

**National Agricultural Research, Extension, Education, and Economics (NAREEE)
Advisory Board**

HIGHLIGHTS OF THE CITRUS DISEASE SUBCOMMITTEE MEETING

February 2-3, 2017
Hotel Indigo San Antonio, 105 N Alamo,
San Antonio, TX, 78205

The Citrus Disease Subcommittee (CDS), a statutory subcommittee of the National Agricultural Research, Extension, Education, and Economics (NAREEE) Advisory Board, met in public session on February 2-3, 2017, in San Antonio, Texas. The meeting's main goals were to hear presentations from new and returning project directors about their research projects funded through the Citrus Disease Research and Extension Program (CDRE), part of the National Institute of Food and Agriculture (NIFA) Specialty Crop Research Initiative (SCRI), and to discuss the CDRE annual budget, agenda, and funding priorities.

SUMMARY OF PRESENTATIONS

Michele Esch, the Executive Director, NAREEE Advisory Board, and Designated Federal Officer, CDS, gave members a brief overview of what is happening under the transition to the new administration and her role in the process. CDS Chair Tom Jerkins welcomed CDS members and underscored the urgency of the need to find a solution to the Huanglongbing (HLB) disease that threatens the U.S. citrus industry, with the Florida industry well on its way to devastation. Following opening remarks and introductions, CDS members heard from Dr. Parag Chitnis, Deputy Director, Institute of Food Production and Sustainability, NIFA. Dr. Chitnis described NIFA's CDRE investment of \$72 million in 18 projects for fiscal years (FY) 2014-2016 and noted program challenges.

The SCRI/CDRE Project Directors, including new and returning directors, gave presentations on the goals of their research projects and accomplishments to date.

The New Project Directors gave their presentations first:

- Dean Gabriel, University of Florida, presented on *Development of Tools for Evaluating and Communicating Short-Term Solutions for HLB*.
- Michelle Cilia, USDA-ARS, presented on *Harnessing Natural Variation in the Ability of the Asian Citrus Psyllid to Transmit Liberibacter for the Development of Novel HLB Control Strategies*.
- David Gang, Washington State University, presented on *Development of In Vitro Biofilm and Planktonic Culture of Ca. Liberibacter Asiaticus: A Game Change in HLB Research*.
- Kirsten Stelinski, University of Florida, presented on *Movement and Inhibition of Candidatus Liberibacter Asiaticus and Asian Citrus Psyllid Endosymbionts Using Targeted Bactericides*.

- Wenbo Ma, University of California, Riverside, presented on *Effectoromics of HuangLongBing (HLB)-Associated Pathogen*.
- Swadeshmukul Santra, University of Central Florida, presented on *Multifunctional Surface/Sub-surface/Systemic Therapeutic (MS3T) Technology for HLB Management*.
- Goutam Gupta, New Mexico Consortium, presented on *Design and Delivery of Therapeutic Proteins for HLB Protection*.

The Returning Project Directors gave presentations updating CDS on their projects presented in 2016:

- Reza Ehsani, University of Florida, presented on *Steam-generated Supplementary Heat Thermotherapy as an Immediate Treatment for Prolonging Productivity of HLB-infected Citrus Trees*.
- Michelle Cilia (for Susan Brown), Kansas State University, presented on *Citrus Greening Solutions: Combining Molecular Biology with Omics to Discover Psyllid-Bacterial Interactions*.
- Graciela Lorca, University of Florida, presented on *A Novel Antimicrobial Approach to Combat Huanglongbing (HLB) Disease*.
- Bill Dawson (for Bryce Falk), University of California, Davis, presented on *Non-transgenic, Near-term RNA Interference-based Application Strategies for Managing Diaphorina citri and Citrus Greening/Huanglongbing*.
- Fred Gmitter, University of Florida, presented on *Determining the Roles of Candidate Genes in Citrus-HLB Interactions and Creating HLB-Resistant Citrus*.
- Chandrika Ramadugu, University of California, Riverside, presented on *Characterization of Liberibacter Populations and Development of Field Detection System for Citrus Huanglongbing*.
- Swadeshmukul Santra, University of Central Florida, presented on *Zinkicide: A Nanotherapeutic for HLB*.

