

CRDF Research Update: Projects Focusing on Citrus Tree Response to HLB

By Harold Browning



Last month we discussed research projects funded by CRDF that address various aspects of the Asian Citrus Psyllid (ACP), its biology, ecology and control in relation to managing HLB. Understanding the vector and being able to reduce ACP populations greatly affects rates of spread of HLB.

This month, we discuss projects that focus on the citrus host plant, another component of the HLB system. There are 30 research projects that are directed at the plant, development of HLB symptoms, and efforts to affect symptoms of the disease. These are summarized below.

Detecting HLB-infected trees is an important feature of monitoring and responding to HLB infection. This is currently being accomplished primarily through DNA testing of suspect trees showing early symptoms. CRDF currently is providing support to two PCR (polymerase chain reaction) laboratories in place to analyze grower samples and to assist research projects in processing samples. The complexity and lack of sensitivity of PCR methods limit the use of this diagnostic method, and thus several other projects are evaluating alternative detection methods. These include sensory-based detection systems as well as detection relying on physiological or chemical changes to leaves following *Candidatus Liberibacter asiaticus* infection. A third approach is to develop additional molecular or serological tests. All of these methods seek quicker, more sensitive diagnostics.

The epidemiology of HLB continues to be an important area of research supported by CRDF. Projects are evaluating spatial and temporal incidence of HLB across Florida, determining factors most important in infection increase and disease movement. An additional element of this research is determining the extent to which seeds from infected citrus trees foster HLB transmission.

Another group of projects focuses on **plant defense and how applied methods can affect the ability of citrus trees to withstand symptom development**. Projects are evaluating innate responses in the plant to *Liberibacter* infection and the physiology of disease symptom development. Focusing on HLB effects on phloem tissue, researchers are looking at the onset of symptoms as well as response of defense-inducing chemicals in infected trees. Applied projects in this realm are evaluating application of materials to affect symptom development, including SAR (systemic acquired resistance) products, antibiotics, and other therapeutics.

A final component of research that relates to the citrus tree is looking at **cultural practices and their role in disease management**, including nutrition and flush management through pruning and plant growth regulators. While short-term results will impact current citrus production and disease management, research in this area also is relevant to new plantings. Combining numerous principles, intensively-managed production systems are being developed and evaluated under field conditions in Florida, with goals of optimizing early productivity and defense against disease. While current cultural practices are being modified in various ways to combat HLB, future groves are being envisioned to produce earlier in their lives and to accommodate higher levels of management of inputs. Field trials exhibiting some of these enhancements are currently being evaluated by researchers and growers alike.

Author's note: An important element of the CRDF mission is to communicate results of HLB research to growers and other interested parties. Please let us know what you would like to hear more about at hwbr@citrusrdf.org

Harold Browning is Chief Operations Officer of CRDF. The foundation is charged with funding citrus research and getting the results of that research to use in the grove.



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