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Progress in Citrus Disease Research

The mission of the Citrus Research and Development Foundation (CRDF) is to protect the profitability of citrus production from infectious disease loss. Where do we look for new solutions? Florida is very fortunate to have two of the world's best citrus research institutions, UF/IFAS and USDA as partners. This base of expertise and infrastructure allows all sorts of collaborators from all over the world to contribute, including growers. Right now we are seeking new molecules to combat the spread of Citrus Greening disease by the psyllid insect vector and to treat or protect trees from infection from the bacteria. The challenge is to find new products and practices quickly. We cannot afford to test every idea by waiting 3-5 years and making juice to measure yields and quality. The industry is built upon a handful of robust cultivars. We want confidence that our research will lead to long-term practices that prolong longevity of production on this strong genetic base.

In order to search for new molecules in an expedient and cost-effective way, one needs a test system that gives answers in a few months instead of a few years. Research sponsored by CRDF discovered new molecules in the form of antibiotics and RNAi. Rather than declare success too early, we have helped to open the lab to compare these findings with any other compounds that might be submitted for testing. We intend to do our best at finding solutions that are highly effective and most likely to be registered for commercial use as quickly as possible.

Some of you may be familiar with this "open innovation" research approach from other examples. Rather than look something up in an encyclopedia, we might check the Internet "Wikipedia" where volunteers have edited over 3.6 million entries. Indeed, much of the software used to build the Internet depends on "open source" software systems that depend on the spontaneous interactions of skilled experts who choose to work primarily for the satisfaction of the outcome and do not use the trademark, copyright or patent system to disclose and protect their work. This approach has now spread to hardware as well, using computer assisted design and fabrication systems. Chemistry and biology applications are not far behind. CRDF engaged an experienced promotion partner, InnoCentive™ to solicit ideas to test in addition to those submitted by our own expert network.

For the antibiotic contest, 238 registered "Solvers" have submitted 48 compounds to test and screening of 21 of these are in progress. For antibiotics, we have the capacity to test any reasonable and available compound. For the RNAi contest, 295 registered "Solvers" have submitted 59 unique genes from the psyllid genome to target for new control activity. Twenty RNAi targets are currently under evaluation.

Even though we already work with the world's citrus experts, we also know that a diversity of opinion from the scientific and grower community at large will bring better results. It turns out most of these "Solvers" are not primarily motivated by the cash but rather the satisfaction that comes from being engaged in a meaningful intellectual challenge.

CRDF has extended the contest deadline for submissions to Sept. 1 at www.innocentive.com.

From the COO

It is a pleasure to be working again with the Florida citrus industry, and to be involved in the research that is addressing HLB and canker. During a critical time, the industry established the Citrus Research and Development Corporation, and CRDF has brought focus and visibility to the excellent efforts of research teams in Florida and beyond. There remains much to be learned until we have reliable, sustainable and economical management schemes for HLB and canker, but progress is being made and results are being tested in the groves. Combined with efforts of innovative growers, research progress will lead us to improved short-term management while long-term solutions are forthcoming. CRDF has an outstanding Board of Directors and staff who are dedicated to moving citrus disease research forward, and I am honored to be able to join in their efforts.

Harold Browning,
CRDF Chief Operating Officer
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New CRDF Board Member

Dr. Mark McLellan, Dean of Research for IFAS since 2005, has resigned as a Board member of CRDF, and will leave UF to become Vice President for Research and Dean of the School Of Graduate Studies at Utah State University in Logan. Mark served on the CRDF Board since its establishment in 2009. Dr. Jack Payne, UF Senior Vice President for Agriculture and Natural Resources, announced at the June CRDF Board Meeting that Dr. Mary L. Duryea had been appointed to succeed Dr. McLellan on the Board. Mary joined the faculty in the School of Forest Resources and Conservation at the University of Florida in 1985, and in 2001, was appointed IFAS Assistant Dean for Research. In 2005, she was promoted to Associate Dean for Research.

