



Citrus Research and
Development Foundation, Inc.

QUARTERLY REPORT
TO THE
COMMERCIAL PRODUCT DEVELOPMENT COMMITTEE

October 2013

Prepared by
Jim Dukowitz
Commercial Product Manager



700 Experiment Station Road • Lake Alfred, FL 33850 • Phone: (863) 956-5894

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Overview

At the September 24 CPDC Meeting, the Committee approved the following revised project list.

- **Tier 1: Active Projects**
- Area-wide insect management (Insecticide label changes and CHMAs)
- Antibacterial compounds
- Naturally occurring microbes*
- Tolerant rootstock plantings
- Plant growth regulator interactions with HLB**
- Thermal therapy*
- Genetic technology (MCTF):Deploying Canker-Resistance Genes

- **Tier 2: Facilitate and Monitor Projects**
- RNAi molecules
- Diaprepes pheromone

- **Tier 3: Information Projects**
- CTV vector***
- Advanced Citrus Production Systems
- HLB Escapes
- nuPsyllid NIFA grant

* New addition to list ** Moved from Tier 3 list *** Moved from Tier 2 list

This Quarterly Report covers the above CPDC Tier 1 projects for the period July through September 2013. For each of these projects, the report focuses on activity highlights of the past quarter, issues and gaps that have surfaced, and performance against milestones.

The established purpose of the reporting system is to provide the Committee with integrated information needed to inform planning, project prioritization and resource allocation decisions going forward.

In order to track changes in the roadmap charts over time, I have inserted the month of the projection inside the boxes.

As always, I welcome your feedback on the content, level of detail, and organization of the report. If there are items that you would like added to or deleted from the report, please let me know. Also let me know if there are items where you disagree, or have additional information or perspective. The goal is to make this a useful working document for Committee members.

Thanks and regards,

Jim Dukowitz
Commercial Product Manager

CPDC PROJECT REPORTS

A. Area Wide Insect Management (Label Changes)

Quarterly Activity Update

Status of Registrations

- No change in the mid-December projected date for an EPA PRIA decision on clothianidin, although that date becomes increasingly risky over time given the lawsuits, mounting pressures from advocacy groups, and an increasingly legal approach being taken at EPA.
- Dan Botts and team are continuing to work on the material to be compiled for the FIFRA Section 18 Emergency Use Exemption Process for clothianidin. The CRDF Board, upon recommendation of CPDC, authorized use of the Section 18 for clothianidin at the July Board meeting.

Beekeeper-Citrus Grower Meeting

- The September 18 Beekeeper-Citrus Grower Meeting hosted by FDACS at Lake Alfred CREC was generally regarded as constructive and a step in the right direction in fostering a dialog between stakeholders, and to identify practical best management practices that could be adopted by Florida growers, pesticide applicators and beekeepers in time for the 2014 citrus bloom.
- Dan Botts is working with FDACS on follow-up to the September 18 meeting

Planned EPA Meetings

- Planned mid-October meetings by Dan Botts with EPA officials in Washington to discuss the Section 18 for clothianidin and follow-up to the September 18 meeting has been cancelled due the government shutdown. Dan is attempting to reschedule for the week of 18 November.

New Pesticide Labels

Two EPA letters were sent out by Dr. Steven Bradbury, Director of the Office of Pesticide Programs, on July 22 and August 15.that

- Indicated that EPA was developing label text intended to minimize exposure to bees and other pollinators from neonicotinoid pesticides;
- Requested the submission of efficacy data and registrant's pollinator stewardship plan;
- Notified registrants to report any incidents involving pollinators on an accelerated 10 day schedule;
- Advised that label changes will include a "Pollinator Protection Box" as well as new pollinator language to be added to the Directions for Use section of each label. The labeling terms will highlight the measures necessary to better protect pollinators and help achieve label clarity and consistency regarding language in all neonic labels, intended to be available for the 2014 growing season;
- The letter applies to all products that have outdoor foliar use directions (except granulars) containing the active ingredients imidacloprid, dinotefuran, clothianidin and thiamethoxam
- The EPA requested registrants to submit a fast-track amendment to revise product labels as per EPA instructions no later than September 30.

