



CITRUS RESEARCH & DEVELOPMENT FOUNDATION GROWER RESEARCH REPORT

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Efficient Plant Improvement Program Top Priority for CRDF

Citrus plant improvement is a topic of great importance to the Florida citrus industry, the Florida citrus grower and the Citrus Research and Development Foundation (CRDF).

The industry views conventional and engineered plant improvement as among the most likely sources of medium- to long-term sustainable management solutions for citrus production in the presence of HLB.

Fortunately, the Florida industry is served by the long-standing citrus improvement programs of the University of Florida and USDA-ARS, whose collective experience and expertise are unsurpassed in citrus arenas.

The industry, previously through the Florida Citrus Production Research Advisory Council, and now through CRDF, has consistently funded these programs to augment institutional and other funding, which we believe has fostered a cooperative environment between growers and the research community.

The CRDF alone had 28 projects for this topic in its portfolio in mid-2016 that cumulatively commit over \$10 million in funding. A current public investment of over \$29 million in 56 projects/programs nationally on this topic was reported in a recent synopsis of plant improvement funding. Much of the CRDF investment in the arena is dedicated to the UF-IFAS and USDA-ARS citrus breeding programs, which are pursuing both conventional and engineered solutions. The significant figures do not include the large number of grower cooperators who are investing directly through hosting a wide range of field trials of advancing germplasm.

Clearly the industry is putting significant dollars toward plant improvement. Anecdotally, rarely is there a grower educational meeting which does not have

Upcoming Board & Committee Meetings

Most meetings are held in the Ben Hill Griffin Hall at the UF-IFAS, CREC campus in Lake Alfred, Florida.

12/05/16	Commercial Product Delivery Comm.	9:30 am
12/06/16	CRDF Board of Directors Meeting	9:30 am

citrus rootstock and/or scion improvement progress as a program topic.

As we consider how to accelerate what is, by definition in citrus, a lengthy, arduous process to create, evaluate, scale-up, and release/deregulate/commercialize HLB in planta solutions, we recognize that a necessary step is to fully understand how the current resources are fueling progress and where coordination and additional resources can foster success.

As a result of an extensive knowledge mapping exercise, the CRDF committed to the employment of a full-time HLB Resistance Project Manager to coordinate, facilitate and advance plant improvement efforts and resources.

Dr. Catherine Hatcher, a formally trained plant breeder with public and corporate breeding experience, has been on the job for about four months and is engaging scientists involved in citrus improvement in gaining an understanding of the landscape, scope of efforts, status of selections and field trials, and how CRDF and the industry can translate progress into solutions in the hands of nurserymen and growers. Through reviewing project documentation and plans, and through meetings and communication directly with the scientists, Dr. Hatcher is gaining an appreciation for both the complexities and the challenges of delivering HLB resistance.

Collective efforts will be necessary for the industry and the research community to be successful. It is in this spirit that CRDF has invested in a process and the capability to integrate ongoing work

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into to the terminal end of the breeding pipeline, and through communication and planning with the research teams, to identify opportunities and resource needs to accomplish the goals. The teams already have communicated the need for additional resources to conduct and evaluate field trials. Progressive field evaluation is fundamental to characterizing and advancing elite lines. CRDF goals for delivery of HLB resistance include understanding and making commitments to remove obstacles and time.

nuPsyllid Project Moves Forward

The push to develop psyllid populations incapable of transmitting CLAs while releasing them to displace current populations is progressing as it enters the fifth and final year.

The project, known as nuPsyllid, has resulted in many learnings that put [researchers and] the industry in a good position over the next few years to achieve the goal.

The project has been supported by USDA, NIFA through a nine million dollar commitment which will end in August, 2017. This funding is provided to scientists at 22 institutions across the U.S.

Chemical control of ACP has only allowed growers to suppress populations so far, and the need for alternative ACP management fits into the goal of an overall tree health management program.

The goals of nuPsyllid are:

1. employ a coordinated, multidisciplinary, and systems-based approach to stop the spread of the economically crippling plant disease HLB
2. eliminate citrus greening by blocking the ability of insects to move the disease from infected trees to healthy ones
3. conduct outreach to growers and consumers to increase the adoption of this new biological control system

Eight sub-teams were established to develop the mechanisms to interfere with ACP/bacterium interactions; integrate the mechanism of choice into ACP populations in the grove; rearing and release of resulting ACP populations; and monitoring and outreach to determine the impacts of this tool and to share the information with growers.

The project is now in its fifth (final) year of funding. The team has met periodically during the course of the project to evaluate progress and to fine-tune the scope and resource allocations. While the project has not yet yielded an ACP population that is ready to be deployed in the field, significant progress has been made.

A spinoff: One real benefit of the work has been progress towards identifying RNA interference targets in the ACP/bacterial interaction that are being exploited. Termed RNAi, this focus area has advanced in the nuPsyllid project, but also has stimulated a related effort to test the strategy in the field. CRDF, with several partners, is moving forward with best ACP/bacterial RNAi candidates, identifying and addressing steps that will allow for a proof-of-concept field trial in the next year. Progress in the nuPsyllid project makes this possible by assembling the teams and fueling the work.

While the outcome of the project is uncertain at present, many lines of the research will continue, building on the progress in this first four years. Several segments of this project have already captured funds to continue the effort beyond year five, and others are planning for continuation of the work.

A more comprehensive overview of nuPsyllid will be provided within the next 2-3 months, updating growers on the outcomes expected from the work and more details of next steps to follow.