CITRUS ADVANCED TECHNOLOGY PROGRAM

QUARTERLY & FINAL PROGRESS REPORT FORM: Control of Citrus Greening, Canker & Emerging Diseases of Citrus

▶ SELECT PERIOD January 2021

● Quarterly Report ○ Final

Proposal Title

How do subterranean pests and diseases affect root health of trees with and without HLB?

Today's Date: 03/21/2021

Sponsoring Organization (drop-down): Citrus Research and Development Foundation

Category (drop down): CLas Bacteria

ABSTRACT (750-word Executive Summary-public report-do not disclose proprietary information or intellectual property)

Citrus Nematode Exp 1 - The experiment was terminated in early January. Plants were removed from pots and weighed (tops and rinsed/blotted roots). Aliquots of fibrous roots were collected for metabolomic analysis and CLas determination (1g), nematode infection rate (2g), and moisture content determination (5g). Females and offspring were separated from roots by comminuting in a dilute sodium hypochlorite solution; juvenile and male nematodes were extracted from soil on Baermann funnels. The females/g root (458) on the susceptible rootstock Carrizo citrange exceeded the damage threshold by more than twofold and those on the resistant rootstock Swingle citrumelo were about half the number considered damaging (103). Roots also exhibited symptoms of infection by *Phytophthora nicotiana* and the presence of the oomycete in soil was confirmed in all treatments. The contaminant originated from the orchard in which the nematode inoculum was obtained. The effects of rootstock, treatment and their interaction were all highly significant and therefore the results from each rootstock were considered separately. Treatment with citrus nematode or CLas reduced the root weight of Carrizo citrange by 57% and 55%, respectively and by 60% when combined. An expected additive interaction between these pathogens would reduce roots by 80%, therefore, the interaction of these organisms on root weight was antagonistic. Citrus nematode and CLas reduced the root weight of Swingle citrumelo by 20% and 26%, respectively and by 4% when combined. An expected additive interaction between these pathogens would reduce roots by 41%, therefore, the interaction of these organisms on root weight was antagonistic. In the nematode susceptible rootstock there was a highly significant inverse relationship between the root weight and the nematode offspring recovered per gram of roots; however, HLB had no significant effect on nematode infection. The nematode resistant rootstock had significantly fewer females in roots (P=0.01) and offspring per rootweight (P=0.001) when infected by CLas. qPCR measurement of CLas infection in roots and tops of plants is ongoing.

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Organization UF, IFAS

Sponsor Project Number 19-016

Project Duration (years 2 *Year of Project* 1

% Completion of Objectives 65.00%

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