CALIFORNIA CITRUS PEST AND DISEASE PREVENTION PROGRAM
SCIENCE AND TECHNOLOGY SUBCOMMITTEE MEETING

Meeting Minutes
Wednesday May 2, 2018

The Science and Technology Subcommittee meeting was called to order at 1:30 p.m. on May 2, 2018.

Committee Members Present:

Dr. Ed Civerolo	Dr. Beth Grafton-Cardwell	Dr. Jason Leathers*
Jim Gorden	Dr. Melinda Klein*	Dr. Etienne Rabe

Committee Members Absent:

George McEwen

Interested Parties:

Bob Atkins	Dean Kelch*	Laura Petro*
Cheryl Blomquist*	Sara Khalid	Sylvie Robbilard
Dr. John Chitambar*	Luci Kumagai*	Gary Schulz
Nick Condos*	Dr. Weiqi Luo*	Cressida Silvers*
Rick Dunn	Geoff Hoellenbeck	Dr. Spencer Walse*
Sara Figuera	Brianna McGuire*	Magally Luque-Williams
Tina Galindo*	Dr. Neil McRoberts*	Bob Wynn*
Dr. Tim Gottwald*	Debby Meyer*	Judy Zaninovich*
Dr. Karen Jetter*	Tobias Moyneur	Sandra Zwaal*

*** Participated via Webinar**

Opening Comments

Dr. Etienne Rabe welcomed the Subcommittee, staff, and members of the public participating in person and online. It was noted that there was a quorum for the meeting.

Strategy 1-Quickly Detect and Eradicate Diseased Trees

Review of State Wide Risk Based Survey and Cluster Survey Process

Dr. Tim Gottwald and Dr. Weiqi Luo presented an update on the Residential Risk Based Survey for 2018 and a proposal for optimizing the HLB delimitation survey. Dr. Gottwald presented a series of slides that showed the distribution of ACP over time from 2011 through 2017. He also resented the number of STR's sampled from 2012 through 2017. He noted that the number of STR's in 2015, 2016 and 2017 have gone down, but the number of samples have gone up and he noted that this is related to the intensive survey in the HLB areas. CDFA staff are revisiting properties in the HLB areas to conduct follow-up sampling. He mentioned that there is a question about the ability to estimate the amount of HLB in each STR and he said that they can predict that

using binomial theory. He explained that they give a minimum and maximum HLB incidence value to each STR and use that in developing the predictive model. Dr. Gottwald went on to explain the development of the 2018 survey. He first described the issue with sampling for HLB, explaining that in a newly infected tree, it is extremely difficult to pick the right sample. He noted that PCR is 99 percent accurate, but you must get the correct sample. He reviewed the criteria used to assess risk of HLB and he stated that they have also included inconclusive ACP and tree samples into the development of the 2018 risk model. He also showed the 2018 risk map that has been developed for CDFA.

Dr. Gottwald then discussed optimization of the HLB delimitation survey. He demonstrated the current work that he does to support the delimitation "cluster" surveys and he also talked about optimizing the survey. He noted that the infection in the LA and Orange County area is entering the exponential phase and the disease progression is increasing and that the program should concentrate on the edges of the high infection region of LA and Orange Counties. He noted that in 2015 CDFA would survey approximately 160 sites prior to finding an HLB positive tree, in 2016 it was about 75 sites survey for every positive tree detection and in 2017 that number was 25 sites visited for every HLB positive tree, this indicates that CDFA is doing a better job surveying, but it also shows that there are more HLB positive trees. Dr. Gottwald conducted a temporal spatial analysis of the 800-meter delimitation survey and compared the survey efficacy with other distances around the initial detections. He determined that using the CDFA HLB detections through 2017, a sequential survey radius of 350-meters would have led to the detection of all if the HLB positive trees and sequential 400-meter surveys would have led to all the *C*Las positive ACP detections. Reducing the survey to 400-meters would reduce the workload to 25 percent of the current workload. The freed-up resources from the reduced survey are should be reassigned to the periphery of the HLB areas. The Subcommittee discussed the proposal. Dr. Neil McRoberts recommended surveying the new area from the outside edge into the core and Dr. Gottwald agreed that this would be a good plan.

