CREC



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. For macronutrients, the rates were a) standard fertilization + 40 lbs acre<sup>-1</sup> Ca + 40 lbs acre<sup>-1</sup> Mg + 220 lbs acre<sup>-1</sup> K and b) standard fertilization + 90 lbs acre<sup>-1</sup> Ca + 90 lbs acre<sup>-1</sup> Mg + 440 lbs acre<sup>-1</sup> K. For micronutrients, the rates were a) standard fertilization + 5 lbs acre<sup>-1</sup> Fe, 5 lbs acre<sup>-1</sup> Mn, 5 lbs acre<sup>-1</sup> Zn + 1 lbs acre<sup>-1</sup> B, b) standard fertilization + 10 lbs acre<sup>-1</sup> Fe, 10 lbs acre<sup>-1</sup> Mn, 10 lbs acre<sup>-1</sup> Zn + 2 lbs acre<sup>-1</sup> B and c) standard fertilization + 20 lbs ha<sup>-1</sup> Fe, 20 lbs acre<sup>-1</sup> Mn + 20 lbs acre<sup>-1</sup> Zn + 4 lbs acre<sup>-1</sup> B. 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<sup>-1</sup> Ca + 40 lbs acre<sup>-1</sup> Mg + 220 lbs acre<sup>-1</sup> K + 20 lbs ha<sup>-1</sup> Fe, 20 lbs acre<sup>-1</sup> Mn + 20 lbs acre<sup>-1</sup> Zn + 4 lbs acre<sup>-1</sup> B), HLB-affected trees showed increased nutrient uptake, improving overall tree performance.

## Funding

