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—Scientific Note—

Fertilizer Inputs Affect Grapefruit Root Health

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Huanglongbing (HLB) is a disease caused by *Candidatus* Liberibacter asiaticus that impacts citrus production areas on a global scale and has decreased citrus yield in Florida by more than 70% over the past decade. Root structure–function relationships remain an understudied component of the tree's responses to infection and may play a key role in tolerance. An HLB-damaged root system has poor water and nutrient uptake capacity, which leads to nutrient deficiencies and impaired tree performance. Furthermore, current fertilization guidelines were developed prior to HLB. However, these guidelines must be revisited given the widespread prevalence of HLB-affected trees. The aim of this study was to evaluate the effects of different fertilizer forms and rates with different planting densities on HLB-affected citrus root health. The study consisted of four foliar fertilizer treatments, which included 0×, 0.5×, 3×, and 6× from the current University of Florida, Institute of Food and Agriculture (UF/IFAS) recommendation. Plant material used in this study consisted of eight-year-old 'Ray Ruby' grapefruit trees (*Citrus* × *paradisi*) grown on Kuharske citrange (*Citrus sinensis* × *Poncirus trifoliata*) rootstock. The planting densities studied were low (300 trees/ha), medium (440 trees/ha), and high (975 trees/ha). Additionally, two granular fertilizer treatments were used, specifically, two controlled-release fertilizer blends (16–3–20 and 12–3–9).

Trees planted at high density had significantly greater root density and total root length than those planted at low density. Soil samples from citrus fertilized with 3× and 6× foliar treatments had significantly higher zinc and manganese concentrations than those fertilized with 0× foliar treatment. Soil samples from plots fertilized with the standard granular treatment had significantly higher potassium, calcium, boron, and pH than those fertilized with the improved granular treatment.

Rhizosphere samples that were previously collected will be analyzed to determine possibly correlations between changes in the bacterial community composition and fertilizer treatments. Both soil and root nutrient data will also be used to identify potential correlations with rhizosphere bacterial community composition.

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