Neonic Stewardship

- On August 23 Dan Botts organized a Neonic Stewardship Workshop to develop the essentials of a program for sustained use of these psyllid control tools.
- On September 20, a follow-on meeting of the group was held to review the results of the September 18 meeting and discuss how to bring the pollinator protection process forward within the requirements already identified on the labels and through research to mitigate potential risk to pollinators.
- A meeting has been scheduled for October 24 for the group to prepare for participation with FDACS on the Pollinator Protection Program and development of the BMPs to implement the actions discussed at the September 18 meeting. The meeting will also address the framework of the neonic soil application program to integrate into that larger effort.

Key Issues

- **Registrant Risk-Reward.** The common issue for all registrants remains the perceived risk-reward associated with registrants moving forward with label expansions for neonics given the extremely small dataset that exists regarding pollinator impacts, the increased legal and political activity surrounding their use, and the increased call for additional information by EPA/ FDACS.
- **Product Stewardship.** This includes following carefully the label instructions, and making every effort to observe the advisories on protecting bees.
- **Messaging.** It is essential that the Florida citrus industry develop the information and create clear, concise messages around the critical importance of using neonics to protect young trees against HLB, and that this can be done in ways that minimize risks to pollinators. These need to be delivered to government and other stakeholders, and to the general public.
- **Outreach.** Finally, there is an ongoing issue of outreach and constructive engagement with the beekeeper community to find common ground upon which to build.

Near Term Roadmap

Activity	Date
• Registrants respond to EPA on new labeling (foliar)	Sep'13
• FDACS Minutes from September 18 meeting as framework for continued dialogue and cooperation	Oct'13
• Complete and submit Section 18 document for clothianidin	Oct/Nov'13
• Dan Botts meeting with EPA to discuss stewardship, beekeeper Meeting and Section 18	Nov'13
• Stewardship program messages and roll out	4Q13/1Q14

Project Roadmap: Neonicotinoid Label Modification

What	Who	Start	End	4Q'12	1Q'13	2Q'13	3Q'13	4Q'13	1Q'14	2Q'14	3Q'14	4Q'14
Imidacloprid 24(c) approval	Bayer/ FDACS	Sep'12	Oct'12	■								
Thiamethoxam 24 (c) submission	Syngenta	Oct'12	Oct'12	■								
Thamethoxam projected approval	FDACS	Nov'13	Nov'13	S'12	→	J'13	→	M'13, Jl'13 S'13				
Clothianidin Section 3 projected approval	EPA	Dec 13	Dec'13	S'12	→	J'13	→	M'13, Jl'13 S'13				
Clothianidin 24(c) projected approval	FDACS	Jan'14	Jan'14	S'12	→	J'13	→	M'13, Jl'13 S'13				
Clothianidin Section 18 projected approval	FDACS/EPA	Dec'13	Dec'13					■				
Beekeeper-Grower Meeting	FDACS/ Growers/ Beekeepers	Sep'13	Sep'13			■						
EPA Notification of label changes (foliar)	EPA	Sep'13	Sep'13			■						
Stewardship program and message development	Growers/ Registrants	Jun'13	Nov'13			■						

S = Sept. J = January M = March Jl = July projections

B. Antibacterial Compounds

Quarterly Activity Update

Over the past quarter progress has been made in the evaluation of candidate antimicrobial compounds, in partner discussions, and, most importantly in formulating an antibacterial/antibiotic strategy that was reviewed and supported by CPDC at its September 25 meeting.

Evaluation of Antimicrobial compounds.

