

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

**MINUTES OF THE CITRUS DISEASE SUBCOMMITTEE
MEETING**

December 4-5, 2019
The Hamilton Hotel
1001 14th St., NW, Washington, DC

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Respectfully submitted,



Justin D. Brown



Executive Director

APPROVAL BY ADVISORY BOARD:

Date

Initials
Chair

Initials
Executive Director

EXECUTIVE SUMMARY

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 December 4-5, 2019, in Washington, DC. The meeting's main goals were for the CDS members to make recommendations on the agenda, priorities, and budget for the Emergency Citrus Disease Research and Extension Program (ECDRE) within the National Institute of Food and Agriculture (NIFA) program to guide the forthcoming Request for Applications (RFA) for research grants. Prior to the CDS meeting, a Foundation for Food and Agriculture Research (FFAR) Citrus Greening Convening was held during which members and other participants discussed the top issues, and the FFAR discussions were repeatedly referenced during the CDS meeting.

SUMMARY OF PRESENTATIONS

Michele Esch, the Executive Director, NAREEE Advisory Board, and Designated Federal Officer, CDS, provided an overview of the meeting agenda and the subcommittee's mission, noting that 8 of 11 members were new to CDS, so they were given an orientation presentation on the Subcommittee's rules and role. Ms. Esch also provided an overview of the Federal Advisory Committee Act (FACA) rules, explaining that as Representatives, the CDS members were not subject to the same Conflict of Interest (COI) rules as other FACA member categories and were expected to present their stakeholder group's interests and views, not "objective" and "unbiased" information, although they were cautioned about avoiding an appearance of COI. Of the 11 CDS members, five are from Florida, five from California, and one from Texas, each serving staggered 2- or 3-year terms to avoid losing too many members at the same time.

National Institute of Food and Agriculture (NIFA) Director Dr. Scott Angle introduced himself and discussed the very important role CDS has to play for NIFA with the Farm Bill's \$125 million, or \$25 million a year, allocated for citrus greening. He cautioned that the last round of Farm Bill funding might be the last, after almost \$1 billion has been spent from various sources to deal with the problem but so far without any breakthroughs. He discussed the last Farm Bill's debacle, which was not NIFA's fault, when an issue of matching money that USDA had not requested stalled the issuance of funding. He also described NIFA's relocation to Kansas City, which resulted in the agency losing 75% of its staff, so NIFA is hiring rapidly at a rate of five people a week.

KEY ISSUES AND DISCUSSIONS

During discussing with Dr. Angle and NIFA Associate Director Dr. Parag Chitnis the CDS members expressed their strong interest in having a greater role besides priority setting in the development of the RFA, notably in the Relevancy Review that determines which projects receive grants. In addition, they raised concerns about the lack of a central database from which a complete understanding of past and current research efforts could be understood. The CDS members, like NIFA, want to see progress accelerated in dealing with HLB. Currently, policy disallows CDS members from serving as Relevancy Review participants, but NIFA and Subcommittee members discussed possible flexibility with regard to the policy, and NIFA will

discuss with the USDA Office of General Counsel (OGC) the possibility of accelerating the process for changing the policy to give CDS members a greater role.

Dr. Chitnis provided an update on what NIFA's 5 years of funding has done in response to HLB. Dr. Chitnis gave a breakdown by state of appropriated funds for the 30 projects NIFA has funded: Florida 43% (13); California 27% (8); USDA-ARS 10% (3); and Arizona, Kansas, New Mexico, Texas, South Carolina, and Washington 3% (1) each. As the second part of the presentation, Dr. Michael Fitzner, Acting Deputy Director, NIFA, joined Dr. Chitnis, describing the ECDRE's proposed priorities, set the CDS, had been fairly steady over 2015-2018. NIFA regards the next 5-year cycle as a fresh start for Farm Bill money. Based on the FFAR discussions, the earlier priorities might be outdated. Dr. Chitnis broached the subject of possibly allocating the 2019-2020 money, totaling \$50M, in one year. He proposed for CDS consideration the idea of Coordinated Agricultural Projects (CAPs) using collaborative teams of scientists from different institutions that would require funded projects to have a business plan for commercialization, regulatory approval, and other steps to go from lab to groves, as well as annual deliverables and an advisory committee. CAPs would give CDS more control.

Dr. Angle commented that the CDS will have influence on those who apply for NIFA grants, and he urged members to talk to prospective applicants. For CAP grants, more direction is better. After HLB occurring for 14 years in the U.S., he would have expected a narrower focus; but so far, three successful approaches have not been found. For this cycle of funding, it would be good to define a limited set of "do or die" needs.

Members took up the issue of the extensive data available on HLB research, with one member suggesting that the HLB-Multi-Agency Coordination (MAC) Group might be a better venue for dealing with the issue of establishing a database that researchers and growers could access. The database would help researchers define goals and encourage teamwork. Over the last 5 years, the MAC has held discussions and several of them began with the same frustration over the inability to see the big picture of activities. Perhaps a database could be run by the Citrus Research and Development Foundation (CRDF) or Citrus Research Board (CRB) but funded through MAC. Members said the database would have to be searchable, with a link to NIFA's site for progress reports. A motion was made to communicate to the MAC the need for a central searchable database at CRB or CRDF; it was seconded, and all members approved.

BOARD BUSINESS

Ms. Esch asked the CDS to discuss selecting a Subcommittee chair. After discussion, a motion was made nominating Justin Brown of D Bar J Orchards, Inc., as chair, and all members approved that motion.

Recommendations and Priorities for CDRE

During the second day of the meeting, CDS members reviewed long- and short-term priorities, modifying, consolidating, and eliminating items, some of which were placed in a "parking lot" of Other recommendations. Chief among the Other recommendations was the CRAFT project, with a member describing it as a statewide program with many funders. About 2,000 acres are

involved, with 10 200-acre plots, to demonstrate the best way to establish new groves in Florida; the CRAFT findings for Florida would benefit other states.

The CDS members discussed two basic questions: What are the goals of the NIFA ECRDE program? What outcomes do you want to see? After discussion, the members agreed to the following statements about the ECRDE goals and outcomes, which it was also agreed Ms. Esch will wordsmith:

- To combat HLB and its disease complex in order to continue to be able to farm citrus in a financially sustainable way through collaborative approaches and knowledge.
- Transition from component research to deploying research outcome/conclusions.
- Encourage teams to bring knowledge together (doesn't seem to have result; more way to get to outcome).

CDS approved of the NIFA CAPs concept and agreed that such projects should be sought along with individual research that might lead to a breakthrough. After members made points about consolidating psyllid control as a national-scale effort and other categories, and the need to emphasize building on previous successes, the CDS developed the following list of CAP priorities:

- ACP regional eradication/Psyllid control (commercial and residential)
 - Resistance management
- Optimize ACP/HLB detection and surveillance/Psyllid attractants – Understanding psyllid movement
 - Early detection for HLB/CLAs; Early detection development requires understanding of mechanisms for confident implementation
- Citrus genetic resistance to HLB
 - Traditional breeding
 - Scalable commercial genetic solution for HLB
 - CRISPR or Understanding the gene-editing targets
 - Large scale evaluation of candidates (growability, marketing, economics)
- Cure the infected trees/Maintain HLB infected trees [avoiding infection]
 - Nutrition and their deliveries
 - Antimicrobials and their deliveries
 - Commercialize molecules that improve production and implement large scale field trials
- Consolidation of screening (intervention targets) -
 - Host plant
 - vector
 - pathogen

It was agreed that the CAP priorities should be kept on a single priority list, but the separate list of CAP priorities was also created because NIFA will need to apply specific requirements to the CAPs, such as the need for an advisory committee. The members approved a motion for NIFA to spend “up to \$50M” in a single year.

It was noted that at the FFAR convening the idea of a “leadership team” coordinating body was raised, with 40% ranking it as a top priority, and that proposal would require some structure. A member noted that MAC has a coordinating function and expressed hesitation about recommending another mechanism. The member asked if MAC needs to be strengthened or a new separate body created. The FFAR leadership team now exists in the MAC. A motion was made that CwwDS recommend to NAREEE and Secretary of Agriculture that the coordinating authority within the existing MAC structure be strengthened. The motion was seconded and all approved.