Following the Project Directors' presentations, CDS heard from the following: Dr. Mary Palm, HLB Multi-Agency Coordination (HLB MAC) and Citrus Health Response Program (CHRP), USDA Animal and Plant Health Inspection Service (APHIS) (*via phone*), spoke about the HLB MAC Group's goals and activities; Dr. Harold Browning, Chief Operating Officer, Citrus Research and Development Foundation, Inc. (CRDF) presented CRDF highlights; Dr. Melinda Klein, Chief Research Scientist, California Citrus Research Board (CRB), gave an overview of CRB activities; Dr. Maureen Whalen, Deputy Administrator, Agricultural Research Service (ARS), spoke about securing citrus in the National Plant Germplasm System and other ARS citrus-related efforts; and Dr. Tom Bewick, National Program Leader, NIFA, gave an overview of CDRE program activities to date and the current status of awards.

In his presentation, Dr. Bewick noted the urgency of the need for HLB solutions and proposed an alternative to the normal NIFA annual grant cycle. The alternative would use a single Request for Applications (RFA) but with two submission dates. The first date

would be for current Standard Research and Extension Projects (SREPs) and Coordinated Agricultural Projects (CAPs) with four-year project periods and would be available for new projects and re-submissions, with a virtual relevance review and an on-site scientific merit panel. However, with the goal of capturing new investigators and new opportunities to bring research projects to fruition, four modifications would apply for applications submitted on the second date: 1) only new applications would be accepted, 2) only SREPs would be allowed, 3) the project period would be limited to 18 months, and 4) the relevance and merit review would be done remotely. If all funds were allocated during the first review, no additional applications would be accepted at the second deadline. Discussion was held on the concern that researchers should be notified in a timely way if funds were depleted in the first round so that they would not expend significant effort to submit proposals for the second deadline only to discover that no funds were available. Members also wanted to be certain that all of the available funds are expended.

After CDS Chair Tom Jerkins reviewed the agenda for February 3, the members discussed their recommendations and priorities for 2017, taking formal votes on items and suggesting language for use in their letter to NIFA. They also briefly discussed the relevancy review process and agreed it should continue with the improvements that were already adopted.

KEY ISSUES AND DISCUSSIONS

Recommendations and Priorities for CDRE FY2017

As a major meeting focus, CDS members discussed their recommendations for the 2017 CDRE budget, agenda, and priorities. Building on the previous day's presentations and discussion, CDS Chair Jerkins expressed optimism that new HLB therapeutic products are on the horizon. But having effective therapies is only one step; in addition, products must undergo regulatory review and approval for commercial use, which could make commercialization of new therapies too late to help prevent the complete failure of the Florida citrus industry, which is 100 percent infected. He challenged the CDS members to consider better ways to optimize use of the remaining \$50 million available over the next two years to advance the commercialization of products so they can be used in the field. Members discussed the possibility of a regulatory process tutorial, such as one addressing data the U.S. Environmental Protection Agency (USEPA) requires. They discussed the need for researchers to partner with an industry registrant to carry their therapies through to commercialization. So far, only one of 14 projects, the Zinka project, has a registrant.

CDS members discussed the urgent need to overcome researchers' current inability to culture the CLas bacterium. That inability remains a significant barrier to solving the HLB problem after 10 years of HLB research. Members discussed options and obstacles to attracting new researchers, possibly from the Massachusetts Institute of Technology or other institutions, who might bring fresh approaches to the CLas culturing challenge. Members discussed the possibility of offering a prize to motivate maximum creativity in coming up with a CLas culturing solution, perhaps through a joint industry-USDA effort.

