

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

HIGHLIGHTS OF THE CITRUS DISEASE SUBCOMMITTEE MEETING

January 25-26, 2018
U.S. Horticultural Research Laboratory (ARS),
2001 S. Rock Road, Fort Pierce, FL, 34945

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 January 25-26, 2018, in Fort Pierce, Florida. The meeting's main goals were to hear presentations from new 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

CDS Chair Tom Jerkins gavelled the meeting to order. Michele Esch, the Executive Director, NAREEE Advisory Board, and Designated Federal Officer, CDS, provided an overview of the meeting agenda and the mission of CDS, which was established in the 2013 Farm Bill. Chair Jerkins suggested that the Subcommittee could conclude its business in a single day by extending the January 25 meeting, with a field tour the following day. He remarked that because of the widespread Huanglongbing (HLB) disease, Florida's citrus industry is in much worse condition than when the Subcommittee first met, and growers in Texas and California are facing threats; however, he remains optimistic about meeting the HLB challenge. The CDS members and all who were present at the meeting introduced themselves. NIFA Institute of Food Production and Sustainability Deputy Director Dr. Parag Chitnis was unable to attend the meeting, so the agenda moved directly to Project Directors' presentations.

Five SCRI/CDRE Project Directors gave presentations on the goals of their research projects and accomplishments to date. The presentations were:

- Bryony Bonning, University of Florida, presented on *Bt Toxin-based Strategies for Management of Diaphorina citri and Citrus Greening*.
- Feng Luo, Clemson University, presented on *Selection, Molecular and Genetic Analysis of HLB Tolerant/Resistant Variant Citrus Plants*.
- Caroline Roper, the Regents of the University of California, presented on *Deployment Of A Spectrum Of Bactericides To Cure And Prophylactically Treat Citrus Huanglongbing*.
- YongPing Duan, USDA-ARS, presented on *Identification, Assessment and Delivery of Antimicrobial Compounds for the Management of Citrus HLB*.

- Jude Grosser, University of Florida, presented on *An Integrated Approach to the Accelerated Development of Rootstocks that Impart HLB Tolerance to Trees Grafted with Commercial Scions*.

In addition to the Project Directors' presentations, CDS members were invited to a Poster Session that was set up in the meeting room to learn more about the projects.

Dr. Tom Bewick, National Program Leader, NIFA, gave an overview of CDRE program activities and the current status of awards. He began by noting that the new Program Specialist is Megan O'Reilly; the Relevance Review Panel Manager is Harold Browning; and the Scientific Merit Review Panel Manager is Neil Gudmestad, who will be replaced next year by Jeff Chang of Oregon State University.

Dr. Bewick then reviewed the submissions data. For the first submission date, there were 38 pre-applications received and assigned to four panels, with each panel having nine industry reviewers. The panels invited 26 full applications, and five awards were announced. For the second submission date, which has a deadline of February 15, CDRE received 10 pre-applications, including several from non-citrus teams. However, none of the submissions were in the final stages. Three proposals were invited to submit full applications. Approximately \$2.4 million is available. Dr. Bewick explained that the Relevance Review Panels decided which pre-applications to invite, ranking them based on the importance of the research to industry. The Scientific Merit Review Panel rated projects by merit, and then developed its funding recommendations by combining the relevance and merit rankings. Dr. Browning was present at the meeting when the Scientific Merit Panel developed funding recommendations, which were made giving significant weight to a project's relevance.

CDS members received 250-word summaries of the 2017 awards and Dr. Bewick listed the titles on a slide:

- *Biopesticidal Dsrna Therapy for Psyllid Mortality and Abatement of Vector-Mediated CLas Transmission*
- *Citrus Under Protective Screen (CUPS) For HLB Management*
- *Transgenic Success-Guided Reproduction of Huanglongbing Disease Resistance/Tolerance in Citrus by Gene Editing*
- *Development of Non-Transgenic HLB Resistant Citrus Varieties Using CRISPR-Cas9*
- *Accelerating Implementation of HLB Tolerant Hybrids as New Commercial Cultivars for Fresh and Processed Citrus*

During the question and answer session, Dr. Bewick affirmed that the number of grant applicants was declining, from 69 in the first year to 38 in the current year. But projects are in the pipeline. It was clarified that if there were no new Farm Bill, the CDS would continue to meet and consult with NIFA, even if no new funding was available for the panel to consider. A CDS member noted that researchers would benefit from knowing what was previously funded. It was agreed that Megan O'Reilly will work with the NIFA information technology staff to update the webpage housing all NIFA projects and

reports, and Michele Esch will develop a link that CDS members and researchers can go to directly.