During public comment, a member of the public suggested that if the current funding might be the last funding under the Farm Bill, CDS might want to consider an economic study being done because it might give weight with Congress on continued or more funding. ERS has the authority and it is worth considering. After discussion, a CDS member made a motion that the CDS recommends ERS conduct a study of the economic impact of HLB and what needs to be accomplished in the next 10 years. The motion was seconded, and all approved.

RESOLUTIONS AND RECOMMENDATIONS

- Members approved a motion to communicate to the MAC the need for central searchable database at CRB or CRDF
- Members approved a motion to remove CRAFT from the list of priorities, placing it in a list of Other Recommendations (not priorities) but observing that industry needs “large scale trials” to take advantage of tools. The language in the Other Recommendations list states: “CRAFT (large scale field trials in FL) – Expand large scale field trials in other states.”

After discussing the ECDRE program Goals and desired Outcomes, members agreed that Michele Esch could wordsmith the language generally deemed agreeable:

- To combat HLB and its disease complex in order to continue to be able to farm citrus in a financially sustainable way through collaborative approaches and knowledge.
- Transition from component research to deploying research outcomes/conclusions.
- Encourage teams to bring knowledge together.
- All members agreed to remove “Epidemiology” from the list of Long-Term priorities.
- Members approved the January 25-26, 2018, CDS meeting minutes.
- Members approved a motion to adopt the list of top priorities (CAPs + individual projects) with the caveat it will be subject to wordsmithing at a later conference call.
- Members approved a motion that the ECDRE’s focus (agenda) is still the HLB pathosystem.
- Members approved a motion to express our deep interest in the CDS having greater input after the Relevancy Review and before the awards.
- Members adopted a motion approving spending up to \$50 million this year.

- Members approved the motion recommending that the CDS participate in an annual meeting where CAPs progress is reported and in addition that NIFA implement an independent review team that brings its findings to the CDS.
- Members approved the motion that the CDS recommends to NAREEE and the Secretary of Agriculture that the coordinating authority within the existing MAC structure should be strengthened.
- Members approved a motion that the CDS recommends ERS conduct a study of the economic impact of HLB and what needs to be accomplished in the next 10 years.

The members approved of the Coordinated Ag Projects (CAPs) concept discussed by Dr. Parag Chitnis and after discussion agreed that the following should be CAP Priorities:

- ACP regional eradication/Psyllid control (commercial and residential)
 - Resistance management
- Optimize ACP/HLB detection and surveillance/Psyllid attractants – Understanding psyllid movement
 - Early detection for HLB/CLAs; Early detection development requires understanding of mechanisms for confident implementation
- Citrus genetic resistance to HLB
 - Traditional breeding
 - Scalable commercial genetic solution for HLB
 - CRISPR or Understanding the gene-editing targets
 - Large scale evaluation of candidates (growability, marketing, economics)
- Cure the infected trees/Maintain HLB infected trees [avoiding infection]
 - Nutrition and their deliveries
 - Antimicrobials and their deliveries
 - Commercialize molecules that improve production and implement large scale field trials
- Consolidation of screening (intervention targets) -
 - Host plant
 - vector
 - pathogen

ACTION ITEMS

- Michele Esch will send to the CDS members a CDRF pie chart of priorities similar to the CDRE Portfolio Projects pie chart presented by Drs. Parag Chitnis and Michael Fitzner (slide 8 of 17) and a list of priorities developed during the 2-day HLB FFAR convening, including the items from the discussion of process.
- If CDS members have ideas for how to streamline and accelerate the RFA timeline, they should let NIFA know.
- Michelle Esch will work with volunteers Harold Browning and Justin Brown on wordsmithing a letter of CDS recommendations and will circulate the draft to CDS members for review and discussion during a follow-up conference call.
- Member were asked to think about language for the CDS recommendations letter and to bring this to the conference call at which the draft will be reviewed.

- NIFA will ask OGC for guidance on CDS having great input during the Relevancy Review process.

WEDNESDAY, DECEMBER 4, 2019

PART I: WELCOME AND ORIENTATION

Introduction of Members and Other Attendees

Ms. Michele Esch (Executive Director, NAREEE Advisory Board, and Designated Federal Officer, Citrus Disease Subcommittee [CDS]) opened the meeting, welcoming members, who then introduced themselves, identifying their specific citrus crops and organizations, followed by guests who introduced themselves.

Note: A list of attending CDS members and other participants for each session of the meeting is provided in Appendix A of this report.

Safety and Hospitality

Ms. Shirley Morgan-Jordan (NAREEE Advisory Board Support Coordinator) reviewed safety procedures and hospitality information.

Orientation/Ethics Briefing/Overview of Citrus Disease Subcommittee

Ms. Esch explained the purpose of the CDS, a Subcommittee of the NAREEE Advisory Board, and how the Subcommittee fits into NAREEE and the U.S. Department of Agriculture.

She gave a CDS Overview and Orientation Session slide presentation, starting by reviewing the day's agenda. She noted that 8 of 11 members were new to CDS, so they needed to know the Subcommittee's charge and other information, which her overview would provide. Because the usual USDA ethics review officer was unavailable, Ms. Esch said she would provide that review. Importantly, the CDS would need to select a Chair, and during the meeting on Thursday, December 5, members would have more time to discuss materials Ms. Esch sent them to review. Representatives from National Institute of Food and Agriculture (NIFA), the Agricultural Research Service (ARS), and other agencies were available to answer questions.

In her overview of the Research, Education, and Economics (REE) mission area, Ms. Esch showed the organization chart listing Dr. Scott Hutchins, REE Deputy Under Secretary, and the leaders of ARS, NIFA, the Economic Research Service (ERS), the National Agricultural Statistics Service (NASS), and the Office of the Chief Scientist (OCS). Together, the REE agencies with the Animal and Plant Health Inspection Service (APHIS) and other USDA units provide basic research for USDA and the United States. The NAREEE Advisory Board is the parent to CDS and two other subcommittees established by the Board: the National Genetic Resources Advisory Council (NGRAC) and the Specialty Crop Committee (SCC). The Board also established the Science Advisory Council (SAC), whose members are the Board's scientific members who advise on emerging science issues, and the Relevancy and Adequacy (R&A) Committee that conducts the annual R&A review.

The CDS has six duties, including advising the Secretary of USDA by proposing a research and extension agenda and annual budgets for the funds made available by Congress. CDS advises NIFA on the serious plant disease called Huanglongbing (HLB) or citrus greening disease caused

by the Asian citrus psyllid, recommending how much money to spend and on what. The NIFA program grants are based on CDS priorities. CDS evaluates already-funded research and can decide that research is no longer relevant. CDS holds an annual consultation with NIFA on its programs, but the CDS can meet more often if members want, and the Chair can hold conference calls if a quorum of two-thirds of members participates.

Because Andrew Tobin, Deputy Director, USDA Office of Ethics, was unavailable, Ms. Esch gave an overview of the Federal Advisory Committee Act (FACA) rules, noting that three kinds of members sit on FACA panels: Federal Employees, Special Government Employees, and Representatives, each with different roles and subject to different Conflict of Interest (COI) rules. The CDS members are Representatives and, as such, are expected to present their stakeholder group's interests and views, not "objective" and "unbiased" information. While not subject to the same COI rules as the other FACA members, CDS stakeholders should be aware of the possible "appearance" of COI; for example, USDA would not want a pet project that is in a member's interest recommended for funding because that would taint the recommendation with an appearance of COI. If members have any COI questions, they should raise them with Ms. Esch who would contact the Office of Ethics. Although subcommittees are deemed technically to be administrative bodies for the NAREEE Board and thus are not required to have open FACA meetings, the CDS and other NAREEE meetings are open by choice, with public comments welcomed.

