Senate Committee on Agriculture

Senator Cathleen Galgiani, Chair

Informational Hearing

Stopping the Spread of Asian Citrus Psyllid: Challenges and Solutions

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SENATOR GALGIANI: Good Afternoon Ladies and Gentlemen. Welcome to the Senate Committee on Agriculture's informational hearing titled, "Stopping the Spread of Asian Citrus Psyllid: Challenges and Solutions."

California leads the nation in agricultural productivity, where in 2012 the farm gate value for ag products was $44.7 billon. Despite this growing market, California is consistently faced with challenges, such as the threat of new pests and diseases like the Asian citrus psyllid and Huanglongbing. ACP has now been detected in multiple counties, requiring emergency quarantines in both ag and residential areas to stop the spread of the Asian citrus psyllids.

The challenge to stop ACP from spreading can only be addressed through local, state, and national collaboration and communication. We have witnessed the massive devastation of Florida's citrus industry as both ACP and Huanglongbing have been detected in every citrus producing county, costing billions of dollars and 8,000 jobs in Florida. California can't afford to sustain similar damages and we must work together to find sustainable ways to prevent this spread. Therefore, today's hearing will provide an update on the recent spread of ACP and discuss challenges and solutions to detecting, combating, and eradicating both Asian citrus psyllids and Huanglongbing in California.

Thank you for your participation and for your attendance today. I hope that through continued efforts and working together, we can solve this problem.

With that, I would like to invite our first panel to come forward: Bob Wynn, Senior Advisor to the Secretary, California Department of Food and Ag; Helene Wright, State Plant Health Director for California, USDA, APHIS, PPQ; and Ruben Arroyo, Kern County Ag Commissioner.

While our first panel comes forward, I would like to invite anyone interested in providing testimony during the public comment period to please sign in with the sergeants at the back of the room here. And we will go ahead and begin.

I also wanted to take a moment to introduce some other officials who are here with us today as well: Stanislaus County Ag Commissioner [Kamal Bagri and Dan Bernaciak] is here with us. Thank you very much for being here.

Our first panel please.

MR BOB WYNN: Thank you Madam Chair. And thank you for the opportunity to enable us to brief the Committee on our ongoing battle with the Asian citrus psyllid and Huanglongbing. I've provided a folder with maps, as well as my testimony, for your information and to provide some perspective on the significance of the effort.

I think it's best if I read through my testimony. There's a lot of information here and with the allotted time I can get through it, I think, in order to provide the rest of the testimony.

At the outset, it's important to mention that this project is truly a cooperative partnership between federal, state, and county government, industry, the University of California, Cal State University, and the very important partner, the public of California.

In 2006, the Department of Food and Agriculture facilitated the formation of the special committee to address the growing threat of ACP and HLB. CDFA, members of the citrus industry, and others, were concerned with the growing presence of ACP in Florida and in Northern Mexico, and, of course, in Central and South America, as well, and realize the need to have an action plan in place should the invasive pest make its way to California.

In June of 2008, ACP was detected in Tijuana, prompting CDFA and cooperating agencies to increase trapping and visual surveys performed along the international border to our south. As a result of this increased surveillance, CDFA, in fact, did detect the first ACP in San Diego County in September of 2008.

Over the course of the following year, ACP rapidly spread to Imperial, Orange, and Los Angeles Counties. By 2010, additional ACP detections had occurred in San Bernardino and Riverside. Initially, CDFA implemented 20-mile quarantines in response to ACP detections and conducted treatment activities within a 4- to 800 meter radius around all find sites. The quarantines were implemented to control the artificial movement by humans moving host material of ACP while facilitating methods to provide

movement of free host material—nursery stock and other host material—that carried the pest within and outside the areas under control. As counties became more heavily infested in the south and quarantined areas expanded, counties requested to move to county-wide quarantines. By 2012, all Southern California counties were deemed infested and placed under a contiguous quarantine.

Initially, CDFA treated all host material in and around urban detection sites in Southern California regardless of the significant level of local infestation. Hence, the public being partners. They were very receptive to our treatments and they were our partners in the program in Southern California.

As in all of our pest prevention programs, which include treatment activities, no treatments took, or take place currently, without notifying the residents within the treatment area via direct contact and public meetings. As the ACP populations and program expanded it was determined that Southern California would be transitioned from an eradication program area to a suppression program area so as to make the most efficient use of resources.

In late 2012, CDFA transitioned from treating all urban detections to a more targeted approach in Southern California aimed at protecting commercial citrus production areas. Additionally, CDFA continues to service an extensive two mile trapping zone along the U.S.-Mexico border to protect against the movement of ACP and HLB across the border. Detections in this buffer zone trigger treatment of 400 meters around each find site. Industry has also implemented psyllid management areas [PMAs] to facilitate treatment of infested commercial groves and prevent ACP spread to adjacent regions. CDFA supports these PMAs by treating adjacent infested urban areas to mitigate ACP movement back into the groves.

