

Citrus Research and Development Foundation, Inc

Revision to the 2018 Update of the 2009-10 Business Plan

May 17, 2023

INDUSTRY SITUATION AND BACKGROUND

In January of 2019, the CRDF Board of Directors (BOD) updated the 2009-10 Business Plan. The update followed a review by the National Academies of Sciences, Engineering, and Medicine of the Foundation's research portfolio. The review concluded that research supported by CRDF and other agencies greatly expanded knowledge of every aspect of HLB, yet no cure for HLB had been found.

The goal of the review was to identify ways to reconfigure HLB research to accelerate the development of tools and strategies to abate disease impacts and prevent the collapse of the Florida citrus industry. Unfortunately, despite reconfiguring HLB research and continued funding of specific research suggestions, production has continued to decline. The ravages of the disease, coupled with devastating hurricanes in 2017 and 2022, have brought the industry to the point where, unless solutions are found quickly, it is hard to see how a critical mass of growers will survive long enough to bring the industry back to sustainability and growth, and preserve necessary industry infrastructure.

There are reasons to be hopeful, however. Research has shown the benefits of using plant growth hormones such as gibberellic acid, 2-4-D, and brassinosteroids, which help hold fruit on the tree until maturity, standardize color break, decrease the number of minor blooms, increase fruit size, and improve quality. Also, state and federal regulators have recently approved injecting a novel formulation of oxytetracycline (OTC) by two registrants, and a third is poised to submit a 24C application for FDACS consideration. These therapies – especially injecting OTC – have the potential to reset the industry by stopping the decline in production and starting a steady increase in fruit quality and quantity to the point where reliance on foreign juice by processors is no longer necessary.

Guiding our research over the last two years has been a document called *Pathway to a Sustainable Florida Citrus Industry (Pathway)*. It put down on paper the most likely research pathway to providing growers with short, medium, and long-term tools to achieve sustainability. CRDF worked hard to implement its provisions. In fact, with funding from CRDF and the USDA, all but one of the research topics was funded by

CRDF or the USDA. And the one topic not addressed – micronutrients – had received significant funding from CRDF in years past.

On the heels of the success of the Pathway document, CRDF’s board recently approved a successor document entitled *Pathway to a Sustainable Florida Citrus Industry 2.0 (Pathway 2.0)*. It lays out next research steps, including seeking to maximize the benefits of the therapies that are working (described above) and pursuing the testing of other antimicrobials that may be as effective or even more so than oxytetracycline.

The success of using gibberellic acid, 2,4-D, brassinosteroids and injectable antimicrobials has given growers renewed hope. Injection has cracked open the door in getting antimicrobials to where CLAs lives in the plant, which opens a whole new world of research possibilities. We do not believe CLAs is hard to kill, and now that we can get to it, great things – perhaps game changing things – are possible. As a result, a significant part of this Business Plan revision focuses on killing CLAs with antimicrobials. However, having such antimicrobials available for growers is of no use if the compounds are not commercialized or if growers can’t afford the products that result therefrom.

Consequently, this revision renews the commitment of CRDF to assisting companies with commercialization effort, whether such efforts involve research, registration, or other means not envisioned. This has always been a primary role of CRDF, but unfortunately there have been few opportunities to provide such assistance because there have been so few products developed. Now that the industry has therapies that work, CRDF looks forward to helping companies and researchers bring these products to market for the benefit of Florida citrus growers. Since many growers believe that a permanent solution to HLB will likely be a breeding solution, CRDF shall renew its efforts to identify promising germplasm, facilitate its testing, and assist in propagation where possible.

VISION

The vision of the Foundation is: A vibrant commercial Florida citrus industry with confidence in its future based upon robust protective and proactive research and technology innovation. In light of the state of the industry and the need to rebuild, the vision is amended to also include stopping the reduction in production and fruit quality and beginning a steady increase in both to approximately 2014 levels, as well as reducing the cost of production inputs.

The mission of the Foundation is: Advance disease and production research and product development activities to ensure the survival and competitiveness of Florida citrus growers. In light of the state of the industry and the need to rebuild, the mission is amended to amplify CRDF’s commitment to assist the developers of therapies known to be helpful in the fight against HLB to get such products to growers.