In her overview of CDS, Ms. Esch noted that there is a small window between when NIFA's grants are announced and when CDS meets to discuss them. CDS recommendations must go through the NAREEE Board, so for that reason Board member Mr. Richard de Los Santos was attending the CDS meeting to hear the CDS recommendations and report to the Board. The recommendations will be given to NIFA for its RFA proposal. All meeting materials, such as presentations, will be public. But if CDS members are asked for information, they should consult with Ms. Esch to make certain no identifiable Principal Investigator (PI) information is included.

Of the 11 CDS members, five are from Florida, five from California, and one from Texas, each serving staggered 2- or 3-year terms to avoid losing too many members at the same time. Members are eligible to serve up to 6 years, and would have to be nominated again when a call for nominations goes out.

Ms. Esch described the CDS General Operating Procedures, which include meeting face-to-face once a year. A quorum is 50% + 1 and members are asked to not send substitutes. Minutes are kept for face-to-face meetings that do not attribute statements to individuals, and for conference calls Ms. Esch or Ms. Morgan-Jordan take minutes. The Secretary of Agriculture responds to the NAREEE Board, but NIFA's response to the CDS recommendations appear quickly in the RFA.

In response to a question, Ms Esch said that the NAREEE Board has never made major modifications to CDS recommendations. At the NAREEE Executive Committee meeting, Mr. De Los Santos will review the CDS discussion. Responding to a question about how the CDS considers projects, Ms. Esch said that the Subcommittee's duty is purely priority setting, recommending categories, not specific projects, and not reviewing individual projects.

One member referred to a slide listing “Duties of the CDS,” requesting more clarity on item 3, which states a duty to “evaluate and review ongoing research and extension funded under the emergency citrus disease research and extension program.” The member expressed an interest in giving more input than just priority recommendations and suggested that many CDS members with expertise were being under-utilized. Ms. Esch explained that projects go through Scientific and stakeholder Relevancy reviews, and the results are given to a scientific merit review panel, which ranks projects with the CDS priorities in mind. Although the member indicated an interest in CDS participating in the Relevancy Reviews, Ms. Esch noted that there could be a potential for a COI appearance if members set priorities and then approved specific projects. It was agreed that CDS members could and should provide the names of stakeholder to serve as reviewers. Responding to a question about whether it was a statutory or internal that CDS members cannot conduct Relevancy Reviews, a USDA staffer attending the meeting said that the rule was internal, not statutory, and was set as policy by the NIFA grants program. The CDS member suggested that disallowing CDS participation may be why reviews have not done as well as they could in the past.

A member asked what criteria were used to vet potential Relevancy Review participants. It was explained that names are solicited from states, organizations, and other places, and potential reviewers must be associated with citrus and have the time to engage in a review. To make sure that one or two reviewers do not dominate the proceedings, review panels have 8-10 people; reviewers read entire project proposals and can speak to the details.

A member expressed interest in a website at which all NIFA project progress reports would be available, but some projects have not submitted progress reports. Ms. Esch clarified that NAREEE does not maintain NIFA items on its website. Another member expressed concern that it is increasingly important but difficult to keep all the HLB research straight, including related research supported by other organizations besides NIFA that have identified their own priorities. CDS members need to see all the work being done. Ms. Esch concurred that with so much information a database might be needed to track it all, but it is unclear whether NAREEE or perhaps a NIFA grant recipient would maintain such a database.

The database idea could be a CDS recommendation. A member emphasized that tracking diverse work is needed because research programs risk redundant funding. PIs are unaware of what studies were funded 12 years ago, so a searchable library is needed. It was noted that the Citrus Research and Development Foundation (CRDF) maintained a spreadsheet of studies for a few years. Responding to a question, Ms. Esch said it would be appropriate for the CDS to recommend such a database as a priority because the Subcommittee’s recommendations can address substantive priorities and process issues. Members noted that both data and a compilation of all studies, two separate things, are needed. The project would not be exceptionally large but would require a central point for gathering the studies and data and a mapping routine to accept the inventory of studies. Data sheets in a specific format would be necessary.

It was noted that big universities had been approached for studies but researchers were unwilling to share their work. Currently, the CRDF site provides the title, period of time, money amount, and other basic information about studies, but federal data are harder to obtain. NIFA-funded research is available at the NIFA site, but the system is not intuitive. Moreover, 10 agencies each have their own way of maintaining information, so a central repository that has a searchable, up-

to-date database with public progress reports is necessary. Under the current system, most people quit before they find what they were looking for, one member noted.

PART II: SCRI/CDRE PRESENTATIONS

Remarks from the National Institute of Food and Agriculture

Ms. Esch introduced Dr. Scott Angle (NIFA Director), who then reviewed his background, saying he is not a citrus expert, though his father-in-law is a citrus grower in Bakersfield, CA, but he knows agriculture. He is still learning the CDS community's concerns. The CDS has a very important role to play for NIFA with the Farm Bill's \$125 million, or \$25 million a year, allocated for citrus greening. The recent round of Farm Bill funding, however, might be the last, so NIFA-funded research will have to show progress. One estimate is that almost \$1 billion in NIFA and other funding has been spent to solve the HLB problem, but with little progress. Some progress has been made in targeted areas, but no breakthrough has occurred in either finding a cure or managing the disease, and no breakthrough is on the horizon.

Dr. Angle compared HLB to the AIDS epidemic, which came quickly and produced no immediate containment strategies, so the AIDS community went far outside the traditional research community and now there are five treatments that extend life almost to normal expectancy. By bringing in many disciplines, researchers found a way and may produce a cure with vaccines. He hopes HLB research can follow a similar pathway.

The last Farm Bill was a debacle, but none of it was the fault of NIFA, which got caught in an issue of matching money that USDA had not requested. The matching issue, which likely originated in the Senate, created a huge problem for HLB research and specialty crops as big grants in California were slowed down, and the government shutdown delayed funding even further. NIFA found creative legal solutions to get projects funded almost on time, and now there is legislation to prevent the matching issue from recurring. But typically, NIFA would be farther ahead in its process for the RFA, which NIFA wants published this year before another cycle. In trying to move forward quickly so that scientists who do work will not be impacted by the prior slowdowns, NIFA needs CDS members' approval.

During the Foundation for Food and Agriculture Research (FFAR) Citrus Greening Convening just prior to the CDS meeting, better coordination was ranked as a highest priority, Dr. Angle said. Funds from NIFA, ARS, APHIS, and industry are available to seek an HLB solution, but better coordination of all research is needed. CDS members are coordinators, but not all of the players are at the table, Dr. Angle noted, and asked what structure CDS suggested to get all players at the table.

NIFA has relocated to Kansas City, and in doing so lost 75% of its staff, so the agency is "hiring like crazy," at a rate of five people a week, and expects to restore full staffing by December 2020. Remaining staff have kept up, with everyone doing two or three jobs. NIFA needs Human Resources specialists, communicators, and many other specialists. NIFA will get the grant money out but it could be two months late, though only if acceptable to universities and others involved. At University of Georgia, where he worked, the administration could move money around to fill any gap if NIFA funds were a little late. But small tribal colleges cannot do that, and if NIFA's money is late, those colleges lay off people. NIFA is constantly in touch with universities on its progress and is doing reasonably well despite losing so many staff.

When Dr. Angle opened the floor for questions, a CDS member commented that it sounded as if there was flexibility in the way the Subcommittee can interact as the RFA is developed, engaging not only in priority setting. Most members could be more involved but do not weigh in on grant awards because of COI issues. But, while members could review annual progress reports for projects, it is unclear they have had that opportunity so far. If decisions are being made on research in Florida or California, and NIFA already is funding studies, it would be helpful to know what progress is being made. Dr. Angle responded that during the pre-CDS FFAR convening, that broad need was discussed. NIFA does great research, but there is no X Prize. Industry has its own perspective and needs. The question discussed earlier was how all of the involved groups can donate to the common effort. Duplicative work should be avoided, and there should not be researchers considering work done a decade ago, or issues falling through the cracks because it is erroneously believed that others are focusing on a specific topic. Because coordination is clearly needed, CDS may be best situated to address that need.