CRDF project management is continuing to identify and screen candidate antimicrobial compounds under three Research Service Agreements with the University of Florida (Triplett, Powell and Wang). Over the past quarter, eight new companies have provided antimicrobial compounds for evaluation under the graft based assay, bringing the total to 27, and several new companies are providing candidates for evaluation using the L.crescens assay. Several of these companies are large, multinational corporations with large libraries of antimicrobial compounds. These relationships can be cultivated as potential commercialization partnerships.

Antimicrobials SWAT Team

The Antimicrobials SWAT Team was created to provide strategic oversight for development of an overall strategy and recommendations on approaches to field trials and other support to the program.

Commercial Partnerships

CRDF project management continues discussions with several companies, and we have identified a commercial partner to proceed with the CRDF antibiotics strategy; and are collaborating with two companies in developing and evaluating new molecular entities against HLB..

Antibacterials/Antibiotics Strategy

At its September 25 meeting CPDC gave its support to an antibacterial/antibiotic strategy for CRDF. The strategy focuses on five areas.

1. Antibiotics.

Conventional antibiotics are clearly the most potent compounds and therefore likely to succeed. Streptomycin and Oxytetracycline are considered most likely to be approved among conventional antibiotics, since there is precedence for their use in agriculture. CRDF reports that corporate research is committed to move these two antibiotics forward. Initial results included Penicillin G as well and this compound is also highly active in the L. crescens assay but it is likely to face significant regulatory opposition because of widespread allergenicity in the general population and because of the perceived potential contribution to the evolution of antibiotic resistance to the important class of compounds, beta-lactams, used in human health.

2. Agricultural Antibiotics

These are used on food crops in other countries. These candidates offer another opportunity for therapy against CLAs, while posing unique challenges, including unraveling intellectual property issues.

3. New Molecular Entities

Compounds with specificity and potency customized to treat HLB and not used for human or animal health. These might be referred to as non-antibiotics.

4. Biopesticides.

One class of compounds in this category is used in agriculture but not formulated for vascular disease of trees. CREF is in discussion with the dominant industry patent holder. CRDF is collaborating with a company in development and evaluation of new, more sophisticated polymer chemistries and targeted ligands in the form of polycation polymers and site-specific inhibitors. CRDF is also working with a second company in evaluating proprietary non-antibiotic derivative compounds that do not have activity on animal or human pathogens.

5. GRAS-like

Simple plant essential oils. Sponsored-research is underway to formulate and deliver compounds that qualify for the GRAS-like status (Generally Regarded as Safe). The appeal of this category is the potential for more rapid deployment through a reduced commercialization and regulatory pathway if the laboratory evidence for efficacy of these materials is translated into the field.

Companies contacted to date are not interested in pursuing this class of compounds because of the lack of enforceable IP, despite the fact that prior art may indicate broad-spectrum antibacterial activity. Therefore, if we want to advance a product based on these results it will take more active development by CRDF as a sponsor.

Key Issues and Gaps

The strategy balances multiple dimensions of risk inherent in developing a product that is safe, effective and can be registered for agricultural use through federal and state agencies. In addition to regulatory concerns, we have to optimize dosages that are non-phytotoxic but still effective

Near Term Roadmap

Activity

Date

Antibiotics

- Pursue development plans with corporate partner(s) 4Q'13
- Identify a regulatory consultant for strategic and navigational support 4Q'13

Agricultural Antibiotics

- Continue to investigate compound availability, IP issues 4Q'13
- Quantify relative activity on *L. crescens* compared to other antibiotics 4Q'13
- “Go-No Go” decision 4Q'13

New Molecular Entities

- Continue collaborations and testing with two companies 4Q'13
- Continue to seek new compounds from third parties 4Q'13
- Develop follow on strategies for promising compounds, including graft based assay or field trials 4Q'13

Biopesticides

- Pursue a broad development approach with targeted company, including testing their libraries and requesting assistance in formulating their current products that contain the targeted active ingredient for HLB treatment 4Q'13