Additionally, CDFA has worked with researchers at USDA and the University of California to develop a number of biological control methods—of which you'll hear more about by Dr. Hoddle later on in the hearing. However, Tamarixia radiata, a stingless parasitic wasp that feeds on ACP, is currently being produced and released by the program in the urban areas of Southern California. Approximately 750,000 Tamarixia have been released across 250 locations in Southern Cal this year. CDFA estimates that number to reach one million by the end of the year and for production of Tamarixia to double next year.

Despite all efforts, ACP continues to move north along the Central Coast and into the Central Valley with detections in Ventura, Santa Barbara, San Luis Obispo, Kern, and Tulare in 2013. This year, a number of ACP have been also been detected in Santa Clara County and San Joaquin County. CDFA has deemed it feasible to eradicate ACP from some of these new areas (Tulare, Kern, San Luis Obispo, and San Joaquin), and has been implementing five mile quarantines and 800 meter treatment zones around finds. Suppression activities and five mile quarantines have been implemented in the additional new areas. Eradication feasibility in some but not all of these areas is based on the relative limited size of the infestations and the distance from other ACP detections. However, ACP is not the primary concern of the program or, obviously, the citrus industry. The objective of this program is to detect and eradicate HLB if or when it arrives in California.

Thus far, California has had only one confirmed detection of HLB; in the residential area of Hacienda Heights in Los Angeles County in December of 2012. CDFA and county staff quickly moved to remove the tree and quarantine the surrounding area. CDFA continues to conduct intensive risk based survey activities for HLB in Southern California and the Central Valley. There have been no additional detections in the original quarantined zone or elsewhere in the state. CDFA continues to be vigilant in our search for HLB.

Cooperative partners: Very early on in the program the citrus industry quickly recognized the immense task before them and in 2009 worked to pass AB 281 and secure a funding source for citrus program activities. AB 281 created authority for the citrus industry to assess themselves, as well as to establish a committee of industry members within CDFA, to advise the Secretary on management and response to all citrus diseases, and in this case, control of ACP and HLB. This committee, the California Citrus Pest and Disease Prevention Committee, has allowed CDFA to work to effectively coordinate all statewide activities in the effort to stop ACP. Funds expended from the assessment from industry dollars totaled approximately $14 million annually and comprise over half of the program's $22.5 million average per year expenditures with additional funding coming directly from USDA's Citrus Health Response Program.

CDFA has worked closely with USDA and the University of California Cooperative Extension to develop best management practices for growers, retailers, and other potentially impacted stakeholders and continues to find solutions as challenges arise.

One such challenge; the Cooperative Extension has assisted the program by providing organic growers with options to maintain their organic certification in suppressive treatment areas. Although, we have yet to find an organic option which can be used for eradicative treatments, the Cooperative Extension continues to screen new treatment options with significant expense to both them and the industry for organic growers as they become available. In areas under eradication, organic growers are still compelled to treat with conventional materials that have been determined by the Cooperative Extension to be effective at or near 100 percent. CDFA also works with USDA to develop screen house requirements, Certified Clean Nursery Stock requirements, and compliance agreements to allow movement of nursery stock within and out of quarantined zones

CDFA works with California Citrus Mutual and communications contractor Nuffer, Smith and Tucker, to conduct a robust outreach and communication program to growers, elected officials, and the residents of California. The goal is to educate the public about the potential threat of ACP and HLB to both commercial and residential citrus. This program is predominantly responsible for the excellent cooperation that the program has experienced from private residents who have been within treatment areas and partners throughout this program.

CDFA will work with our cooperators to increase our trapping and survey activities around the new detection areas in San Joaquin and Santa Clara Counties and will overcome any challenges presented by this expanded area, as well as any other challenges that may be on the horizon. We have already held a number of public meetings in both of these counties to provide information to the public and address any potential concerns. We will be performing additional outreach activities and reaffirming that CDFA is dedicated to protecting California's iconic citrus groves and the economic benefits the industry brings to our state.

Thank you Madam Chair.

SENATOR GALGIANI: Thank you very much. With regard to the funding; you mentioned that $22.5 million is spent per year and of that, about $14 million a year is from self-assessments from the industry and there's—is it the full remainder of the $22.5 million that comes from the USDA Citrus Health Response Program, or are there some state general funds that are part of this funding mixture?