Dr. Parag Chitnis (NIFA Associate Director) commented that an oversight role that could be useful would be for NIFA to give CDS members direct feedback every year on the progress of projects—such as, “this worked, that did not do well”—so that after 5 years there would be a deliverable result. A member suggested that CDS would be qualified to accelerate progress, especially if a project were near the end of a funding cycle, but Dr. Angle noted that such a role does not exist yet. CDS could propose this role for itself or a bigger role; there is clear frustration among growers that ARS scientists and university scientists are not commercializing solutions quickly enough to help. In the RFA, there will be an economic assessment of grants to gauge whether proposed solutions would be too expensive or impractical. A member questioned how progress on solutions could be accelerated if time was running out for CDS to set priorities by vague categories rather than specific projects. With top citrus growers as CDS members, perhaps their role could be expanded to offering actual comments in project reviews. COI issues could be eliminated, for example, by not permitting Florida members to vote on Florida projects. Dr. Angle replied that by setting priority categories CDS would guide money to appropriate problems.

A member asked about public-private partnerships in NIFA, and the Small Business Innovation Research program was mentioned as one such program.

When discussion returned to the question of CDS members participating in the Relevancy Review process, Dr. Chitnis asked where NIFA could draw the line on member involvement. Several years ago NIFA said the SCC and CDS members cannot serve as Relevancy reviewers, but perhaps the USDA Office of General Counsel (OGC) could accelerate the process for changing the policy. Dr. Angle said that an internal rule could always be changed, and such changes have happened a lot lately, but NIFA must have a plan and time is a constraint because speedy reviews are needed.

Overview of the FY 2020 Emergency Citrus Disease Research Program and Research Outcomes

NIFA Associate Director Dr. Chitnis and Dr. Michael Fitzner (NIFA Acting Deputy Director) gave a joint slide presentation, starting with Dr. Chitnis, who began by saying that NIFA must incorporate the CDS recommendations in the RFA.

Dr. Chitnis gave an update on what NIFA's 5 years of funding has done in response to HLB, which is important for the country as a whole. Similar problems will arise in the future, and NIFA will have a model for those problems using its HLB experience. HLB is a high priority for NIFA, and the program wants to see how it can work with CDS as a partner to obtain a good return on investment. As of September 30, 94% of NIFA positions are based in Kansas City, and NIFA is aggressively hiring staff and recruiting national program leaders. Drs. Angle and Chitnis are overseeing implementation of the HLB program, which is Dr. Fitzner's responsibility, and the two national program leaders are Drs. Ann Lichens-Park and Robert Nowierski, with Dr. Tom Bewick providing advice, though he is now with the Specialty Crop Research Initiative (SCRI).

Before the 2014 Farm Bill, the SCRI supported citrus greening projects, and in the 2014 bill the CDRE derived its funding of \$25 million per year, adjusted for sequestration, and its authority from the SCRI. But with the 2018 Farm Bill, the Emergency Citrus Disease Research and Extension (ECDRE), emphasizing "emergency," the program derived its same funding level from the Citrus Disease Trust Fund while continuing to derive its authority from the SCRI. If SCRI has provisions, such as a Relevancy Review and matching funds, the EDCRE must also have those provisions. Under the Farm Bill, only universities can lead EDCRE projects, but private entities can participate.

Under the CDRE process, the CDS tells NIFA its priorities for the RFA. After scientists send in their grant applications, they are ranked as relevant to the priorities, and some proposals are invited to submit full applications. Panel managers for both the Science and Relevancy reviews are selected, the two panels' results are merged in an integrated ranking, and awards are funded.

In total, 30 awards have been made. Noting that the RFA timeline leads to awards being given 8 months from the RFA, Dr. Chitnis asked CDS members to provide NIFA any ideas they might have for streamlining and accelerating the RFA process.

Dr. Chitnis gave a breakdown by state of appropriated funds for the 30 NIFA projects: Florida 43% (13); California 27% (8); USDA-ARS 10% (3); and Arizona, Kansas, New Mexico, Texas, South Carolina, and Washington 3% (1) each. He provided several examples of project results; for example, researchers in a University of Florida project discovered a bacterium that could be a source for future spray treatments to protect trees against the insect that spreads citrus greening. Projects are both short- and long-term. Some are promising but nothing has gone to farmers because, for various reasons, it is hard to commercialize and get products to the groves. Dr. Chitnis cited core ECDRE challenges, noting that new ideas are needed; some solutions are known and already tried, but NIFA seeks advice on what new targets should be addressed, how efforts can be coordinated, and how best management practices can be transmitted for close oversight of the progress made by researchers. In some cases, even the same university's researchers are doing similar things but scientists want to publish their results first and do not coordinate with others. Active management helps deliver products.

A member asked if the coordination problem would become worse with NIFA's staff turnover. Dr. Chitnis responded that CDS has a role in this regard. When projects are funded, CDS can provide oversight on how they are progressing toward goals. In the past, most goals were focused on "how" to do tasks, such as culturing methods, not on desired outcomes, such as having registered lines by the fifth year. With timelines, milestones, deliverables, and a business plan to commercialize results, projects could be held responsible for meeting outcome goals.

A member said that for the Relevancy and Science reviews more transparency is needed. The CDS wants to know if a project can get from the lab to the grove within a timeframe, which is a top CDS priority. The member asked how NIFA weighs commercialization in the Relevancy Review. Dr. Chitnis responded that the CDS can and has provided recommendations on the weight of factors in reviews. Regarding the question of what is a reasonable timeline for outcomes, Dr. Chitnis responded that it depends on what has been done before. It was noted that the Relevancy Review is a categorical ranking system that could consider projects in terms of which ones are offering to put something in the field within 2 to 5 years. A hindrance to commercialization is companies being astute about whether a product will realistically receive EPA approval and blocking it if the product will not pass EPA review. But EPA does not participate in reviews; only stakeholders do.

Dr. Fitzner took over the presentation, describing ECDRE's proposed priorities. NIFA regards the next 5-year cycle as a fresh start for Farm Bill money, so the CDS meeting was important in that regard. NIFA wants to do things better than in the past. A meeting participant objected, however, that if only Land Grant universities are allowed to lead projects, change is unlikely. But Dr. Chitnis interjected that any university, not just Land Grant universities, can lead projects. The participant said that the CRDF just finished a \$12.3 million joint effort with Bayer and Coca Cola and asked if that project was ineligible for NIFA funding. The project is ineligible because Congress mandates that only universities, as well as some research foundations, can receive the ECDRE funds, But the participant said there was a good chance the project would die without additional support and asked if an alternative was available that would enable NIFA to bypass some of the previous process, such as when a peer-reviewed project is ready. Dr. Chitnis reiterated that the SCRI processes govern and the law cannot be changed.

In reviewing CDS priorities for 2015-2018, it was noted that they remained fairly steady, with a few exceptions. For example, in 2017, the CDS added "Systems for delivering new or currently available therapies into the phloem of citrus trees" and "Development of pre- and post-harvest tools to maximize citrus fruit quality for use as fresh fruit or processed products." In 2018, CDS added "Improve productivity of infected trees, including root health." Although the other CDS priorities remained the same, with 60% focused on therapies, NIFA is not wedded to those.

A member commented that a description of a new model was needed, and asked if the CDS had enough time for something new in the 2019 or 2020 funding cycles. Dr. Chitnis responded that there was enough time, even though the RFA process was starting late and time is not unlimited. Dr. Chitnis showed a slide with ECDRE's proposed priorities, although noting that based on the discussions prior to the CDS meeting at the FFAR convening, the priorities might be out of date. They included Therapies; Early detection and prevention; Breeding for resistance; and Integrated HLB management.

