A two-year project combining individual protective covers with brassinosteroids to prolong the health of trees was funded for $800,000.

Researchers awarded new resources to help in the HLB fight

By Michael Rogers

University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) citrus faculty continue to pursue opportunities to support Florida citrus growers. Late in 2022, the U.S. Department of Agriculture (USDA) awarded UF/IFAS faculty over $16 million in new funding to advance research projects to combat the deadly HLB disease. UF/IFAS scientists earned the majority of the $22 million that was awarded in 2022, reasserting their commitment to finding solutions — and resources — for the Florida citrus industry.

The funding is awarded from the USDA National Institute of Food and Agriculture (NIFA) Emergency Citrus Disease Research and Extension program. The program is designed to accelerate the application of scientific discovery to farm-level solutions for HLB.

The funding ($16,382,191) is spread out over eight projects, five of which are funded at $1 million or more, and run from two to five years. Most of the projects are collaborations with UF/IFAS faculty from the Citrus Research and Education Center (CREC) in Lake Alfred, the Southwest Florida Research and Education Center in Immokalee and the University of Florida in Gainesville. A few of the projects engage scientists in California, Texas and Connecticut. Most of these projects actively engage local growers, making the research relevant and current to today's challenges.

HLB MANAGEMENT TOOLS

The largest grant, awarded to Nian Wang, professor of microbiology and cell science, for nearly $8.6 million, supports the development and delivery of HLB disease management tools by approaching it as a pathogen-triggered immune response disease. The ultimate goal of this integrated project is to develop both HLB management approaches for existing groves and

Project	Amount	Duration	Principal Investigator
Development, evaluation and delivery of citrus HLB management approaches by targeting its nature as a pathogen-triggered immune disease	$8,589,573	5 years	Nian Wang
A coordinated network for the improvement of HLB research and Extension outputs	$2,000,000	2 years	Megan Dewdney
HLB-resistant rootstock candidates for the citrus industry: Validating and understanding disease resistance	$1,163,487	2 years	John Chater
Targeted production of non-transgenic HLB-tolerant trees through complementary approaches	$1,499,888	2 years	Zhonglin Mou
Combining individual protective covers and brassinosteroids to prolong health and improve fruit yield and quality in newly planted trees under HLB	$800,000	2 years	Fernando Alferez
Toward a reliable insect cell culture-based technique for culturing CLas bacteria	$793,286	2 years	Kirsten Pelz-Stelinski
Accelerating the delivery of conventionally developed HLB-tolerant citrus scions and rootstocks as pathogen-free budlines for replicated multi-site testing	$535,957	2 years	Jude Grosser
A method for generating an optimally attractive scent for Asian citrus psyllid biocontrol	$1,000,000	2 years	Lukasz Stelinski (co-investigator)

non-transgenic HLB-resistant and HLB-tolerant citrus varieties for long-term, sustainable disease control. This project was also approved as a USDA NIFA Center of Excellence and was reviewed as outstanding.

ROOTSTOCK RESEARCH

Two projects, led by citrus breeders John Chater and Jude Grosser, will look at rootstocks that appear to be HLB-tolerant and/or resistant. Chater arrived at the CREC in 2022 and has "hit the groves running" by investigating the performance of multiple rootstocks against HLB. This project will advance knowledge on why some rootstocks appear to be more tolerant to HLB than others. Grosser will utilize

the citrus plant improvement team's extensive collections of novel citrus germplasm to develop a reliable, rapid protocol for generating pathogen-free material for the timely delivery of new scions and rootstocks to the citrus industry. The successful adoption of this technology will reduce the current clean-up time by 1.5 to 2 years and significantly increase the number of selections that can be processed.

IPCs AND BRs

Another project, led by horticulturist Fernando Alferez of the UF/IFAS Southwest Florida Research and Education Center, will focus on how to use a combination of individual protective covers (IPCs) and brassinosteroids (BRs), a plant growth regulator, for enhanced protection of citrus trees against HLB after IPC removal. IPCs are now being increasingly adopted to protect newly planted citrus trees from psyllid colonization. Even though IPCs effectively protect young trees from HLB, it is only for the first two to three years after planting. Eventually covers must be removed, exposing the trees to the disease vector. Alferez will be looking at how to prolong the health of young trees after IPC removal, especially with the use of Brs.

> *All of these projects will ultimately benefit Florida growers with useful information that they can deploy in their operations in the years ahead.*

OTHER PROJECTS

UF/IFAS entomologists Kirsten Pelz-Stelinski and Lukasz Stelinski will work on two separate projects. Pelz-Stelinski will work to provide a reliable method for culturing of *Candidatus* Liberibacter asiaticus (CLas) bacteria using a novel insect cell line approach. Upon completion of this project, Pelz-Stelinski hopes to have a culture system that serves as an essential research tool for increased understanding of CLas biology and for effective, rapid screening of antimicrobial agents against CLas. Lukasz Stelinski's project aims to create an artificial intelligence-driven release device for chemicals that attract Asian citrus psyllids to a killing device. The hope is that a complex smell-generation approach can make the attract-and-kill strategy for psyllids feasible and practical.

Another project tackles the challenging task of gathering and organizing the vast amounts of research findings available to growers by developing tools for citrus industry stakeholders, the HLB-research community and research organization administrators. Outcomes of this national project, led by plant pathologist Megan Dewdney, will be a database for stakeholders to access critical information about research findings on HLB and high-quality Extension products from existing and future knowledge sources.

All of these projects will ultimately benefit Florida growers with useful information that they can deploy in their operations in the years ahead.

Michael Rogers is the director of the UF/IFAS CREC in Lake Alfred.