GRAS-Like Compounds

- Continue to investigate “nano-emulsions” and other formulations through sponsored research at the UF Particle Engineering Research Center 4Q'13
- Begin investigation of use toll manufacturing to scale up candidates for field trials 4Q/1Q'14

Project Roadmap: Antimicrobials

What	Who	Start	End	3Q'12 4Q'12 1Q'13 2Q'13 3Q'13 4Q'13 2014 2015 2016 2017+
InnoCentive challenge awards selected	Turpen	Aug	Aug'12	
Approve amended Powell research proposal (1 Yr)	UF/Powell	April'13	Apr'13	
Approve RSAs (Powell, Wang), RA (Powell)	CRDF/UF	Apr'13	Apr'13	
Approve RSA (Triplet)	CRDF/UF	Jul'13	Jul'13	
Source candidate compounds	CRDF	Jan'13	Ongoing	
Screen compounds with various assays	UF/TBD	Jul'13	Ongoing	
Grower-led field experiments	CPDC/ Growers	Fall'13	Ongoing	
Powell research in greenhouse/field (Y1)	UF	Apr'13	Apr'14	
Regulatory roadmap	TBD	2013+	Ongoing	
Secure commercial partners/ Develop toll mfg strategy	CRDF	2013+	Ongoing	
Develop and optimize products	Companies	2014+	Ongoing	
Regulatory approvals (antibacterials)	Companies	2015+	Ongoing	
Regulatory approvals (antibiotics)	Companies	2017+	Ongoing	
First commercial availability	Companies	2015+	Ongoing	

S = September'12, J = Jan'13, M = Mar'13

C. Naturally Occurring Microbes

Quarterly Activity Update

Background

- Anecdotal information has been circulating through the Florida citrus industry touting the beneficial effects of naturally occurring microbes in combating HLB and its symptoms such as premature fruit drop. These observations are generally lacking supporting scientific evaluation.
- Today there are several companies currently supplying their commercially available products that contain naturally occurring microbes to the Florida citrus industry. These products make general claims such as strengthening the plant's root system, suppressing and controlling soil bacterial, fungal and other pathogens, and aiding plants in complexing minerals and micronutrients, allowing easier uptake and, thus creating stronger and more robust plants.
- According to reliable reports, collectively these commercially available products are being used on more than 30,000 acres of Florida citrus. Generally speaking, however, these are individual company; or grower driven and there is little commonality of experimental protocols, evaluation techniques, and information sharing of results across the grower community.
- Expanded research along with replicated field trials are needed to better understand whether and the extent to which the use of naturally occurring microbes can be used as tools to control greening and fruit drop.

CATP Project

- CRDF has been funding research into the impacts of beneficial bacteria in combating HLB. For example, CATP project # 608 (Wang) was recently expanded to increase from two to four field trials in four locations, larger scale of field test, test more beneficial microbes and test different approaches to enhance the survival of the beneficial microbes in the soil.
- The study will conduct a detailed analysis regarding the effect of the microbe program including:
 - Yield,
 - Root development,
 - Effect on microbial community in the rhizosphere,
 - Survival of applied microbes in the environment,
 - Monitoring C. Las population in the roots and leaf midrib in the different treatments at different times;
 - Examination of the expression of PR gene and other defense-related genes in different treatments,
 - Observation of starch accumulation and phloem blockage in the roots and leaf midrib in different treatments.