Dr. Chitnis broached the subject of possibly allocating the 2019-2020 money, totaling \$50M, in one year. He proposed for CDS consideration the idea of Coordinated Agricultural Projects (CAPs) that would require funded projects to have a business plan for commercialization, regulatory approval, and other steps to go from lab to groves, as well as annual deliverables and an advisory committee. He showed a slide enumerating CAPs advantages, including their requiring deliberate coordination among scientists, growers, and industry; the creation of a framework for the formation of public-private consortia; the seamless integration of research with extension; an annual review by NIFA and the CDS; and fast-tracking research into the

hands of growers, among other benefits. If during an annual review, a CAP was found to be not making appropriate progress, its future-year funding could be denied. The CDS could query project representatives why progress was not achieved and could recommend replacing project components. Good parts of separate projects could be combined and CDS could be involved in such conjoining of projects. The CAPs would not be for scientific discovery but would only be funded if teams already showed progress and the CAP would be the final project to move projects to actual use. CAPs in other programs have hired a non-PhD coordinator to keep deadlines moving forward.

CDS members were told that if they liked the CAP concept, they would have to decide how many they wanted to fund and to help NIFA define which areas they want CAPs to focus on, such as therapies or breeding. To avoid duplicative funding, once it was decided a CAP should be funded, NIFA would look at potential overlap with other grants.

Dr. Angle said that NIFA was proposing the CAPs approach because it gives CDS more control; CAP teams would regularly consult with CDS. Not all of the ECDRE money would be spent on CAPs because small projects might identify an “unexpected silver bullet” for HLB. But the bulk of the money could be used in CAPs, with focus areas for high risk, breakthrough, Ideas Lab, and other research. Having only 3-4 CAPs also would allow more time for annual reviews, with awardee presentations and CDS feedback, unlike in the past when many projects were ongoing simultaneously.

A member raised concerns that with CAPs there could be some “fox guarding the henhouse” hyping of projects and suggested that an independent investigator could be hired to conduct a separate project assessment. Other program CAPs have had people go to a site for a first-hand look at projects, followed by a report to the funding agency.

Ms. Esch told the CDS that CAP reviews could be conducted during a 2.5-day or 1.5-day Subcommittee meeting, or in a separate meeting. But the CDS first had to decide if they liked the CAPs approach and then set priorities in order for NIFA to get the RFA out. Although the RFA forms are very long, the programmatic part is only a few pages. Once NIFA receives the CDS members’ input, and approval is obtained, the hope would be for an RFA by January. A member raised a concern that the CAPs are more cumbersome and would “set ourselves up for failure,” a concern acknowledged as legitimate given the lengthy applications. But Dr. Angle responded affirmatively to a member’s question about whether CAPs might help obtain additional Farm Bill funding if the projects are making good progress, although additional funding is “possible,” not guaranteed. Projects must demonstrate progress, not simply ask for more time, and both California and Florida lawmakers must be made aware of progress, though USDA is not in a position to engage in such outreach to lawmakers.

Dr. Chitnis noted that during the FFAR Citrus Greening Convening, NIFA took notes—for example, on the need for a commercialization plan in grant applications—and immediately adopted such recommendations. Although only one CDRE CAP was funded, a systematic analysis has not been done to derive lessons from the project receiving funds and those that were rejected. However, one observer noted that it is easy to tell if a team is ready for a CAP; it is not really an issue of the science but of whether the team members are really working together and ready to move forward. A member suggested that a pre-announcement could be issued saying that large CAPs will be part of the RFA and urging likely “team science” applicants to start

working because only 2 months will be available for developing applications after the RFA is published.

Dr. Chitnis concluded the presentation by stating that the CAP approach was NIFA's proposal for more CDS oversight, with some room left for small projects. Once CAPs have been decided, research gaps will be discernible and can be highlighted for smaller grants.

Discussion on Subcommittee Charge and Decision Requirements

Ms. Esch directed the CDS members to materials in their meeting binders listing the Subcommittee's priorities for 2014-2018, noting that in 2014 there were many priorities under the categories of bacterium, consumer, production systems, regulation, and vectors. Priorities were not ranked for 2016 but were for other years. She suggested that the members, having heard about processes and NIFA's CAP proposal, might want to next consider their priorities before deciding which might be appropriate for CAPs and other process issues.

A member responded favorably to a suggestion that it would be useful to define the final outcomes of priorities, specifying the outcome wanted by year 5, and making that the priority; scientists could then figure out how to achieve the outcome. A member asked if the program goal was to increase growers' profitability so they can remain in business, or to get rid of diseases. Members were urged to think differently about priorities.

Members discussed whether any of the seven 2018 priorities should be taken off. One member commented that progress had been made on "Culturing or cultivating the CLas bacterium," but not with a funded project, so it should be kept on the list.

A member observed that control of the vector itself is missing from the 2018 list; there is a void of research examining vector control and tree removal. The member—a Florida grower—had abandoned both, but noted that China is removing trees. Tree removal was helpful but was not given credit; it could guide California and the state's growers would not want to miss that approach if it could be shown that such vector control will either be part of the solution or buy growers time. California is trying to buy time, and vector control is very important for the state, so it is worth thinking about moving that priority back onto the list. Resistance management is basic farming practice, not psyllid research. It was noted that the San Joaquin Valley did not give up on vector control and the psyllids were not detected for two years until recently. Vector control is one of the easiest things to do, and growers would be sorely mistaken to give up on the practice. Another member agreed it was very important and said that if Florida began its HLB fight again, the growers there would have vector control as a priority.

Members discussed priorities on the CDRE pie chart of portfolio projects shown on slide 8 of Dr. Chitnis's presentation. They asked if the new CDS members wanted to duplicate those priorities or prioritize things not in the pie chart, and where to best spend \$50 million available for research. It was noted that therapies to prevent or suppress HLB continue year after year because significant progress was made, so the question was whether to add it to the list again.

Members discussed how specific or general to be in identifying priorities, with one member asking, "Do we want to be vague or say 'go after phloem'." If a priority was stated as "psyllid management," that would encompass virus control, genetics, and a whole range of other approaches. If the CDS knows what it wants, it could be explicit; for example, the Subcommittee could say "we say want to stop the progression of psyllids in California," and not get in the

weeds. By casting a wide net, that could yield a lot, but there have been “ridiculously wide nets” that yielded 30 projects and growers are not celebrating success today.

Dr. Angle commented that the CDS will have influence on those who apply for NIFA grants, and he urged members to talk to prospective applicants. For CAP grants, more direction is better. After HLB occurring for 14 years in the U.S., he would have expected a narrower focus; but so far, three successful approaches have not been found. For this cycle of funding, it would be good to define a limited set of “do or die” needs.

To help CDS members have a comprehensive view of priorities, Ms. Esch said she would send them a CDRF pie chart similar to the one presented by Drs. Chitnis and Fitzner (slide 8 of 17) as well as a list of priorities developed during the 2-day HLB meeting, including the items from the discussion of process. She urged the members to think about the NIFA program goal and to work backward from that.

A member noted that California and Florida have two different priorities for HLB, with California prioritizing vector control, which would also help Texas, and Florida prioritizing therapies. Trying to merge the priorities would be a good starting place. It was noted that there was enough money available for both states to get what they need.

Establish Chair of the Citrus Disease Subcommittee

Ms. Esch asked the CDS members to discuss selecting a Subcommittee chair. After discussion, a motion was made nominating Justin D. Brown of D Bar J Orchards, Inc., as chair. The motion was seconded and all members voted in favor. It was noted, however, that Mr. Brown’s term expires in September 2020, so the CDS could lack a chair for its meeting next year, though before the end of his term it would be possible to elect a chair by email who could step into the chair position.

Public Comment

Ms. Esch asked if there were any public comments. There were none.

The meeting was adjourned.

THURSDAY, DECEMBER 5, 2019

Overview of Agenda for Day

Newly nominated CDS Chair Justin Brown opened the meeting at 8:30. He began by offering a motion to approve the January 25-26, 2018, CDS meeting minutes; it was seconded, and all voted in favor. He then began the discussion of the Subcommittee’s future priorities.