MR. WYNN: There are no state general funds currently in this program. We have spent in the past CDFA funds coming out of some general funds—a very small amount,

some emergency funds that come from the unclaimed gas tax accounts, but those have been relatively limited. So essentially at this point in time, expenditures are sourced from the USDA account, as well as the citrus industry self-assessment.

SENATOR GALGIANI: If we were to have another detection of HLB itself, would there be a need for increased funding at that point in time?

MR. WYNN: Well, it's a little bit hard to say. What would probably happen is priorities at that point in time would probably shift. We're developing—I mentioned the psyllid management areas in the commercial groves, those would become absolutely critical for growers to participate in. And by the way; the growers, as well as creating the self-assessment, they're also spending a tremendous amount (especially in Southern California) to control psyllids in their commercial groves. If we detect HLB, we get into a situation in which we're going to have to remove the trees that are infected, so there will be shift in priorities somewhat to that, to eradicating HLB. At this point in time, the industry, even though we're spending $14 million a year, the industry has a significant reserve to plan on that event. So at this point in time, I can't say that we would need additional funds from anywhere else except for these two accounts because we have some reserve in those accounts that can be used for that occasion.

SENATOR GALGIANI: Okay. Thank you very much.

MS. HELENE WRIGHT: Okay. Good morning. I appreciate the opportunity to testify before you today on invasive pests threatening California's agricultural and natural resources. The U.S. Department of Agriculture Animal and Plant Health Inspection Service, or APHIS, works to safeguard those resources. My name is Helene Wright, and I am APHIS' State Plant Health Director for California.

APHIS' mission is to safeguard American agriculture and natural resources from both domestic foreign pests and diseases. This mission is one of the USDA's most critical and one we carry out in partnership with the state of California, the county agricultural commissioners, the citrus industry, and other federal partners, including U.S. Customs and Border Protection, USDA's Agricultural Research Service, and the National Institute of Food and Agriculture.

Today, I will provide a brief national perspective on our efforts to combat the Asian citrus psyllid and more specifically about our work through the USDA's Citrus Health Response Program in the state of California.

The Asian citrus psyllid is a vector for the disease Huanglongbing, or HLB. It's also referred to as "citrus greening," but in California we stick with Huanglongbing or HLB—that seems to resonate better with the public—and it really is a dangerous disease that we want to convey to them. HLB is one of the most serious threats confronting the U.S. citrus industry which has an estimated worth of $3.25 billion.

The Asian citrus psyllid was discovered in the United States nearly two decades ago in the backyard of a home in Palm Beach County, Florida. By 2001, the psyllid had spread to 31 counties in Florida as well as other citrus producing states. In 2014, Florida, Texas, Louisiana, Alabama, Georgia, Mississippi, South Carolina, Arizona, Hawaii, California, Puerto Rico, the U.S. Virgin Islands, and the U.S. territories of American Samoa, Guam, and Northern Marinara islands are either fully or partially quarantined for the psyllid. The spread of Asian citrus psyllid in Florida was soon followed by detections of HLB. Currently, the entire state of Florida, and all major citrus growing areas in Texas, are quarantined for HLB. APHIS must also safeguard against a constant threat of psyllid or HLB incursions from across the border in Mexico.

Let me shift now to talking specifically about California. Currently, Los Angeles, Orange, Fresno, Tulare, San Luis Obispo, Imperial, Kern, Riverside, San Bernardino, San Diego, Santa Barbara, and Ventura are either fully or partially quarantined for Asian citrus psyllid at the federal level. We are also in the process of adding Santa Clara and San Joaquin, which the State has already quarantined. HLB was detected in a Los Angeles County residence in December 2012. In response, CDFA established a five mile quarantine area. Fortunately, no additional HLB positive trees have been detected since that initial detection. That said, we are continuing to refine our surveys for the disease.

HLB is the biggest threat to the more than $2 billion California citrus crop grown on 250,000 acres. In fact, preventing the spread and destruction caused by Asian citrus psyllid and HLB is one of the Agency's top ten goals. Accordingly, we have employed a number of approaches to greatly reduce the immediate impact of Asian citrus psyllid and HLB in California in conjunction with our cooperators and stakeholders, including:

- conducting surveys to ensure early detection of both the psyllid and HLB;
- enforcing regulatory measures to safeguard domestic trade and exports;
- and funding extensive outreach programs to educate the public and increase awareness about the dangers of moving citrus plants.

In terms of resources, in fiscal year 2014, through our Citrus Health Response Program, APHIS provided approximately $12.5 million for regulatory, biocontrol, survey, and management activities in California. Biocontrol is a suppression technique where pest populations are reduced through the use of natural enemies such as predators and pathogens. This program will target Asian citrus psyllid in residential and organic groves where conventional control using chemicals are not sustainable.