A CDS member asked how the Subcommittee's priority recommendations fit into the CDRE award determination. Dr. Bewick explained that the 2017 CDS-ranked priorities were used to give greater weight to projects with high relevancy and scientific merit scores; for example, if equal in relevance and merit, a project that matched the CDS's top-ranked priority would receive greater weight than a project matching the CDS's fourth-ranked priority. Members discussed the issue of supplemental funding for existing projects, and a CDS member requested that NIFA inform them about the process for seeking supplemental funds once it is clarified. A member asked if the CDS could recommend that no more new projects receive funding and that all remaining funds be set aside for supplemental awards. Dr. Bewick responded that NIFA has the authority and if CDS made such a recommendation the leadership would have to consider it.

Dr. Gail Wisler, Retired, National Program Leader for HLB/Asian citrus psyllid (ACP) Research, USDA-Agricultural Research Service (ARS), gave a presentation on *ARS Research Update on Citrus Diseases*. She began by describing differences among the USDA partners working on HLB solutions: ARS, NIFA, and the Animal and Plant Health Inspection Service (APHIS). USDA's HLB National Plan targets all three components of the problem: the ACP vector, the associated pathogens, and the citrus hosts. When HLB hit Florida in 2005-2006, ARS responded with an "all hands on deck" that refocused research at ARS locations around the country on various aspects of the disease and solutions. Dr. Wisler presented a map showing the increase of ACP over time. She presented information about research conducted at the ARS Parlier, California, station, that has identified and targeted *Liberibacter asiaticus* virulence genes, with preliminary tests showing enhanced growth of citrus trees treated with selected compounds. She reviewed other promising research. Dr. Wisler described the ARS-wide 2017 Grand Challenge aiming to "Transform agriculture to deliver a 20 percent increase in quality production at 20 percent lower environmental impact by 2025." The ARS administration recognized HLB as one of agriculture's greatest challenges. In 2017, \$18.7 million went to projects coded for citrus, and \$2.3 million for citrus greening.

During the question and answer session, Dr. Wisler was asked about quarantine zones she depicted, and she replied that Georgia should be able to move material within weeks. Samples have been drawn and analyzed.

Dr. Angela McMellen-Brannigan, USDA-APHIS, gave an update via teleconference on the *Huanglongbing Multi-agency Coordination Group (HLB MAC)*, whose goal is to get tools to growers within 1-3 years, starting with two-year funding of \$20 million in Fiscal Year (FY) 2014 and an additional \$5.5 million slated for FY16-17 and FY17-18. She noted several vector control projects being funded using \$2 million of \$11 million available. Two projects are directed at the field management of HLB using approximately \$500,000 out of \$8 million, several projects are funded at approximately \$2 million, and an additional \$1.5 million is being spent on other projects. Because not all of the \$11 million has been spent, money will be left at the end of the fiscal year, and the HLB-

MAC wants to evaluate if biocontrol and early detection are worthwhile as priority research areas. At the request of the CRDF, the National Academy of Sciences (NAS) is conducting a comprehensive review of HLB efforts since 2005, following up on a 2009-2010 review that NAS published, with a final report due in March.

KEY ISSUES AND DISCUSSIONS

Recommendations and Priorities for CDRE FY2018

The afternoon discussion focused on the CDRE 2018 agenda and priorities. DFO Michele Esch opened the discussion by presenting an overview of the CDS charge and reviewing the goals for the afternoon. She presented a list of the 2014-2017 CDS priorities. Ms. Esch posted the 2017 rank-ordered priorities for discussion by the CDS. They were:

1. Therapies to prevent or suppress *Candidatus Liberibacter asiaticus* (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 of citrus trees.
4. Culturing or cultivating the CLas bacterium.
5. Early detection of the bacterium in host and vector.
6. Development of pre- and post-harvest tools to maximize citrus fruit quality for use in fresh fruit or processed products.

Members discussed individual priorities, including whether any should be removed. Members spoke at length about the critical culturing issues and current research that has been funded to address the challenge. Based on the discussion, Chair Jerkins concluded, without dissent, that culturing remains elusive and should remain on the priority list. A member added that a process is needed to be sure supplemental funding for culturing can be obtained if necessary without having to resubmit a completely redone project proposal. Together with Dr. Bewick, the CDS reviewed the funding amounts, which equal \$24.4 million, and Chair Jerkins requested that for clarity an Excel spreadsheet be created so the CDS can see the numbers. It was agreed NIFA can create such a spreadsheet for the members.