PART III: USDA RESEARCH EFFORTS AND ACTIVITIES ON CITRUS DISEASE

Discussion and Q&A on USDA Research Activities and Future Priorities – How do they fit into priorities from FFAR Citrus Greening Convening?

Members took up the issue of the extensive data available on HLB research, with one member suggesting that the HLB-Multi-Agency Coordination (MAC) Group might be a better venue for

dealing with the issue of establishing a database that researchers and growers could access. The database would help researchers define goals and encourage teamwork. Ms. Esch noted that because CDS makes recommendations not just to NIFA but to USDA, that idea could be moved forward if CDS chose to do so. A member said that the database should extend beyond research to include funding spent on issues, which would help with understanding what is going on with HLB.

Over the last 5 years, the MAC has held discussions and several of them began with the same frustration over the inability to see the big picture of activities. Just having the title of projects in one place would be insufficient; a database, not a spreadsheet, is needed. APHIS looked into an easily accessible function to allow non-federal access, but the discussion always returned to an accessible database needing to be external to the federal government, perhaps run by the CRDF or Citrus Research Board (CRB) but funded through MAC. Members said the database would have to be searchable, with a link to NIFA's site for progress reports. A database would need numerous non-federal users accessing and changing it; the CDS should communicate to the MAC its full support for such a database because it is hard to carve a forward path without knowing where things stand. A member asked why such a database was not yet established, and another offered that inertia was the reason because the CRDF and CRB have gone through changes. It was suggested that CDS members on the MAC could invite CRDF and CRB to propose a database that would suffice. It was noted that University of Florida had a database on HLB literature; it is still available, but has not been updated for 2 years.

A motion was made to communicate to the MAC the need for a central searchable database at CRB or CRDF; it was seconded, and all members approved.

PART IV: ESTABLISHMENT OF FY 2020 AGENDA AND PRIORITIES FOR THE CITRUS DISEASE RESEARCH AND EXTENSION

Working Session: Formalizing Recommendations and Priorities for the FY2020 Emergency Citrus Disease Research and Extension Program

Chair Justin Brown noted that the members had discussed an outcome- or results-based set of priorities rather than the vague overarching priorities of the previous 5 years and he asked members for any ideas. Ms. Esch noted that she had sent to CDS members the priorities from the FFAR convening, the history of funded projects at the CRDF, and other materials, and pointed out that APHIS and ARS representatives were at the meeting to answer CDS members' questions about specific priorities.

Ms. Esch posted a slide listing the FFAR convening recommendations for short-term (1-5 years) knowledge as well as process and members offered comments. A member said that "understanding the pathogen biology and developing therapies" item seemed similar to understanding gene editing targets and suggested reducing the known HLB intervention targets and creating a short list of two or three items that could be passed on to someone else for development and deployment. Another member asked about the definition of "therapy," which now refers to microbials but which began as heat therapy. It was noted that therapy could be chemical, RNA interference, or genetic targets for transformation, but on the psyllid side, it could be competitive endophytes, making the disease less able to transmit, or RNA silencing. There is the same goal, but different organisms.

The “sugarbell line” item was discussed and members noted that Florida growers were not excited about sugarbell citrus, but it would be interesting to see if they were popular in California. It was agreed the item should not be added to the CDS priority list. A member commented that growers want to get research done short-term but realistically some priorities are not short-term; adding new molecules will take time. Florida and California regionally are looking at efforts specific to their areas. Florida has focused on short-term items because of the industry’s dire situation. While agreeing that growers would not want to be sidetracked by region-specific efforts, it was noted that if the sugarbell line works in California it would not be regional but an industrywide issue. At the FFAR convening, participants spoke about the need to focus on a national outlook.

Members noted that some priority items were alike or similar and could be regrouped, with some priorities being merged into a single item. For example, delivery of antimicrobials and nutrition along with “ACP regional eradication” were linked, as were understanding the interaction between the host, pathogen and vector, and maintaining the tree health/fruit health of HLB infected trees. Members noted missing items, such as research to understand the phloem, which was a top priority, and fruit quality, although it was noted that several priority items indirectly affect quality. It was agreed to create a separate list of “Other recommendations” as a parking lot for items not kept on the CDS priority list. A member said the CDS discussion was attempting to capture and organize the FFAR convening discussions. Once the priority elements have been identified members could discuss how the MAC structure could be used to coordinate them.

Members suggested various combinations of listed priorities, including mentions of the following: Understand the phloem; Test potential therapeutics and delivery strategies; Maintain HLB-infected trees; Nutrition and their deliveries; Antimicrobials and their deliveries; Commercialize molecules and improve production; Better understand the disease triangle, with a member commenting that specific things, not the entire triangle, must be understood, including what the pathogen is doing in the phloem, or how it gets from introduction to impact. A member suggested the words: host/pathogen interaction to derive solutions; CLas and therapy movement into and through phloem to understand how, once in the phloem, the pathogens move, and how that movement will affect the delivery of solutions.

A member mentioned Consolidation Screening Intervention Targets and was asked to clarify the term “Consolidation Screening.” The concept referred to the situation in which the work of everyone researching psyllid control would be tested on various measures and compared, and in the end, the best would be picked for further movement forward. The CDS would be inviting a CAPs project to evaluate all top psyllid controls and to recommend the top two or three to go forward; there are host, pathogen, and vector elements, and they might be different projects. A member liked the idea of forcing a merger of psyllids research so that after 4 years the focus of research could be narrowed and it might lead to synergies.

As members suggested linkages the initial list was revised. Sugarbell was deleted. CRAFT (large field trials) was set aside for later discussion, with the question of whether this item could be folded into the MAC. Linkages includes Maintain and Cure infected trees; Phloem and the disease triangle; Test potential therapeutics, antimicrobials, and deliveries, although a member suggested that deliveries should stand alone as a fundamental need. Other observations were made, including that the top priority should be to give growers a delivery system for phloem—an engineering project for phloem delivery, either an injection or some other system that could be

used for nutrition. Long-term the goal is all about breeding, but the priorities discussed were short-term. But an ARS participant remarked that breeding is part of the picture, but not everything; ARS has a \$2.4 million specialty crop budget, plus \$5 million/year for cranberry, \$15 million/year for grapes—a diverse program. An X Prize was added.

A discussion of CRAFT ensued, with a member describing it as a statewide program with many funders. Growers apply, presenting demonstrations of strategies, testing combinations, and other proposals. If approved, growers plant crops, then collect data from different groves on irrigation, soil adjustment, psyllid control, and other elements that are all options growers can choose from. About 2,000 acres are involved, with 10 200-acre plots, to demonstrate the best way to establish new groves in Florida. When asked why CRAFT would be part of the HLB program, the reply was that what is learned could apply in Texas or California. The model could be used to encourage the adoption of strategies by systematically getting information. MAC and others fund CRAFT, which is to test solutions and move to adoption. It is adoption growers are aiming at by using research today to look more closely at whether local conditions matter. But a member said it was not certain that CRAFT is a priority for the RFA, and maybe MAC is more suitable. There is a CRAFT Tech Advisory Group that sets up parameters and members are to stay aware of new tools and incorporate them into CRAFT. But because the trials are already in place, it was suggested CRAFT does not belong in the RFA and a motion was made to remove it. The motion was seconded and approved by the CDS. It was added to the “Other recommendations” list, with members noting that industry needs “large scale trials” to take advantage of tools. The language in the Other Recommendations list states: “CRAFT (large scale field trials in FL) – Expand large scale field trials in other states.”

A member expressed frustration that for 15 years the RFA funded various researchers, some of whom left, while others are working in their labs on their own little list of chemicals for psyllids and wanting to work alone because they get funding. The Consolidation Screening of testing will result in the best of the best, and the same approach should be used for breeding. Members emphasized the need to work together, not in silos. When HLB RFAs began, the goal was to have different groups working on the same problem. That has been done, and now testing and comparing are needed, and if researchers agree to work together, they can receive support.