> **Motion:** To recommend to the full Committee that the delimiting distance around an HLB find be reduced to 400 meters for both HLB positive trees and *C*Las positive ACP.
> First: Jim Gorden
> Second: Beth Grafton-Cardwell
> Motion Passes: All in favor

Review Definition of Tree "Exposure"

Brianna McGuire, staff researcher with Dr. Neil McRoberts lab in UC Davis presented a presentation on defining exposure to HLB in Southern California. Brianna discussed the scope of the data which she received from CDFA, pre-definitions of exposure, her work towards a definition of exposure based on the psyllid path, time and distance and future steps. In the data she reviewed there were 118,990 trees and 198 positive trees. She stated that in some areas like Garden Grove, Pico Rivera and West Anaheim the spread was dense and in areas like San Gabriel and Hacienda Heights, the spread was more diffuse. She noted that in a definition of exposure you should focus on dense infection. Her analyses to date would indicate that an ACP traveling 10 meters may have visited 4,838 trees. The Subcommittee discussed the presentation and Nick Condos noted that Brianna was given additional information and that she should review that information and focus her work on the dense infection areas to refine her work and look at the definition of exposed.

Cost/Benefit Analysis for State Wide Risk Based Survey

Dr. Karen Jetter gave an update on the overview of the economic risk analysis of ACP/HLB management in Southern California. The objectives are to identify the least-costly method of surveying for ACP/HLB in urban areas of Southern California and to estimate the expected cost of ACP/HLB management in urban areas. Karen reviewed known costs versus unknown costs as well as key costs and probabilities (the spreading of HLB). The model works by estimating the known costs for a specific risk survey protocol scenario, plus the costs of a scenario for managing a known HLB infestation, estimates the expected costs of detecting an infestation of HLB and having to incur new delimitation costs, and estimates the expected costs of not detecting an existing infestation of HLB and HLB spreading. The two outputs will be the total cost overtime as well as the estimated time that it will take for HLB to spread to a commercial orchard. There are two considerations, artificial versus natural spread. Current infestations have very different risks of natural spread to commercial groves. Karen also discussed some scenario suggestions regarding the budget and handed out a budget document to the Committee. She will be working with Dr. Gottwald to populate her bioeconomic model and hopes to have some analysis done by June 2018.

PCR Sensitivity

Luci Kumagai presented an update on the revised HLB PCR protocols. She reminded that Subcommittee that PCR is the only validated protocol that is a direct test for HLB, it is sensitive and specific. She mentioned Dr. Gottwald's statement regarding PCR, where he stated that sampling is the issue with PCR, she noted that the quadrant sampling has helped address this issue. In late 2016 the program began quadrant sampling remaining trees on positive tree and adjacent properties and due to this change in sampling, we have detected many more positive trees. For ACP samples, the positive cut off has moved from a CT less than 32 to a CT less than 38, indicating that the test is more stringent she wanted everyone to know that CDFA retests all samples that have a CT less than 40. She also mentioned that the 16S primer for *C*Las was modified to add a nucleotide to make the test more specific. The *C*Lam test has been eliminated, which is a good thing, *C*Lam has not been detected in 10 years of sampling. Also, the RNR primer has been validated and it is much more specific and more sensitive. For plant protocol there were not any changes, but we are using the RNR as another tool help validate the 16S results. Bob asked about going back and retesting suspect sites with RNR to remove the noise that might be associated with closely related non-specific bacteria.

Strategy 2-Control Movement of Psyllids Around the State; Regulations

Re-visit Boundaries of Bulk Citrus Quarantine Zones

Sara Garcia-Figuera provided a presentation regarding the bulk citrus regional movement risk evaluation. The objective of the project is to estimate the risk of introducing *C*Las or *C*Las-infected ACPs when moving bulk citrus between the regional quarantine zones. DATOC selected a panel of risk factors based on the criteria for defining the quarantine zones and the APHIS PPQ guidelines for Pest Risk Analysis. Scores were combined using a program called DEXi for multi-attribute decision making. The program allowed the DATOC to combine all the scores and a risk matrix was generated which includes seven risk zones. Sara stated that the current evaluation does not support a change in the regulation, as the risk is high for most of the likely combinations: either the likelihood of *C*Las on the fruit at the zone of origin is high or the damage potential at the zone

of destination is high. Some sensitivity analysis was done to look at possible scenarios and packing at the zone of origin could reduce risk. The model is flexible enough to accommodate refinements if there is interest in developing a working group. She stated that there was data presented at the Operations Subcommittee meeting that may impact the initial evaluation. Etienne noted that the matrix will need to be refined a lot since even though risk levels differ, the regulatory aspects stay the same regardless where to or from where fruit is moved, although it is understandable that from a regulatory point of view discrepant rules for different regions would pose enormous difficulties, thought should be given as to how there might be differential enforcement. Nick mentioned that it would be a good idea to add a few more experts and run the model again.