After obtaining agreement that none of the six 2017 priorities should be removed, Chair Jerkins asked if any should be added. CDS member Joe Davis, Jr., raised the issue of root health as critically important. Members agreed to modify 2017 priority number 3, adding the words, *including the root system*. After a brief discussion about whether the issue was root health or the whole tree, the CDS also approved a new priority that read: *Improve productivity of infected trees, including root health*.

Project Director Dr. Duan offered his view that 2017 priority number 2 required a reference to the variety of pathogenic strains because there are clear differences in strains from Florida and California, so strains from all major areas should be used. Members agreed to modify priority 2, adding the words: *with consideration of pathogen genetic diversity*.

Chair Jerkins called for a motion to accept all seven of the priorities now listed for 2018 and the list was unanimously adopted. He then opened the floor to discussion of how the priorities should be ranked in importance. Following discussion, the CDS produced the following consensus on the 2018 rank-ordered priorities list:

1. Therapies to prevent or suppress *Candidatus Liberibacter asiaticus* (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, with consideration of pathogen genetic diversity.
3. Improve productivity of infected trees, including root health.
4. Systems for delivery of therapies into the phloem of citrus trees, including the root system.
5. Culturing or cultivating the CLAs bacterium.
6. Early detection of the bacterium in host and vector.
7. Development of pre- and post-harvest tools to maximize citrus fruit quality for use in fresh fruit or processed products.

A CDS member made a motion to add language to the FY2018 letter to the Secretary that would convey the idea of reserving a portion of any remaining funding to supplement existing projects. Discussion resulted in agreement to convey to the NIFA director that *“the intent is for an amount of funding, not to exceed 25 percent, to be awarded to advance existing projects if justified by merit in light of these seven priorities.”*

Ms. Esch sought CDS comments on grants awarded as a way to test how the awards process is working. Members raised concerns about the fact that the five awards made in 2017 included a project on *Citrus Under Protective Screen (CUPS) for HLB Management*, although CUPS is not a CDS priority. Chair Jerkins suggested that, since members were not asking for any action to be taken on the CUPS project, there should be no comment, and no members disagreed.

BOARD BUSINESS

Chair Jerkins turned to the topic of changing the CDS membership. Ms. Esch pointed out that all but three members had reached their maximum six-year terms and would rotate off, although a request can be made to extend the terms of three members for an additional year. Members agreed that extensions should be requested because it would be too disruptive for CDS to lose all except three members at once. Ms. Esch said NAREEE would issue a call to replace three members for appointments starting October 1, 2018. Citrus producers are required, with these numbers from each state: Florida (5), California (3), and Texas (1). Chair Jerkins requested that members who have reached their six-year limit send Ms. Esch an email indicating their willingness to serve an additional year. She requested that CDS members suggest candidates to serve as new members.

Members discussed possible locations for the 2019 CDS meeting. Arizona and Fresno, California, were named as potential locations.

On Friday, January 26, 2018, the CDS and several project researchers met at the ARS Horticultural Research Laboratory at 8:30 for a tour of the facility and fields.

RESOLUTIONS AND RECOMMENDATIONS

- A CDS member suggested that it would be helpful to see the 38 project proposals for last year categorized according to which of the 2017 priorities they matched.
- CDS members expressed interest in the possibility of setting aside a portion of remaining CDRE funds for use as supplemental dollars for existing research projects, such as culturing research; for clarity on the funding issue, they requested that NIFA create an Excel spreadsheet so the CDS can see the amount of CDRE funds that have been spent and the amount remaining.
- The CDS, after reviewing the 2017 priorities, modifying two, and adding a new one, unanimously adopted the new list of priorities.
- After discussion, the CDS conducted a voting procedure to rank order the 2018 priorities and adopted a final rank order that will be influential in funding recommendations, with higher priority goals receiving greater weight.
- The CDS supported NAREEE requesting an additional one-year extension for members whose term has reached the maximum six years.

ACTION ITEMS

- Megan O'Reilly will work with the NIFA information technology staff to update the webpage housing all NIFA projects and reports, and Michele Esch will develop a link that CDS members and researchers can go to directly.
- NIFA will inform the CDS members about the process for making supplemental funding awards to existing projects.
- Tom Bewick will classify the 38 research project proposals received last year according to which of the six 2017 CDS priorities the proposals matched and make the information available to CDS members.
- NIFA will create an Excel spreadsheet so the CDS can see the amount of CDRE funds that have been spent and the amount remaining.
- CDS members who have reached the maximum of their six-year terms will send Michele Esch an email indicating whether they would be available to extend another year.
- Michele Esch will request a one-year extension for three CDS members who have reached their six-year term maximum but are willing to extend their service another year.
- NAREEE will issue a call for three new CDS members for appointments starting October 1, 2018.
- CDS members will suggest candidates to serve as new CDS members.