Finally, in collaboration with the Mexican agricultural agencies, APHIS provides more than $1 million annually to monitor citrus across the border for Asian citrus psyllid and HLB. Customs and Border Protection has also increased inspections at ports of entry of incoming shipments from Mexico.

In addition to providing funding through Citrus Health Response Program, late last year, the USDA established the Huanglongbing Multi-Agency Coordination Initiative, or the HLB-MAC, to support near term goals and solutions for the citrus industry to combat HLB. The HLB-MAC initiative is led by APHIS, and the HLB-MAC group consists of representatives from federal agencies as well as state departments of agriculture and industry, and works collectively to combat HLB in California and other citrus producing states. The MAC provides the industry with a single contact for all the federal and state entities that work on citrus issues and allows the representatives to collaborate on policy decisions, priorities, and the allocation of critical resources. USDA committed $1 million to jumpstart the MAC effort in December 2013, and Congress provided another $20 million this year to help fund the most promising tools and solutions.

In May 2014, USDA announced an additional $1.5 million of HLB-MAC funds to expand biocontrol efforts in California, Arizona, Texas, and Florida. Of the $1.5 million, nearly half a million went to California: $46,000 cooperative agreement with CDFA to equip the biocontrol facility at Cal Poly Pomona; and a $424,000 cooperative agreement with the Citrus Research Board to scale up biocontrol work in collaboration with UC Riverside.

In fiscal year ’14, the USDA HLB-MAC allocated nearly $5 million to fund, in addition to the biocontrol work, several field trials of promising antimicrobials, establishment of a model demonstration grove in Florida where HLB has spread quickly, and training of canines for early detection of HLB. If successful, these new management technologies being piloted in Florida will be transferred to California should HLB be detected in groves or other residential sites.

In addition to the HLB-MAC initiative, USDA's National Institute of Food and Agriculture through the Specialty Crop Research Initiative program will provide $25 million per year for the next five years for citrus health research as instructed in the 2014 Farm Bill. The 2014 research proposals have just been reviewed. Funding decisions for 2014 will be made in early December and the next Request for Applications will be announced in early 2015.

I want to thank the Committee for the opportunity to discuss this important issue for California and reaffirm USDA's continued commitment to fighting this destructive disease, along with our partners, state and local government, the citrus industry, the nursery industry, and academia.

Thank you.

SENATOR GALGIANI: Thank you very much. Our next speaker is Tim Pelican, San Joaquin County Agricultural Commissioner. Thank you.

MR. TIM PELICAN: I appreciate being asked to be here today, Senator Galgiani. Our county happens to be the latest to be infested with the Asian citrus psyllid.

On October 10th, my office was informed that there were two traps where there had been a positive identification of Asian citrus psyllid. One was in Lodi and one in Manteca. The two insects were actually found in traps that were meant for another pest detection program—the Glassy-Winged Sharpshooter Program. And those traps were originally pulled and weighted for inspection on September 12th and 14th.

Town hall meetings were held in both Lodi and Manteca. Twenty-eight people attended in Lodi; and 16 were in attendance in Manteca. There were mandatory treatments in both Lodi and Manteca. We had a total of 1,356 properties treated. The treatments took approximately 14 days. And we had actually five people where we had to obtain warrants to treat their homes.

Because of the timing of the finds—for the most part our trapping season was coming to an end so we had to kind of scramble and find some people that were working in another program that had already ended because of the number of hours that were required to keep people in those types of positions in employment. And actually, a lot of the traps had already been removed, so we had to go back and also replace those traps. Most of our non-trapping man hours went to meeting people who had called in thinking they had an infestation in their home trees for ACP. Usually it was citrus leaf mite or something like that, so fortunately we haven't found anything else. But a lot of that time

also went to—we had almost a hundred hours that were spent dealing strictly with people that originally refused to have their properties inspected or treated, which in the term of the whole project, a hundred hours may not seem like a lot, but for a county department that's a sizeable amount of time.

We had a total of 13 retail nurseries that were affected and that required us to issue 13 compliance agreements with them to ensure that they were only bringing in certified nursery stock and that none of the nursery stock that they sell in those nurseries can leave the quarantined area.

And one of the things I'd like to point out for San Joaquin County is that in reality we have a total of nine acres of citrus production in our county and the majority of this work that we did was to help protect our neighboring counties that have larger mandarin production and in the case of Stanislaus County to our south, a large number of acres of nursery—citrus nursery—production. So even though we have little to gain in this, we have to take a look at what's best for northern San Joaquin County, as well as the State

One of the things that we found that happened during this eradication is that one of the things that I think would really help counties out is that there be more tools available for the eradication. The conventional chemicals most people really didn't have a problem with. They're used in pretty small quantities. However, there are people that are not for that sort of thing. And the fact that there are no organic treatments available for eradication, I think is something that should be looked at. It would help, again, like I said, give us another tool. And there are also people that were willing to have their trees removed rather than treated. And to me, that is kind of a no brainer if the funding is available; to remove those trees because if there is a problem that's found in the future, say another citrus psyllid find or Huanglongbing, that would be one less refusal property that we would have to go back and visit.