ROLE

The role of the Foundation is to:

1. Fund research to help growers increase yields from existing trees.
2. Fund research to develop HLB resistant and/or tolerant trees.
3. Monitor the research projects it funds.
4. Identify knowledge gaps beyond the funded research projects' scope and capacity, and fund projects that address these gaps.
5. Assemble research data from the projects it funds, then distribute said data to growers for their practical use in ways which are consistent with the protection of the intellectual property rights of the owners of the data.
6. Facilitate communication between researchers, growers, and other industry partners.
7. Assist researchers with field trial evaluations in collecting and distributing data to growers.
8. Secure, on behalf of Florida citrus growers, rights to intellectual property developed under its sponsorship and co-development or even through donation. These rights will be secured when the research grant is negotiated.
9. Assist the developers of therapies known to be helpful in the fight against HLB to get such products to growers.

SCOPE OF SERVICES

As a Direct Support Organization of the University of Florida, the Foundation has three primary areas of activity: research management; product development; and fund raising.

Research Management:

The Foundation shall:

1. Identify research gaps.
2. Solicit research proposals.
3. Identify promising research activities.
4. Fund research activities through grants that provide the Foundation the right to participate in the commercialization of IP that is developed through funded research, and to provide for a return on research funds invested in the form of royalties.
5. Identify ways to exploit any technology discovered, along with ways to commercialize the solution.
6. Work with any researcher who presents research proposals that present promising outcomes in HLB management at any point during the research funding cycle.
7. Assist researchers with field trial evaluations in collecting and distributing data to growers.

Research management activities include:

Identifying research gaps and priorities in coordination with other industry representatives and scientific advisors.

Requesting research proposals to address research needs.

Reviewing and ranking proposals based on technical quality, innovation and potential impact, using unbiased, un-conflicted third-party scientific advisors.

Identifying research proposals that most closely match the Foundation's priorities.

Negotiating contracts with research organizations.

Reviewing research progress reports and accounting for all Foundation-funded projects as well as those projects funded directly by state or federal grants for the purpose of recommending whether to continue funding said projects.

Negotiating follow-on investments as necessary to enable product development.

Historically, the basic process for funding research grants has been to announce a Request for Proposals and follow reasonable timeline and standard research protocols which provide adequate opportunity for consideration by researchers, peer review of the scientific merit of proposals, and input from CRDF committees.. However, the Foundation has also had the right to award grants outside the Request for Proposals process in order to take advantage of unique opportunities or exigent circumstances. Given the state of the industry and the need for speedier consideration of research needs, CRDF has also begun the following other ways of funding research:

1. Directed research
2. Off-cycle proposals
3. Putting out to bid specific scopes of work or services Regardless of research method, peer review of all proposals is required.

When multiple projects are considered as part of a single research solicitation, independent peer review of research proposals will be accomplished using technical review panels to evaluate and score the final proposals for project funding. Although the composition of future panels is to be determined, the precedent has been set to engage the best scientific minds possible to evaluate the scientific merit of proposals.

Any Foundation policy regarding intellectual property shall be aligned with the overall mission of the Foundation, will provide that the Foundation participate in decisions on licensing of intellectual property that results from funded research, and provide for a sharing of royalties from license agreements for intellectual property that result from Foundation research funding.

Product Development:

Regarding product development, the Foundation shall work closely with researchers, regulatory authorities and companies that develop commercial products or technologies for agriculture producers to ensure that same are developed and brought to market as quickly as possible and in a manner that makes them affordable to the majority of growers.

The Foundation shall endeavor to recognize on-going citrus research and grants made directly to researchers or research institutions when identifying research gaps and funding needs.

Product development activities include:

- Evaluating research findings to identify product or technology development opportunities

- Identifying potential commercial development partners

- Establishing business relationships with potential commercial development partners; and

- Participating in the product or technology registration process.

For promising greening-suppression technologies, the Foundation will work closely with both the research organization in possession of such technology to identify the next steps in the product development process and any possible candidate companies to license the patents and move said technology into and through the regulatory process.

The Foundation will work to gain rapid regulatory approvals for new products for the citrus industry in the fight against citrus diseases. New products that are used in groves may need approvals from the State of Florida, U.S. Department of Agriculture, Environmental Protection Agency, and Food and Drug Administration. Where needed, the Foundation may take the initiative to obtain regulatory approvals for new technologies, especially in the case where the technology may not be mature enough for a commercial company to license the patent.

To accelerate regulatory approval for product use in groves, the Foundation shall attempt to leverage its status to help obtain necessary regulatory approvals in parallel, rather than sequentially. In addition, the Foundation shall develop regulatory checklists and roadmaps for promising technologies until there is a commercial partner involved.

Fund Raising: Working with UF Foundation, the Foundation will work with Florida Citrus Mutual and other industry organizations to meet its financial needs.