Ms. Esch asked members to state their top one or two goals. In reply to the question of whether an overarching statement on the program goal was needed, a member commented that everything said starting with the FFAR convening was that growers want to go from component research to identifying and deploying solutions. Before, a “come all and tell us what you want to do” approach prevailed, but now, growers want to guide the research to conclusions by encouraging teams to bring knowledge together. Approximately \$1 billion has been spent on research, so it should be organized into existing solutions. The goal is to facilitate best rootstocks so growers can start planting. If there are knowledge gaps, they should be identified.

After discussion, Ms. Esch drafted language on a slide for members to consider. With member input, the slide language stated:

What are the goals of the NIFA ECRDE program?

What outcomes do you want to see?

- To combat HLB and its disease complex in order to continue to be able to farm citrus in a financially sustainable way through collaborative approaches and knowledge.
- Transition from component research to deploying research outcome/conclusions.
- Encourage teams to bring knowledge together (doesn't seem to have result; more way to get to outcome).

Members agreed that the language was generally agreeable but that Ms. Esch could wordsmith it.

Discussion continued, with one member expressing frustration at the lack of results from all the research and stating that every project must answer how it will help all growers continue to grow citrus in a financially sustainable way. So the ECDRE needs to focus on that goal of funding projects that facilitate the sustainable growing of citrus. It was noted that the NIFA website says: "combat citrus diseases," HLB imposes an imminent threat, "support commercialization of techniques discovered..." For now, NIFA's focus is HLB, but other diseases are part of NIFA's agenda. Living with the disease is more likely than finding a cure. In Florida, tolerance is the issue; how much can a grower tolerate and stay viable.

Members continued their discussion and made a variety of points. Early detection should not be on the long-term priorities list. Canine detection has given 99% positive results, though it is specific to California's efforts. Investment in knowledge systems did not belong on the long-term list and was moved to the Other recommendations list. Basic citrus greening knowledge was under short-term priorities and was deleted from the long-term list, as was epidemiology, which has been worked on. Regarding the ecological item, a member asked if there were ecological aspects preventing the finding of a solution. The study of "-omics" was brought up and described as a misunderstood part of the science; it could be ecological, but a definition is needed. Ecological has both long- and short-term aspects. Texas has seen its first infected plot. On the breeding issue, it was noted that it is a "program," not a 2-3-year funding project; it takes 15 years to develop a sugar cane variety. A member asked how long it would take for a citrus variety. If breeding proposals were part of the RFA, it was unclear what would result in 2-3 years. In Florida, 46 rootstocks were released but little is known about them so far.

Members discussed the CAPs described by Dr. Chitnis. After discussing NIFA's proposal, and how many CAPs there should be, the members approved of the CAP concept and discussed CAP priorities. After members made points about consolidating psyllid control as a national-scale effort and other categories, and the need to emphasize building on previous successes, the CDS developed the following list of CAP priorities:

- ACP regional eradication/Psyllid control (commercial and residential)
 - Resistance management
- Optimize ACP/HLB detection and surveillance/Psyllid attractants – Understanding psyllid movement
 - Early detection for HLB/CLAs; Early detection development requires understanding of mechanisms for confident implementation
- Citrus genetic resistance to HLB
 - Traditional breeding
 - Scalable commercial genetic solution for HLB
 - CRISPR or Understanding the gene-editing targets

- Large scale evaluation of candidates (growability, marketing, economics)
- Cure the infected trees/Maintain HLB infected trees [avoiding infection]
 - Nutrition and their deliveries
 - Antimicrobials and their deliveries
 - Commercialize molecules that improve production and implement large scale field trials
- Consolidation of screening (intervention targets) -
 - Host plant
 - vector
 - pathogen

It was agreed that the CAP priorities should be kept on a single priority list, but the separate list of CAP priorities was also created because NIFA will need to apply specific requirements to the CAPs, including the need for an advisory committee for such projects. After identifying the CAPs priorities, the list of additional priorities included the following:

1. Develop a delivery system for therapeutics and nutrition and other HLB solutions
 1. Give us a delivery system for phloem [engineering project]
2. Understand the phloem/Better understanding of the disease triangle – host, pathogen and vector interaction to derive solutions
 - A. CLas and therapy movement into and through phloem [biology]
3. Culturing CLas bacteria.
4. Ecological – are there ecological aspects preventing us from getting to a solution? How does environment/climate effect spread of disease or vector, tree health, etc.?

Members approved a motion to adopt the list of top priorities, including both the CAPs priorities and individual projects, with the caveat it will be subject to wordsmithing at a later conference call. Members approved a motion that the ECDRE’s agenda should still be the “HLB pathosystem.”

Members suggested not publishing a range of grant limits because proposals will be at the top of the range, though it was noted that applicants will have to have some idea of the range, such as \$5-\$40 million. Members said it would be critical if NIFA plans to spend so much money, \$50 million in a year, the CDS wants more involvement—not direct oversight, but more relevant participation in how awards are made. NIFA will ask the OGC for guidance on the question of CDS involvement.

Discussion of the Relevancy Review Process for SCRI/CDRE

After a member said that CDS wants involvement before CAPs are awarded, members approved a motion to express their deep interest in the CDS having greater input after the Relevancy Review and before the awards. The member who offered the motion later noted that it included the science review and “all of it.” A member requested, though not as part of motion, that NIFA give CDS guidance on the Relevancy Review and pre-award process. A member asked if CDS involvement in the Relevancy Review would be the best alternative if OGC says CDS cannot insert itself after the review and before the award. But another member commented that CDS

being part of the Relevancy Review would raise concern among the members' colleagues, and it was suggested that OGC should not be given the option of considering whether the CDS can be part of the Relevancy Review, though no motion was offered on that point. But the members approved a motion for NIFA to spend "up to \$50M" in a single year.

Dr. Chitnis said that NIFA likely would require a site visit before giving the money for CAPs, making sure awardees can address criticisms, and some CDS members could be included in visits. If members were especially interested in a CAP, they could follow that one and participate in the site visit. A member cautioned that CDS involvement could get too close to project management and expressed a preference for a third-party review over participating on a review team.

A motion was made that the members recommend CDS participate in an annual meeting where CAPs progress is reported and in addition that NIFA implement an independent review team that brings its findings to CDS. The motion was seconded and all voted in favor.

It was noted that at the FFAR convening the idea of a "leadership team" coordinating body was raised, with 40% ranking it as a top priority, and that proposal would require some structure. A member noted that MAC has a coordinating function and expressed hesitation about recommending another mechanism. The member asked if MAC needs to be strengthened or a new separate body created. The FFAR leadership team now exists in the MAC. A motion was made that CDS recommend to NAREEE and the Secretary of Agriculture that the coordinating authority within the existing MAC structure be strengthened. The motion was seconded and all approved.

It was noted that the CAP structure has built-in both a commercial PI and a regular PI, so all CAP proposals will be asked for that and no motion was needed on that point.

The issue of wordsmithing the CDS recommendations was raised. Ms. Esch will put the recommendations in letter format and a team of volunteers to work on the draft was created, including Harold Browning of Premier Citrus and CDS Chair Justin Brown. The draft letter will be circulated by Ms. Esch for group discussion after it is drafted.

A member noted that at the FFAR meeting an economic analysis of HLB's impact was discussed. It would add potency to any request to Congress for additional money. A member suggested that it was better to have industry-specific analysis to bring to the Hill, but another member observed that an ERS study would be more impactful.

Public comment

A member of the public suggested that if the current funding might be the last funding under the Farm Bill, CDS might want to consider an economic study being done because it might give weight with Congress on continued or more funding. ERS has the authority and it is worth considering.

It was noted that ERS lost a lot of staff in moving to Kansas City and is now working on mission-critical activities, so there is not a lot of discretionary work ERS is doing, but the HLB impact study could be added to the queue. It was suggested the study would be in two parts—the first examining HLB's economic impact, and the second discussing what needs to be

accomplished in the next 10 years. The next Farm Bill is 2023, so an ERS economic study might not be important right now, though a good study takes time to do.

A member made a motion that the CDS recommends ERS conduct a study of the economic impact of HLB and what needs to be accomplished in the next 10 years. The motion was seconded, and all approved.