One of the things that I was looking at too today, is that we put a lot of effort into trying to educate the general public in not moving plant material from areas that are infested with an insect. And in our case, it's most likely that that's what happened; for us, to leapfrog from Tulare County to San Joaquin is—I doubt that two psyllids just decided to take off one day and land in Lodi and Manteca. So that's something that, you know, I don't know what we'd do, but I think maybe some continued efforts into educating the general public on the importance of following quarantine restrictions and what the outcome can be.

One of the other things that is of concern is that the northern San Joaquin County in 2013 originally had an ACP contract with the State to trap. In May of 2013, those contracts were negated. A lot of that was due to the lack of Farm Bill money, so again, federal funding. And then we began trapping again in March of 2014. So basically, you had a year span in the northern San Joaquin Valley where there was no trapping program.

So one of the things we really need to look at is the State, to me, is being a little bit remiss and shortsighted by not providing any funding towards most of the pest detection programs in the state. And we have a multi-billion dollar industry that is the economic motor for the San Joaquin Valley, and for the State to not put any money for investment into that industry, to me, is something that really needs to be reconsidered.

So I guess really that's what I have to say. Again, to me the effects to my county really isn't great, but our responsibility to our other counties is. And I guess that's all I really have to say.

SENATOR GALGIANI: Thank you. You talked about the fact that the traps were actually intended to be traps for the glassy-winged sharpshooter and those were the traps that detected the Asian citrus psyllid. That seems problematic to me and maybe you can expand on that.

MR. PELICAN: Well, one of the problems that we have in trying to detect this particular insect is we don't have a very good tool to use in terms of trap type, where in most cases with fruit flies we can use an attractant or a pheromone, something like that, in this case, it's just a yellow panel trap, a bubble trap basically where it's just—it basically just happened to land on it and that's how you find them. I know in—and Ruben can probably speak to this a little bit better than I can—but I know in Southern California where they had some original finds there was a pretty heavy infestation of one property and they found two psyllids in trees next door—one on each. I think they were probably a glassy-winged trap too. So it just goes to show to, I think, the timeframe between when our traps were actually pulled and the time that the positive identification was made was a month. Now if we had more traps out, if we had a stronger trapping program, that perhaps could have been lowered that amount of time. Those traps—Asian citrus psyllid traps are checked, at least in northern San Joaquin Valley, just one time every month. So from the time you find a psyllid to the time it's actually identified, you could have a larger infestation take place during that time.

SENATOR GALGIANI: And you said that there is no pheromone that's known…

MR. PELICAN: No. Because of the type of insect; it's a sucking insect. It's the same reason they use the same type of trap for a glassy winged sharpshooter. There's not really any food source that you could use in a trap for something like that, so that's one of the problematic portions of trying to track where this insect is going.

SENATOR GALGIANI: Okay. Thank you very much. And next, we have Ruben Arroyo, Kern County Agricultural Commissioner.

MR. RUBEN ARROYO: Madam Chair, thank you for the opportunity to speak about an industry that, of course, is important to Kern County but also an industry that's near and dear to my heart. I grew up in Tulare County just north of Kern County. Both myself and my family grew up in citrus picking. I grew up picking when I was young, and then as I got older I worked in the orange groves spraying, and, on occasion, sleeping under orange trees—during lunch, of course—on these orange groves.

Kern County currently has 55,000 acres of citrus. It is our number four crop in Kern County. The value of citrus in Kern County is $642 million. We're the four ranking commodity of our $642 billion industry.

I was asked today to speak about the history, the detection programs we have, and the outreach, and, of course, the treatment of ACP so I'm going to start with our first find. Back in September of 2013, we found one ACP in a trap in Wasco, which is a smaller town in urban Kern County closer to the Tulare County border to the north. When ACP is found—and it was kind of mentioned here—but that triggers all sorts of things to occur and that originally starts with an 88 square mile quarantine zone around the find, but then also, you have a core 800 meter eradicative circle—I guess you can call that—around that find. And that's where, you know, both Tim and Mr. Wynn have talked about, you know, visiting homes and having our outreach meetings to specifically talk to those homeowners to let them know what is occurring and why we're doing that. And that plays a big part in at least the outreach efforts, I believe, in getting the word out, because at that time is when we have the media there, we have growers there, we also have homeowners there and that is key to what I've noticed over the years now in getting the word out and expressing the, you know, what is occurring in the county and why we need to do this.

