

Current Research Objectives

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Research topic: Tritrophic interactions between citrus, psyllid and *Candidatus liberibacter*.

Primary Research Objective(s):

- To investigate citrus response for both psyllid and CLAs, psyllid herbivory and bacterial pathogenicity.
- Interfering with the transmission by psyllid using RNA interference.

Research Goal: Reduce the HLB spread in new citrus plantings and maintain the existent grove productive.

Outcomes to date:

We learned the following facts:

- Herbivory by the Asian citrus psyllid (ACP) induces greater changes in the citrus plant volatile profile than does infection by the bacterium, CLAs.
- CLAs utilizes the energetic mechanism of ACP for its benefit including protein-protein interactions that mediate the circulation within ACP and the acquisition of ATP.
- Cell-to-cell signaling systems controls CLAs colonization in citrus and ACP.
- We determined the nutrients needed for the growth of CLAs and ACP by analyzing the chemical composition of phloem sap, ACP haemolymph, and honeydew. This work is being used by other labs to develop methods for culturing CLAs, and to improve diet solutions to rear ACP.
- We established RNAi technology to confirm the roles of certain genes in citrus and in ACP that are implicated in CLAs virulence and transmissibility.
- Used RNAi technology to establish management strategies for the control ACP by targeting genes implicated in its development and metamorphosis. Important genes are targeted by RNAi using the CTV-based induced gene silencing system in citrus trees.
- We are evaluated many new released citrus varieties for their tolerance to HLB. Sugar Belle showed tolerance to HLB and our chemical analysis identified important chemical elements behind this tolerance. We continue to evaluate other new varieties chemically to anticipate their level of tolerance.
- Additionally, we tested the effect of rootstock on Sugar Belle and we believe that swingle may be the best choice for better productivity.

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