CPDC Project

- In its August 2013 meeting, the CRDF Board approved, upon CPDC recommendation, enhanced project funding up to \$75,000 for the first year of a field trial that evaluates naturally occurring microbes for efficacy in combating HLB and reducing symptoms such as premature fruit drop among HLB affected trees.
- As a first step, CPDC staff is requesting that Committee members make recommendations of commercially available products for evaluation in the trial.
- Once this information is collected, the plan is to organize a team to review and select the products, and address field trial design, Foundation role and liability release and indemnity issues. This team may include researchers, consultants, and grower representatives. Results will be presented at the December CPDC and CRDF Board meetings.
- To determine the best course of action, several questions are being addressed:
 - What does CRDF hope to learn from the field trial above and beyond what is currently known or being investigated in current funded research programs, e.g. the RMC funded study?
 - How does CRDF add value beyond the on-going company-funded commercial trials?
 - What is the best timing for a field trial
 - What products should be included in the trial?
 - What role should CRDF play in facilitating the field trial process? Put out an RFP soliciting proposals from experts in conducting such trials? Or should the team develop a protocol before seeking proposals?
 - In addition, we need to think through any liability, indemnity, regulatory, or other issues associated with CRDF funding field testing of commercially available products. This includes conditions for grower participation, crop destruct issues, keeping within label instructions, permits, etc.

Issues and Gaps

- Determination of products to be tested, field trial design, Foundation role, liability release, indemnity and regulatory issues.

Near Term Roadmap

<u>Activity</u>	<u>Date</u>
• Request candidate products from CPDC members	Oct '13
• Organize team to evaluate candidate products and create a plan and roadmap	Nov'13
• Present a plan and roadmap to CPDC and CRDF Board	Dec'13

Project Roadmap: Naturally Occuring Microbes

What	Who	Start	End	Oct'13	Nov'13	Dec'13	1Q'14	2Q'14	3Q'14+
Request candidate products from CPDC members	CRDF staff	Oct'13	Oct'13	█					
Organize team to evaluate candidate products and create plan and roadmap	CRDF staff/ team	Nov'13	Nov'13		█				
Present plan and roadmap to CPDC and CRDF Board	CRDF staff	Dec'13	Dec'13			█			
Conduct field trials								█	

D. Tolerant Rootstock Plantings

Quarterly Activity Update

Interest continues in grower evaluation of candidate HLB-tolerant rootstocks and CRDF is following several avenues to facilitate moving this project area along. The following steps are progressing towards this goal.

Early Release of Promising Candidate Rootstocks

UF, IFAS and USDA, ARS are seeking institutional support for early release of promising candidate rootstocks for grower evaluation.

- The IFAS process towards release of rootstocks is being advanced, and a clear pathway for grower planting of trees on these rootstocks is being developed.
- Early release options are challenging some of the fundamentals of release of new plant materials, and both USDA, ARS and UF, IFAS are navigating through these issues.

Contract for Tree Propagation

With funding approval at the August CRDF Board meeting, the next step in enabling planting of commercial scale trials is to contract for tree propagation.

- Discussions with citrus nurseries and with IFAS will allow for contracting of budded trees on candidate rootstocks for planting in 2014.
- A limitation identified with some of the 30+ candidate rootstocks being considered for field evaluation is seed availability.
- CRDF has ongoing communication with state regulatory officials and with out-of-state micro-propagation companies who are considering scale-up to produce rootstock liner materials through micro-propagation.
- This will be particularly important for rootstocks which are currently limited by seed availability. Having alternative methods for multiplication of promising rootstocks will be important for grower evaluation and adoption.
- With success, trees generated from micro-propagated rootstock material could be planted in 2015.

Commercial Trials in 2014 and 2015

Through commitment of funding support and bringing the partners together, CRDF is anticipating the planting of 3 commercial-scale field trials as described above using materials being grown from seed (2014 trial) as well as from micro-propagation (2015 trial).

- These field trials will be placed with growers in strategic sites across the state to represent variations in growing conditions and perhaps HLB pressure.
- Specific details of the plantings and determination of grower cooperators are being developed through a task force of citrus breeders, citrus growers and CRDF.

Data Collection and Analysis

Data collection in existing and planned field trials of tolerant rootstock candidates will be crucial to understanding the benefit of these new rootstocks, and so CRDF has committed support for organized data collection. At present, the determination of how best to coordinate an evaluation team is underway.