The following November—not the following November, but in November of 2013, an additional ACP was found in Tulare County along the Kern County line. So when that

88 square mile buffer quarantine was placed in Tulare County, it encompassed a portion of Kern County. And that's where we actually got involved with some of the commercial spray options for Kern County, because a portion of that circle that encompassed Tulare County and portions of Kern, got into an arena of our organic orchards. And so I feel strongly, along with Tim, about there does need to, at least, something needs to occur. And I know it's been worked on as far as the organic options for our industry because organic ground in Kern County has just been growing phenomenally over the past ten years. And so, I think it's something that is probably a good avenue to look into with some sort of funding. It all comes down to funding. And I know where the commercial aren't necessarily predominantly organic, you know, so on traditional chemicals it works just great. But I also think looking at the organic eradication tools we can have will also help pacify some of the homeowners that we run into a lot. Because the big concern they have is why are you spraying chemicals in my backyard; and is it going to hurt my children; is it going to kill my dogs? So it is a concern. And I think if we have an additional tool for us to use, I think that would benefit the industry and our outreach efforts.

In April of 2014—of this year—we found an ACP in a citrus packing shed. That triggered what we call a "regulatory quarantine." It's considered a regulatory find because we know that that was a hitchhiker that came in on loads from possibly another county, so that's treated a little bit differently compared to our original 88 square mile quarantine.

September of 2014, we found an additional ACP in southern Bakersfield city limits. I guess you call—it's an area we call "Pumpkin Center," again triggered the 88 square mile and 800 meter quarantines.

The end of September, September 29th, an additional, again, an ACP was found east and north of that find. Not very far away. Just kind of across the highway. So that—you put two circles together and you try to combine and expand the quarantine and so that encompassed an additional total of 148 square miles into the quarantine. In October of 2014, we found an ACP kind of in between those two finds and the boundaries have not been set for that one as of yet, so we're waiting to hear back from CDFA and USDA about where we're going to set those boundaries. Of all the finds that we've had in Kern County, none of them have had affected the commercial orchards or groves in Kern County, thankfully. So as far as the efforts that Kern County has had to

deal with, have all been in the city and urban type areas that are far enough away from our citrus commercial groves.

And so, now we talk about the trapping in Kern County. Kern County, under the cooperative agreement and partnerships we have with CDFA and USDA, we placed traps in our urban areas. We have a total of about 2,713 traps which include some of the traps that Mr. Pelican had mentioned here, of these ACP/glassy-winged traps in our packing sheds. So we try to cover, between the agreements we have with USDA and CDFA and the county cooperative agreements, we cover practically the entire counties in the state with, especially in our production counties, with traps and they have proven to be effective. Even though they are considered a blender trap, they are attracted to the color, apparently, and are put in places that are known to have citrus. And so, it's what we have and it seems to be working once we do have a find, at least to find any additional if there are any in the area.

As part of being in the county and protecting the industry, we also do whatever we can to inspect any outgoing shipments of citrus nursery stock. Mr. Wynn had mentioned programs. In our nursery screened facilities we inspect those once a year to ensure the certification. Make sure there's no holes in any of the screens that are involved in that. We go to our local Home Depots and KMarts and even our FedEx, UPS, all of those facilities, looking for incoming shipments of citrus or citrus host material. Even in our Asian markets, I mean our ethnic markets, any of them; we're looking for host materials. So my staff is vigilant. They've done a great job in finding citrus host material. We've written notices of violations and administrative civil penalties to people that are unaware or bring stuff in to the county, including green waste.

You know, we visit our green waste facilities because we do have counties and cities to the south of my county that do not know what to do with their green waste but are also involved in these quarantines. And so, they literally give away the green waste to neighboring counties and so that's something we've been really looking into. And we're in the middle of an administrative civil penalty with some of those currently.

And so, you know, we're being bombarded around. You know, we have Tulare County to the north that's gone through a lot of finds and quarantines and have now considered themselves, I guess, fully quarantined—the entire county. And so, hopefully, you know, Kern County won't get to that point. But with the efforts that we have together and doing everything that we have—and I know and understand a lot of it

comes down to funding, but in Kern County and throughout the San Joaquin Valley we're working with the industry; we're working with the Citrus Research Board; we're working with Joel behind me here and trying; and CDFA and USDA and all, working together to keep this insect and disease out of the area. Doing what we can to suppress it, eradicate it, and work together and that seems to be what's working right now, is the cooperative effort we have among ourselves to combat one single issue.

And so, again, thank you for the time you've given me today.

SENATOR GALGIANI: Thank you. And this question is for any of the panelists. I believe that in California we've been successful in eradicating the glassy-winged sharpshooter. How is this fight different than that fight?