Upcoming Meetings

July (date tbd - see www.citrusrdf.org)
Industry Research Coordinating Comm.

August 16
Research Mgmt. Committee

July 26
Board of Directors

August 23
Board of Directors

CRDF Approves Assumption of Functions of FCIRCC

At their May, 2011 Board Meeting, CRDF approved a proposal to assume the functions of the Florida Citrus Industry Research Coordinating Council (FCIRCC). This council was established in 2001 to assure that the pressing research needs of the citrus industry were addressed, and brought together representatives of all segments of the industry to inventory ongoing citrus research, assemble industry priorities, and to conduct analyses and communicate the results relating to the most critical gaps in research that warranted attention. With the creation of CRDF, it is desirable for the functions of these two groups to be closely coordinated. CRDF amended its by-laws to accommodate the formation of a standing committee, the Industry Research Coordination Committee, to assume the principal functions of FCIRCC. Committee membership and roles are being defined, and the initial committee meeting is expected to occur in July. Mr. John Jackson, the Executive Director of FCIRCC, is working closely with CRDF to integrate the important functions of this council into CRDF.

Annual and Final Reports Available Online

Following are the annual and final reports on CRDF-funded research projects which have been posted online since our last issue. The full report can be accessed from the 'link' button. These and interim progress reports on all projects as well as projects funded by California Research Board can be found at www.citrusrdf.org -> For Growers -> Search Reports.

LINK	TITLE	RESEARCHER	HEADLINE
	Transferring disease resistance technology from a model system to citrus	Mou	Citrus plants overexpressing AtMKK7 have been generated.
	The citrus psyllid transcriptome and time course differential gene expression in <i>Ca. Liberibacter</i> -infected/free whole psyllids and organs	Brown	ACP & potato psyllid transcriptomes; annotation ;mining, RNAi
	Production of Transgenic Commercial Cultivars Resistant to HLB and Canker	Stover	Diverse transgenic strategies mobilized for HLB resistance
	Gross and fine structure localization of <i>Liberibacter</i> in citrus psyllid <i>Diaphorina citri</i> organs: elucidating the transmission pathway.	Brown	FISH; oral box; ecdysis; working model-bacterial transmission
	Reduction of bacterial inoculum and vector control as strategies to manage citrus huanglongbing (greening)	Bassanezi	Wide-area HLB management vantages
	Controlling HLB by controlling psyllids with RNA interference	Falk	RNAi effects in tomato psyllids induced by ds- and siRNAs
	CAN INSECTICIDES AND MINERAL OIL AVOID TRANSMISSION OF <i>Candidatus Liberibacter asiaticus</i> BY <i>Diaphorina citri</i> ?	Yamamoto	Insecticides and mineral oil are efficient to control ACP
	Expand Research Plots and Maintain Existing Areas at Mid Florida Citrus Foundation	Atwood	Maintaining existing research trials at the Mid Florida Citrus Foundation A.H. Krezdorn grove.
	Comparative epidemiology of citrus huanglongbing (greening) caused by <i>Candidatus Liberibacter asiaticus</i> and <i>Ca. Liberibacter americanus</i>	Bassanezi	Disease severity progress is faster in younger trees
	Development and evaluation of psyllid management programs for protection of resets and young tree plantings from HLB	Rogers	Protection of non-bearing trees from HLB infection is possible
	Pre-Grading Fresh Citrus for Canker Prior to Dumping on the Main Packingline	Ritenour	Fresh citrus fruit can be pre-graded for canker.
	MANAGEMENT OF PSYLLA IN TREE FRUIT CROPS, USING RNA INTERFERENCE	Cox	RNAi ready citrus with citrus phloem promoters developed
	In vitro culture of the fastidious bacteria <i>Candidatus Liberibacter asiaticus</i> associated with Citrus Greening (Huanglongbing or HLB) Disease.	Dollet	Improvement of the axenic in vitro culture of LAS