Review Implementation of Performance Standards

Dr. Spencer Walse presented an update on the progress of the ACP mitigation measures for bulk citrus. Joel Nelsen and Jim Cranney are trying to set up meetings with DPR to review the treatment protocol. The decision is a legal issue, pre-harvest applications all citrus varieties are exempt, but if the treatment is post-harvest, then the treatment is limited to sweet oranges. The team is looking at a short list of other chemicals that might be acceptable to DPR for post-harvest treatments. Spencer stated that they will also be discussing the idea of reviewing the tolerances.

Strategy 3-Suppress Asian Citrus Psyllid Population

Research on Current Treatment Effectiveness

Dr. Beth Grafton-Cardwell reported that she had a scout sample ACP density in the Riverside HLB treatment area, pre- and post-treatment. She noted that the sites treated with Tempo and Merit showed zero ACP 16 weeks post treatment, this argues for continuing the residential treatments. In Ventura, however the control was not as good, this was due to timing issues between the buffer treatments and the grove treatments.

Recommendations on Areawide Buffer Treatments

Beth suggested that the buffer treatments should not be continued as a program activity; initially is was to entice growers in an area to do areawide management (AWM); this will now happen regardless of buffer treatments and even if it continues, likely won't entice unwilling/unconvinced growers to enter an AWM.

Strategy 4-Improve Data Technology, Analysis and Sharing

Sharing Data with Researchers-MOU

Sara Khalid reported that both MOU's have been signed by all three parties and once Sara receives them back from the UC Davis and UC Riverside, she will send copies out to the parties.

Explore New Solutions-Citrus Surveyor Mobile Application

Colleen Murphy-Vierra gave an update on the scoping project with the CDFA IT Division to develop a mobile application to collect all the field information on the survey activities. Nick mentioned that this app will be a good investment for the future.

Review of Current Supporting Activities on Research

Luci Kumagai gave an update on the research support activities that CDFA has been involved in. This includes the following:

1. Providing ACP samples to CRB lab and the CPDP lab for analysis and following up on any suspect results.
2. Providing samples to the metabolomics laboratory (2016-curent). To date CDFA has provided over 170 samples of positive leaf tissue.
3. Following up on the 34 dog alert trees from 2016. The lab proposes to complete quadrant sampling of the trees in 2018.
4. Providing budwood to CPHST for their HLB collection.
5. Providing ACP DNA to Jianchi Chen at USDA for genotyping,
6. Processed 1000 samples for CA-1 and follow up on ant EDT suspect samples from the 1000 trees.
7. Provided 89 samples for CA-1b and followed up on any EDT suspects.
8. Collected and processed 200 samples for CA-1b part 2.

The CDFA will also participated in the following future research projects:

1. Will provide qPCR data on 500 samples provided to the Phytobiome project.
2. Provide budwood to Dr. Gang and WSU for culturing *C*Las isolates.
3. Providing budwood to Dr. Ramadagu at UCR for challenging tolerant rootstocks.

Research Permits

Laura Petro gave an overview of the permits that CDFA has been issuing to assist in the activities at UC Riverside since the detection of HLB in the area. She explained the layers of regulations, both State and Federal that regulated ACP and HLB. There were many things to consider, including the type of structures, the lab needs and the regulatory framework. Research was ongoing at UCR on EDT's, diagnostics, breeding, lab certification and ACP biocontrol. There was multiple collection requests and requests for movement associated with the variety collection. Many of the requests were associated with breeding and propagation. Some activities were small scale citrus fruit harvested for boutique uses, including food service, local restaurants, special tasting events and contracts for flavoring companies. Laura and Dean were able to permit these activities and to do so while mitigating the risk of spreading HLB.

The meeting was adjourned at 4:17 p.m.