MR. WYNN: I can take that if you'd like. That's one of our programs—CDFA. We have not eradicated the glassy-winged sharpshooters from the state. What we have is basically similar situations for glassy-winged as we have with ACP. All of a sudden California is infested with glassy-winged sharpshooter. We have controls in place to inhibit the movement to non-infested areas. So when we … let me back up. The infestation, actually, of glassy-wing reaches about halfway up through Tulare County, so the ag commissioners in southern San Joaquin Valley are very busy with that program.

And I'm glad you brought that up because I want to discuss the use of the traps as well. But for glassy-wing, any incipient infestation similar to ACP we address with an eradicated program in those uninfested counties. We've had 17 successful eradication programs for glassy-winged sharpshooter. But only in the northern counties that are deemed uninfested.

I have actually two comments. The use of the trap, it's actually not problematic. On the contrary; it's benefiting the program that we have those traps out there for glassy-winged sharpshooter. We have a massive area-wide program in southern San Joaquin Valley in which we have thousands of glassy-winged sharpshooter yellow panel traps in citrus. Those yellow panel traps, even though they are less than desirable, I hesitate to use the word "blender" because there is an attractant to the color because it emulates flush in citrus, even though if you put it side by side, the trap versus the flush, ACP will go to the flush instead of the trap. But there is a little bit of an attraction there. But it's enabled us to create economies in the citrus program just by the mere fact that we have such a large array of these traps for glassy-wing out in the environment. So now we're able to share those traps with two programs, cutting the expenses.

The other thing I want to … we shouldn't lose sight on the organic solutions. I mentioned in my testimony—and the Secretary would be very disappointed if I didn't tell you this is her top priority in this program—to find an organic solution, and has been for years, as well as the citrus industry. The Citrus Research Board, which is also a CDFA Marketing Board, operates on assessment funds by the growers. But it's in the research arena. They've spent millions of dollars in the past several years trying to find organic solutions. It's a finite universe. We only have so many products out there. We've searched forever. Not just products that are registered for citrus and ACP, but all other organic products that are out there. So we shouldn't lose sight that not only have we invested in the past, but we continue to invest. And I'm sure citrus industry will allude to this in their testimony. But we're doing everything we can. And we agree with the need for these solutions. And again, this is the Secretary's top priority.

SENATOR GALGIANI: Thank you very much. So with all of these different practices in place, is there one master plan that the State has or the USDA has that is clear that there's an exact protocol that should be followed under on a statewide master plan? And again, that question is for anyone.

MS. WRIGHT: Well, from the USDA perspective, what we're most concerned about is the spread of Huanglongbing and we know that it's spread by the Asian citrus psyllid. So any programs that can be done to suppress the Asian citrus psyllid. And in Florida, they have put together areas of growers where they treat at the same time so they can keep down the population of the Asian citrus psyllid. And we're in the process of establishing some of those in California now that we're finding Asian citrus psyllid in more counties and in more areas where there are groves. And so that's the master plan as far as USDA is concerned, is really to suppress those ACP populations. We're not sure that they can necessarily be eradicated, but we can suppress them in the hopes of keeping HLB from spreading.

SENATOR GALGIANI: Thank you.

MR. WYNN: And I'll add a little bit to that. I mentioned AB 281 which also requires that the industry and CDFA develop a work plan, and action plan for both ACP control and HLB control. And I apologize, I should have brought that with us today and I'll provide the Committee with a copy of those when we get back.

But those, basically what Helene just alluded to, those are our master plans. When we find … well, let me back up. We're following what's going on. We have been for

years, in the world with this disease and vector complex. And there are measures taken that are found to be most effective, even though no one's been very successful in controlling this thing, because you see what's happening in Florida and now Texas. But we've been able to stave the disease off longer than anyone else at this point because of our suppression activities and because of our removal of that infected tree in the Hacienda Heights. We feel that that is the plan. Right now, the technology is such that suppress the vector, remove the inoculum or infected plants and that's the only chance you have of surviving.

SENATOR GALGIANI: Okay. Thank you. Thank you very much to each of the panelists. I appreciate your time and effort in getting the research together and making your presentation to us today. Thank you.

And for our second panel: Developing solutions to combat ACP and HLB, we have Dr. MaryLou Poleck, Vice President of Science and Technology, Citrus Research Board; Dr. Mark Hoddle, Director for the Center for Invasive Species Research, at UC Riverside; and Dr. Georgios Vidalakis, Extension Specialist and Plant Pathologist and Director of the Citrus Clonal Protection Program at UC Riverside. Thank you very much. And welcome.