Funding activities include:

Establishing annual and long-term funding needs for research, product, and technology development, and

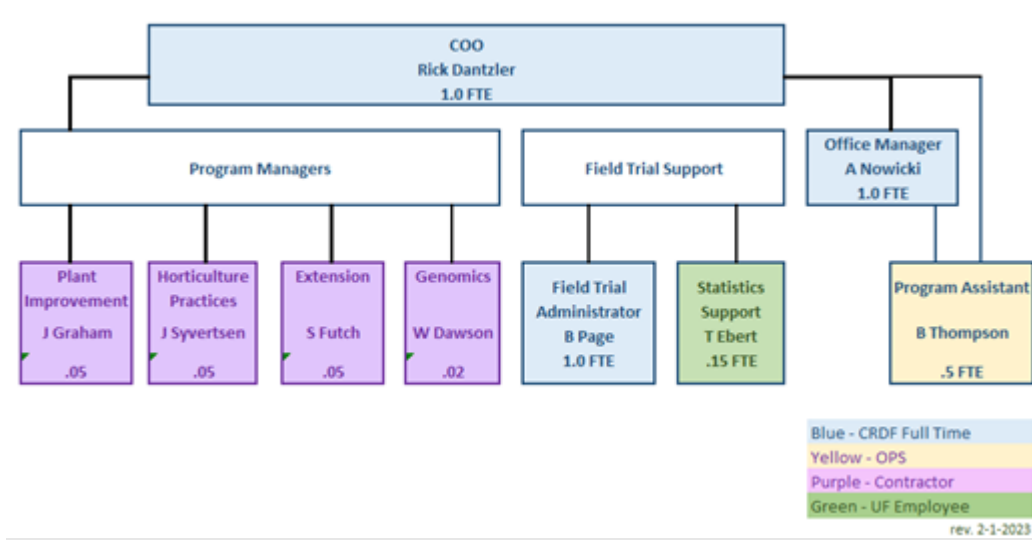
Coordinating with FCM and other industry organizations to secure grower, state, and federal funds for research, product, and technology development.

FOUNDATION MANAGEMENT

The functions of the management team shall be primarily office management, research management, data collection, and communications with growers, policy makers and the public. All employees will be hired through the University of Florida using Foundation funds. The organizational structure shall



be:



Chief Operating Officer

The Chief Operating Officer (COO) is the operational leader of the Foundation. This position will report to the Board of Directors and to the President of the University of Florida or his designee. The COO will work closely with the Foundation board to set research and development priorities and obtain research and commercialization funding.

The COO will make recommendations to the Board of Directors regarding intellectual property licensing and aggregating intellectual property for product and technology development. The COO will be responsible for communications with all stakeholders.

Office Manager

The Office Manager will be responsible for effective office management to ensure efficient and expedient flow of paperwork and problem solving. The duties include managing finances, grants, personnel records, financial records and assisting with the management of contracts for grants and commercialization of investments.

FOUNDATION GOALS

The goals of the Foundation are divided into short and long term:

Short-term Goals:

1. Balance the need for all research with commercial development, including an emphasis on projects aimed at increasing citrus production from existing, greening-infected trees. Transition, maintain and advance the greening research activities established by FCPRAC, FCC, and other industry partners.
2. Secure adequate funding by working with FCM and other industry organizations.
3. Effectively communicate Foundation efforts to citrus growers, policy makers, funders, and the industry as a whole.
4. Develop a research portfolio which has a reasonable likelihood of bringing practical benefit to growers.
5. Develop a process of selecting research that provides decisionmakers adequate time to reflect on the proposals before having to decide on them.
6. Serve as a coordinating liaison to institutionalize regular public meetings between Foundation stakeholder groups, including, but not limited to, the leadership of IFAS, CREC, researchers and the Foundation board of directors.
7. Evaluate the status of regulatory matters regarding the work of plant breeders the Foundation has funded.
8. Critically evaluate projects regarding the reasonable likelihood of technology transfer to the field.
9. Identify promising germplasm, facilitate its testing, and assist in propagation where possible.

Long-term Goals:

1. Fund research that leads to the creation of HLB tolerant or resistant citrus trees.
2. Satisfy the needs of growers from every growing region of Florida.
3. Ensure adequate and sustainable funding.
4. Work with other citrus-producing states to improve greening management research efforts.
5. Establish long-term funding for research and development.

FINANCIAL

The Foundation will seek to secure both current year and long-term sources to fund the citrus research and commercialization program. Obtaining stable, long-term sources of funding will assure the research community of the ongoing commitment by the citrus industry as well as provide credibility to the licensing and business development aspects of the Foundation.

Management will report monthly on the receipts and expenditures of funds managed by the Foundation.