Conclusions

With promising outcome on releases of a number of tolerant rootstocks for grower evaluation, discussion continue on methods to overcome seed supply, how to manage early plantings to greatest benefit, and other related topics. CRDF's goal in this area is to remove obstacles to the use of this new tool against HLB.

Key Issues and Gaps

- Methods of overcome seed supply
- Managing early plantings to greatest benefit
- Determination of grower cooperators
- Data collection and analysis in existing and planned field trials

Near Term Roadmap

<u>Activity</u>	<u>Date</u>
• IFAS release of candidate rootstocks	4Q2013
• Rootstock liners of candidate rootstock availability	4Q2013
• Contracting propagation of budded trees on candidate rootstocks	4Q2013
• Agromillora import permit and scale up to produce liners	1Q2014
• Cold protection for St. Helena rootstock trial (in contract)	4Q2013
• Data collection/coordination of rootstock trials: contracting and hiring	1H2014

Project Roadmap: Tolerant Rootstock Plantings

What	Who	Start	End	4Q13	1Q14	2Q14	3Q14	4Q14	1Q15	2Q15	3Q15	4Q15	1Q16
Early release of candidate rootstocks	IFAS/ USDA	4Q2013	4Q2013	█									
Rootstock liners of candidate rootstock availability	4Q2013	4Q2013	4Q2013	█									
Contracting propagation of budded trees on candidate rootstocks	4Q2013	4Q2013	4Q2013	█									
Agromillora import permit and scale-up to produce liners	1H2014	1H2014	1H2014		█	█	█						
Cold protection for St. Helena rootstock trial	4Q2013	4Q2013	4Q2013	█									
Data collection/coordination of rootstock trials	1H2014	1H2014	1H2014		█	█	█						
1 st CRDF commercial trials	2H2014	2H2014	1H2015					█	█	█			
2 nd CRDF commercial trials	2H2015	2H2015	1H2016								█	█	█

E. Plant Growth Regulator Interactions with HLB

Quarterly Update Report

Background

The 2012-2013 growing season for Florida citrus was severely impacted by pre-harvest fruit drop. The U.S. Department of Agriculture dropped the 2012-13 Florida orange crop estimate to 133.4 million boxes, down 13.4 percent from the USDA's original October estimate of 154 million orange boxes, and again dropped its estimate 600 thousand boxes below the June USDA report. This estimate was 9 percent below the 2011-12 orange harvest of 146.7 million.

There are several Plant Growth Regulator (PGR) products labeled to prevent fruit drop in a variety of plants, including citrus. These PGR products contain active ingredients such as 2,4-D, Gibberillic Acid, or Naphthalene Acetic Acid (NAA). There is, however, very little scientific research to date on their effectiveness in reducing fruit drop in trees infected with HLB.

To address this situation, the Research Management Committee (RMC) of CRDF amended an already funded study (CATP # 707) to evaluate a combined PGR-surfactant-nutrition therapy technique to mitigate severity of HLB symptoms in a mature "Hamlin" orange block that is unresponsive to nutrient therapy alone. The amendment adds an additional set of experiments to specifically address the problem of fruit drop during the 2012-2013 harvest by using split applications of 2,4-D applications at reduced levels along with a nutrient spray. This will be applied to both mature and young trees within a block.

Sponsored Field Trials

In its August 2013 meeting, the CRDF Board approved, upon CPDC recommendation, enhanced project funding up to \$100,000 for a field trial that evaluates 2, 4-D and/or other PGRs for efficacy in reducing fruit drop among HLB affected trees. To determine the best course of action, several questions are being addressed:

- What do we hope to learn from the field trial above and beyond what is currently known or being investigated in the RMC funded study?
- What is the best timing for a field trial? At the end of the current growing season? Wait until next season?
- What PGR(s) should be included in the trial?

CPDC staff is in the process of organizing a meeting in late October/early November time frame with Drs. Arnold Schumann and Gene Albrigo (IFAS), and Ed Stover (USDA), all recognized experts in PGRs and fruit drop to discuss these issues and assist in developing a framework and roadmap for actions. This will be presented in December to CPDC and CRDF Board.