PART V: OTHER BUSINESS

Travel Procedures

Ms. Morgan-Jordan reminded members of the travel procedures and who to contact should any irregularities occur while members were traveling.

The meeting adjourned.

RESOLUTIONS AND RECOMMENDATIONS

- Members approved a motion to communicate to the MAC the need for central searchable database at CRB or CRDF
- Members approved a motion to remove CRAFT from the list of priorities, placing it in a list of Other Recommendations (not priorities) but observing that industry needs “large scale trials” to take advantage of tools. The language in the Other Recommendations list states: “CRAFT (large scale field trials in FL) – Expand large scale field trials in other states.”

After discussing the ECDRE program Goals and desired Outcomes, members agreed that Michele Esch could wordsmith the language generally deemed agreeable:

- To combat HLB and its disease complex in order to continue to be able to farm citrus in a financially sustainable way through collaborative approaches and knowledge.
- Transition from component research to deploying research outcomes/conclusions.
- Encourage teams to bring knowledge together.
- All members agreed to remove “Epidemiology” from the list of Long-Term priorities.
- Members all voted for a motion to approve the January 25-26, 2018, CDS meeting minutes.
- Members approved a motion to adopt the list of top priorities (CAPs + individual projects) with the caveat it will be subject to wordsmithing at a later conference call.
- Members approved a motion that the ECDRE’s focus (agenda) is still the HLB pathosystem.
- Members approved a motion to express our deep interest in the CDS having greater input after the Relevancy Review and before the awards.
- Members adopted a motion approving spending up to \$50 million this year.
- Members approved the motion recommending that the CDS participate in an annual meeting where CAPs progress is reported and in addition that NIFA implement an independent review team that brings its findings to the CDS.
- Members approved the motion that the CDS recommends to NAREEE and the Secretary of Agriculture that the coordinating authority within the existing MAC structure should be strengthened.

- Members approved a motion that the CDS recommends ERS conduct a study of the economic impact of HLB and what needs to be accomplished in the next 10 years.

The members approved of the Coordinated Ag Projects (CAPs) concept discussed by Dr. Parag Chitnis and after discussion agreed that the following should be CAP Priorities:

- ACP regional eradication/Psyllid control (commercial and residential)
 - Resistance management
- Optimize ACP/HLB detection and surveillance/Psyllid attractants – Understanding psyllid movement
 - Early detection for HLB/CLAs; Early detection development requires understanding of mechanisms for confident implementation
- Citrus genetic resistance to HLB
 - Traditional breeding
 - Scalable commercial genetic solution for HLB
 - CRISPR or Understanding the gene-editing targets
 - Large scale evaluation of candidates (growability, marketing, economics)
- Cure the infected trees/Maintain HLB infected trees [avoiding infection]
 - Nutrition and their deliveries
 - Antimicrobials and their deliveries
 - Commercialize molecules that improve production and implement large scale field trials
- Consolidation of screening (intervention targets) -
 - Host plant
 - vector
 - pathogen

ACTION ITEMS

- Michele Esch will send to the CDS members a CDRF pie chart of priorities similar to the CDRE Portfolio Projects pie chart presented by Drs. Parag Chitnis and Michael Fitzner (slide 8 of 17) and a list of priorities developed during the 2-day HLB FFAR convening, including the items from the discussion of process.
- If CDS members have ideas for how to streamline and accelerate the RFA timeline, they should let NIFA know.
- Michelle Esch will work with volunteers Harold Browning and Justin Brown on wordsmithing a letter of CDS recommendations and will circulate the draft to CDS members for review and discussion during a follow-up conference call.
- Member were asked to think about language for the CDS recommendations letter and to bring this to the conference call at which the draft will be reviewed.
- NIFA will ask OGC for guidance on CDS having great input during the Relevancy Review preprocess.

APPENDIX A: LIST OF MEETING ATTENDEES

Note: A list of public attendees is available from the NAREEE Advisory Board Office.

Wednesday, December 4, 2019

PART I: WELCOME AND ORIENTATION

CDS Members Present: Justin D. Brown, Harold Browning, Gregory Galloway, John C. Gless, Justin Golding, David F. Howard, Julia Inestroza, Matt McLean, William “Gee” Roe III, Mani Skaria, James Snively,

CDS Members Absent: None

NAREEE Advisory Board Staff: Michele Esch, Shirley Morgan-Jordan

Other USDA Staff: Dr. Scott Angle, Dr. Parag Chitnis, Dr. Michael Fitzner, Kevin Hackett, Allen Proxmire, Tim Rinehart, Abby Stillwell, Paul Zankowski

Other Guests: Melinda Klein, Dennis Manker, Marcy Martin,

PART II: SCRI/CDRE PRESENTATION

CDS Members Present: Justin D. Brown, Harold Browning, Gregory Galloway, John C. Gless, Justin Golding, David F. Howard, Julia Inestroza, Matt McLean, William “Gee” Roe III, Mani Skaria, James Snively,

CDS Members Absent: None

NAREEE Advisory Board Staff: Michele Esch, Shirley Morgan-Jordan

Other USDA Staff: Dr. Scott Angle, Dr. Parag Chitnis, Dr. Michael Fitzner, Kevin Hackett, Allen Proxmire, Tim Rinehart, Abby Stillwell, Paul Zankowski

Other Guests: Melinda Klein, Dennis Manker, Marcy Martin

Thursday, December 5, 2019

PART III: USDA RESEARCH EFFORTS AND ACTIVITIES ON CITRUS DISEASE

CDS Members Present: Justin D. Brown, Harold Browning, Gregory Galloway, John C. Gless, Justin Golding, David F. Howard, Julia Inestroza, Matt McLean, William “Gee” Roe III, Mani Skaria, James Snively,

CDS Members Absent: None

NAREEE Advisory Board Staff: Michele Esch, Shirley Morgan-Jordan

Other USDA Staff: Dr. Scott Angle, Dr. Parag Chitnis, Dr. Michael Fitzner, Allen Proxmire, Tim Rinehart, Abby Stillwell

Other Guests: Rich Dantzler, Melinda Klein, Marcy Martin

PART IV: ESTABLISHMENT OF FY2020 AGENDA AND PRIORITIES FOR THE CITRUS DISEASE RESEARCH AND EXTENSION

CDS Members Present: Justin D. Brown, Harold Browning, Gregory Galloway, John C. Gless, Justin Golding, David F. Howard, Julia Inestroza, Matt McLean, William “Gee” Roe III, Mani Skaria, James Snively,

CDS Members Absent: None

NAREEE Advisory Board Staff: Michele Esch, Shirley Morgan-Jordan

Other USDA Staff: Dr. Scott Angle, Dr. Parag Chitnis, Dr. Michael Fitzner, Allen Proxmire, Tim Rinehart, Abby Stillwell,

Other Guests: Rich Dantzler, Melinda Klein, Marcy Martin,

PART V: OTHER BUSINESS

CDS Members Present: Justin D. Brown, Harold Browning, Gregory Galloway, John C. Gless, Justin Golding, David F. Howard, Julia Inestroza, Matt McLean, William “Gee” Roe III, Mani Skaria, James Snively,

CDS Members Absent: None

NAREEE Advisory Board Staff: Michele Esch, Shirley Morgan-Jordan

Other USDA Staff: Dr. Scott Angle, Dr. Parag Chitnis, Dr. Michael Fitzner, Allen Proxmire, Tim Rinehart, Abby Stillwell

Other Guests: Rich Dantzler, Melinda Klein, Marcy Martin,

APPENDIX B: PRESENTATIONS

Note: Presentations made to CDS members are available upon request to the NAREEE Advisory Board Office:

- *CDS Overview & Orientation Session, 12/4/2019, Michele Esch, Executive Director/Designated Federal Officer, National Agricultural Research, Extension, Education, and Economics Advisory Board*
- *Citrus Disease Subcommittee Consultation 2019, USDA National Institute of Food and Agriculture*