Members agreed that CDRE funding in 2017 should remain focused exclusively on HLB, with culturing CLAs as a top priority. But they also discussed additional priorities, including the development of systems to deliver HLB therapies and publishing a dynamic guidance for growers on the value they would receive for the costs of deploying different therapies; the guidance, described as a “catalog of choices,” would quantify the economic value to growers of different therapeutic choices they might adopt.

The CDS discussed 2017 priorities, with members raising fruit quality issues and underscoring the need for researchers to consider the effects on fruit quality of any therapy and delivery system.

Based on their knowledge of the FY2016 funding decisions and the status of projects, as well as other considerations, CDS members agreed on the following:

- 1) *Agenda.* CDRE funding in FY2017 should continue to focus exclusively on HLB.
- 2) *Budget.* All of the CDRE funds available should be expended in the next fiscal year.
- 3) *Priorities.* Members agreed that the 2016 priorities should be retained and two new priorities added. CDS members voted on and rank ordered the priorities as follows:
 1. Therapies to prevent or suppress CLAs bacteria within trees;
 2. Development of tolerance or resistance in commercial citrus in all production areas with a focus on delivery of new cultivars (or rootstocks and scions) using all available strategies;
 3. Systems for delivery of therapies into the phloem;
 4. Culturing or cultivating the CLAs bacterium;
 5. Early detection of the bacterium in host and vector;
 6. Pre- and post-harvest tools to maximize fruit quality for fresh and processed.

Members further discussed the proposal for comparative guidance on quantifying the economic value to growers of different therapies, current and future, so that growers could determine which HLB strategy would provide them with the best effects for the money spent. It was noted that the issues are more economic than biological, and that controlled field trials would be needed but such data currently are unavailable to compare different strategies.

BOARD BUSINESS

The CDS will produce its final letter of FY2017 recommendations as soon as possible following the meeting.

RESOLUTIONS AND RECOMMENDATIONS

- CDS recommends that NIFA utilize the two-deadline process for the 2017 CDRE program. The second deadline must meet the four criteria: 1) only new applications would be accepted, 2) only SREPs would be allowed, 3) the project period would be limited to 18 months, and 4) the relevance and merit review would be done remotely.
- CDS approved expending the entire budget and adopted the six rank-ordered priorities to be provided to NIFA for use in developing the RFA.

- CDS members discussed using the following language for its official letter to NIFA: The CDS recommends that NIFA communicate to grant awardees the “expansion of scope and continued funding of existing projects to produce grower tools more quickly.” The CDS also recommends “NIFA should include this in the RFA.”
- CDS in its advice to NIFA recommends that USDA reach out to the citrus community to create an award aimed at finding a way to kill the CLas bacterium.
- CDS recommends that NIFA consider establishing a regulatory ombudsman for citrus products.
- CDS recommends that NIFA encourage, and could consider requiring, that the consideration of regulatory processes be built into projects, not treated as a stand-alone issue.
- CDS recommends that NIFA consider including an Intellectual Property partner in grant proposals to support commercialization.
- CDS recommends that the new transition advisor to USDA work with USEPA on regulatory matters.
- CDS recommends obtaining guidance from USEPA on the structure of data to obtain regulatory approval for new products.
- CDS agreed to state that, “As far as we know, the relevancy review worked well” and members appreciate the improvements.

ACTION ITEMS

- The CDS will seek to expand its outreach efforts to the broader scientific community using various measures to encourage new researchers to apply for grants, including a joint letter with Citrus Mutual and other groups, partnership with the California Citrus Research Board, notices in *Nature*, *Science*, and other relevant periodicals, and CDS might further explore the idea of expanded outreach in a teleconference.
- The next CDS meeting will be held in the 3rd or 4th week of January 2018 in Florida as a first choice and Washington, D.C., as a second choice.
- The Executive Director will conduct a Doodle poll to determine the dates of the next CDS meeting.