Revised Product Labeling

Much current attention among some Florida citrus growers has focused on 2, 4-D since it is currently labeled for use against fruit drop on Florida citrus in a restricted sense. Citrus Fix, an AMVAC product containing 2,4-D as active ingredient, has an EPA label for use in California, and the California label allows for two different options: split applications for fruit drop prevention on lemons, Naval oranges, Valencias and tangelos; and a single application per crop cycle option for increasing fruit size and pre-harvest fruit drop prevention for Navals, Valencias and grapefruit.

The Florida SLN label for Citrus Fix allows for a single application only to Naval oranges to reduce fruit drop. There are timing options, but only on Navels and only one application.

The company indicates that the ester form of 2,4-D is more thoroughly and quickly absorbed into plant tissues than is the amine form, making it more effective than the amine form. However, when drifting onto non-target plants, this translates into greater risk of phytotoxicity.

The label for citrus in California was enabled by data investment by the California Citrus Quality Council (CCQC), that actually owns the data and receives a royalty on sales. Seeking a variance on residues associated with a change in use label for Florida will require interaction with CCQC.

Next step is to determine AMVAC's level of interest in pursuing a more flexible label in Florida, and CCQC's providing residue data in support of that effort.

October Brazil Trip

Dr. Harold Browning, Bobbie Barben and Ben McLean will be travelling to Brazil in late October to meet with key researchers and view field trials using various approaches to HLB. This information will be incorporated into CRDF's overall strategic approach to PGR/Fruit Drop.

Issues and Gaps

- Development plan and timing for field trial
- Proposal to CPDC/Board at December meetings

Near Term Roadmap

<u>Activity</u>	<u>Date</u>
• Bring together experts to discuss on-going research and trials, and how CRDF can best add value through funding field trials	Oct/Nov
• Recommendation to CPDC/CRDF Board at December meetings	Dec
• Begin discussions with AMVAC to determine potential interest in pursuing	
• Label changes for Florida citrus; and with CCQC about possible data access	1Q2014
• Coordinate, as appropriate, with FDACs and EPA on plans and overall approach to the labeling issue.	1Q2014

Project Roadmap: PGR Interactions with HLB

What	Who	Start	End	Oct'13	Nov'13	Dec'13	Jan'14	Feb'14	Mar'14
Bring together experts to discuss on-going research and trials, and CRDF roadmap	CRDF/ IFAS/ USDA	Oct/ Nov'13	Oct/ Nov'13	█					
Staff recommendation to CPDC/CRDF Board	CPDC staff	Dec'13	Dec'13			█			
Labeling discussions with AMVAC and CCQC	CPDC staff	1Q'14	1Q'14				█		
Coordination with FDACS and EPA on overall approach	CPDC staff	1Q'14	1Q'14				█		

F. Thermal Therapy

Quarterly Update Report

Current CRDF research is focused on evaluating thermal conditions that may lower C Las Titer in infected field-plant trees. Similarly Dr. Duan Ping (USDA-ARS) is investigating this potential under a two year specialty crop block grant project. Growers are currently engaged in trying different approaches to design and use of thermal therapy.

For the July 2013 CPDC meeting, Dr. Duan and Dr. Ehsani developed two enhanced project proposals to thermal therapy which are under review by CPDC.

- Dr Duan focused on larger scale field trials with three different locations and different citrus varieties, different devices for better effects and more cost effectiveness, mathematical models to predict time duration for best outcome, and methods to monitor dynamics of Las prophage/phages, including their movement inside plants.
- Dr. Ehsani's proposal was to develop and test an approach to treat larger areas more efficiently. It involves covering a row or partial row of trees with a plastic cover and integrating a wireless temperature control system to monitor temperature remotely.

The CPDC raised several questions, and requested that they be addressed prior to approval.

