CITRUS ADVANCED TECHNOLOGY PROGRAM

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

▶**PROJECT QUARTER END** February 2022 ◯ *Quarterly Report* ◉ *Final*

Proposal Title

Understanding the role of systemic acquired resistance (SAR) in enhancing tolerance to HLB in the Parson Brown sweet orange

Today's Date	Sponsoring Organization (drop-down)	Category (drop down)
03/30/2022	Citrus Research and Development Foundation	Horticultural & Management

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

Conclusions of the one year preliminary study:

- Trees were evaluated on a quarterly basis from 8 different locations. Tree aged ranged from 20 to 40 years in these locations. Most locations had changed management several times in these years and there was no clonal identification records.
- `Parson Brown' trees, irrespective of location, clone or rootstock had enhanced SAR activity as indicated by enhanced PR1 and PR2 gene expression. Statistically significant differences were always observed in the different locations during the March and December samplings.
- PP2 gene downregulation was observed only in the `Parson Brown' trees. This indirectly suggests an active protection mechanism in the phloem of the `Parson Brown'. Targeted RNA seq and metabolomics of the phloem would confirm these results and provide more insights into the exact mechanism of HLB tolerance.
- All trees (`Parson Brown' and `Hamlin') evaluated in this study were HLB positive with similar *Ca*Las titer. `Parson Brown' trees however, maintained a good canopy and held on to fruit much better than comparable `Hamlin' trees.
- Oil content % ranged from 0.007 to 0.0011 in `Hamlin' juice whereas, it ranged from 0.020 to 0.042 in `Parson Brown' juice, depending on the location the fruit was harvested from. This could be due to clonal differences between trees grown in different locations and could help to differentiate between the different clones.
- Lbs. Solids Per Box were comparable between `Parson Brown' and `Hamlin.' However, `Hamlin' has recorded good Lbs. Solids Per Box in 2021, and samples will need be evaluated for multiple seasons to understand differences between the two early season sweet oranges.
- Limonin levels were less than 5 ppm in both `Parson Brown' and `Hamlin' and within acceptable levels.
- It was not possible to identify specific clones based on the data generated. Whole genome sequencing can shed insights into clonal differences by looking at the overall pattern of SNPs and INDELS among the specific selections.
- `Parson Brown' trees at a grower location in Lorida had the best growth, canopy coverage,

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Sponsor Project Number 20-014

Project Duration (years) 1 *Year of Project* 1

% Completion of Objectives (FDACS requirement) 100.00%

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