

# Bayer Project Update

By Rick Dantzer, CRDF chief operating officer



The Citrus Research and Development Foundation's (CRDF) project with Bayer Crop Science Division (Bayer) is nearing its end. While we didn't hit the homerun we had hoped for, we did hit a solid double off the outfield wall. Here's a summary of the project to date.

In 2017, CRDF, PepsiCo and Coca-Cola partnered to fund a project with Bayer that had three objectives: 1) to develop a high throughput screening cascade to evaluate antibacterial microbes and synthetic compounds for efficacy against HLB, 2) to find a curative antibacterial microbe and 3) to develop a plant host defense solution using a synthetic chemical. To set this approach up for success, Bayer established collaborations with the University of California Davis, Southern Gardens Citrus, Texas A&M University and the University of Florida to evaluate advanced leads selected from *in vitro* assays in *in planta* test systems. The Bayer team included scientists from California, France and Germany.

At the end of the three-year project, the high throughput screening cascade has been established, 2,500 antibacterial microbes have been screened against pathogens, and 150,000 synthetic chemicals have been tested for inducing plant natural defenses (plant defense inducers, or PDIs). Of those showing sufficient levels of efficacy, 6,560 were tested in citrus. From these, top candidates were placed in four Florida field trials.

With an annual cash burn rate of more than CRDF could sustain, the California Citrus Research Board joined with CRDF, PepsiCo and Coca-Cola to fund the project long enough to apply for a U.S. Department of Agriculture National Institute of Food and Agriculture (NIFA) grant. The proposal was accepted for funding by NIFA, providing three more years of funding.

During this three-year period, promising antibacterial microbial candidates were narrowed, and synthetic PDIs were optimized, leading to synthesis of 6,000 PDI analogs. Top performers of both approaches were placed in field trials. Other scientists were also given access to the high throughput screening cascade that had been developed.

This three-year period expired several weeks ago. No cost extensions were granted to allow scientists to finish their work, including field trials. CRDF is evaluating outcomes to determine next steps. Here's where we are:

Despite testing 23 antibacterial microbial strains in greenhouse HLB-positive trees, none were determined to be efficacious enough against *Liberibacter* and have suitable toxicology profiles to believe they could receive registration approval from federal regulatory agencies. However, two synthetic PDIs show enough promise in greenhouse conditions to warrant further work. In one ongoing field trial, one of these analogs — especially when sprayed as a follow-up to an oxytetracycline (OTC) injection — showed a good level of protection against HLB. Tree performance was better than in those receiving only OTC. If a decision is made to pursue further work on this PDI, the next step would likely be another year of field trials.

CRDF's Research Management Committee will soon review all project results to make a recommendation to the board about whether to proceed, and if so, what next steps it would recommend.



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