At the August Research Management Committee meeting, the committee approved a revised and integrated proposal as an enhancement to Dr. Ehsani's CATP 11 Project #586. The enhancement recommended acceleration of work on Thermal Therapy treatment and commitment of an additional \$229.6K to the project over a one year period 2013-2014. Within this proposal Dr. Duan's work was added as subcontractor work under this proposal, and represented \$179.9K of the total net add of \$229.6K.

CPDC designated thermal therapy as a Tier 1 Issue at the September meeting, recognizing that such work may be funded by the Research Management Committee or elsewhere. In the above example, proposals that initially came to CPDC were handled by expanding a current Research Management Committee project.

Issues and Gaps

A key issue is how can CPDC best add value to this activity, given its strong momentum among growers.


In discussion, CPDC recognized that the Foundation has an important role as an interface between research and grower adoption. This involves listening to growers and the industry, finding out what is useful, and playing a facilitative role, including sharing of data, designs, etc. This is particularly important given the number of information requests coming from industry, and the large number of grower-driven initiatives such as building their own cages.

A concrete near-term action CPDC can take is to encourage field demonstrations of projects. For example, CPDC could organize a field day in Indian River and one in Central Florida, in coordination with IFAS and/or USDA.

Near Term Roadmap

- Organize one or two field days in coordination with IFAS and/or USDA 4Q/1Q

Project Roadmap: Thermal Therapy

What	Who	Start	End	Oct'13	Nov'13	Dec'13	Jan'14	Feb'14	Mar'14
Organize 1 or 2 Field Days to provide opportunity to share ideas and approaches	CRDF/ IFAS/ USDA	4Q/1Q	4Q/1Q						

G. Genetic Technology (MCTF)


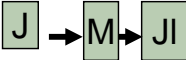
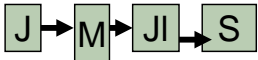
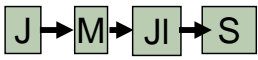







Quarterly Activity Update

- Dr. Janice Zale has accepted the position of MCTF Coordinator began work mid-July. Dr. Zale brings experience in plant molecular biology, breeding, plant pathology and genetic transformation of crops and model species. CRDF staff will be meeting with her in mid-July to discuss the “go forward” roadmap.
- An initial Steering Committee has been established, and the committee plans to meet in the October/November timeframe to define objectives, create an operational plan, and begin work on mature transformation of commercially important citrus scion and root stock cultivars.

Issues and Gaps

- Providing needed support to Dr. Zale in performance of her duties
- Finalize arrangements with Dr. Leandro Pena to provide valuable support in ensuring the facilities, tools, protocols and work plan are in place

Project Roadmap: Genetic Disease Resistance (Canker)

What	Who	Start	End	3Q'12 4Q'12 1Q'13 2Q'13 3Q'13 4Q'13 '14 '15 '16' 17 '18 '19 '20 '21'22
<u>MCTF Ramp</u>				
Interim MCTF Oversight	CREC	Sep'12	Jul'13	
Secure new MCTF Manager	CREC	Jul'13	Jul'13	
Establish Steering Comm	CREC/CRDF	Nov'13	Nov'13	
Establish resource requirements/budgets	MCTF/Steer Comm	Dec'13	Dec'13	
Ongoing operations	MCTF/Steer Comm	4Q'13	Ongoing	
<u>Commercialization</u>				
Mature tissue transformation into commercial cultivars	MCTF	4Q'13	Ongoing	
First raw materials with desired canker traits	MCTF	2017+	Ongoing	
Field evaluations/wide area testing	CRDF/Com Partners	2017+	Ongoing	
Regulatory studies, permits	CRDF/Com Partners	2014	Ongoing	
Achieve deregulation of first new line	CRDF/Com Partners	2021	Ongoing	
New cultivar budwood to nurseries	CRDF/Com Partners	2022	Ongoing	
Strategic partnerships	CRDF/Steer Comm	2014	Ongoing	