DR. MARYLOU POLEK: Thank you very much Senator Galgiani. Thank you for listening to us talk about the most devastating disease of citrus. It is a very serious problem and it's threatening the citrus industry. And thank you for listening to both the researchers and the industry, talking to you about what we are currently doing and taking it upon ourselves to protect our industry.

So I represent the Citrus Research Board. I am MaryLou Polek. And by training, I'm a plant pathologist. I was trained by the University of California system. My responsibility with the Citrus Research Board is to provide the oversight for our research program.

The California Research Board is a grower-funded program. We're a nonprofit but we were formed under a state marketing order, so we are quasi-governmental with oversight with from the CDFA Marketing Branch.

Our growers are assessed a box tax of field harvested fruit and that is what funds our industry. Every five years there is a referendum with the citrus growers as whether they want to continue support to the Citrus Research Board, and at the last referendum

we had 98 percent support, so I think the industry is satisfied with the job that we are doing.

So the mission of the Citrus Research Board is to ensure a sustainable California citrus industry for the benefit of growers by prioritizing, investing in, and promoting sound science.

So we have three overall major priorities:

One, of course is what we're talking about today, is invasive pests. And what we strive for is early detection, rapid response, and eradication and those methods that we can achieve eradication.

We also look at plant security. You'll hear testimony from Dr. Georgios Vidalakis, who is the Director of the Clonal Protection Program. That is a program that is funded by the citrus industry by the Citrus Research Board.

We also consider food safety issues. I'm sure you're aware of some of the problems with listeria in some of the packing houses, so we work towards finding solutions to that problem as well.

We are always very concerned with market access and maintaining open and free access to all markets and overcome any trade barriers. Sometimes that's with pesticide residue or with particular pathogens.

The NAVEK program deals with Septoria leaf spot and that was in response to a barrier put up by Korea for exports. And just recently, we've overcome the trade barrier with China with phytophthora root rot diseases.

Within the Citrus Research Board we have five different categories of research.

- One is production efficiency that deals with irrigation, fertigation, worker safety, labor saving devices.
- We also have a variety development and improvement program which is one of our core programs that deals with breeding and evaluation.
- Insect-vectored diseases—and Huanglongbing is part of this group—and these are the diseases that are vectored by insects and those are looked at a little bit differently than the non-insect vectored and post-harvest diseases. That includes all the packing house diseases like blue mold, green mold and the food safety issues.
- Lastly is the pest management which we also have a core program that deals with integrated pest management that looks at how to deal with our

endemic pests, but we also provide a great deal of research for exotic pests and for biological control. And you'll hear some of that by Dr. Mark Hoddle who we have funded for several years and he'll talk to you about his research.

In the testimony provided to you I did provide a graph just showing you the increase of our research budget. Just in 2008 and 2009 our research budget was $2.5 million and only 15 percent of that was devoted to ACP and HLB research. This current fiscal year, in 2014/2015, we now have a $5.5 million research budget. Sixty percent of that goes to ACP and HLB research. Over a million dollars of that is going towards early detection methodologies/technologies.

So in the Citrus Research Board role and in the war on ACP and HLB, one of our largest priorities is early detection. When we saw what happened in Florida when they first detected their first tree infected with citrus greening and started their delimitation, they found that the disease was already so widespread. Part of that is they were dependent upon visual symptoms in the tree and if you wait for visual symptoms in the tree, it's already too late because the psyllid vector is very efficient at finding trees that are infected, feeding on those trees and then going to a neighboring healthy tree and transferring the bacterium that causes the disease.

So we have been looking at not just one way, but several ways of detecting the disease much earlier. And this research has started, or was started, in about 2006/2007. So currently we are looking at testing these technologies in the field, validating them, evaluating them, and actually seeing their practicality for use in the field and how they would be implemented; whether it was something a grower can use; whether it's a diagnostic laboratory, it's not going to be one-size-that-fits-all.

So we look at detecting the pathogen indirectly and that is through a host plant response. When a plant is fed upon by an insect it causes a cascade of different reactions and many of them are metabolic, so we look for these unique changes to this particular pathogen. And we've been looking at volatile organic compounds, changes in a metabolic pathway, changes in protein production, and small RNAs. But we've also been looking directly, or to detect the pathogen directly, so one of that is by actually detecting the cell itself but also looking at proteins that the bacteria produces that then goes systemic within the plant. The bacteria itself tends to be aggregated within the plant; it's not evenly distributed. So as inspectors or collectors are collecting samples,

you know, sometimes it's a crap shoot as are you getting leaves that actually have the bacteria in them? So we're trying to, maybe, looking at proteins that the bacteria secretes that then go throughout the plant, that we increase the odds of actually detecting the pathogen, and that particular technology is looking very promising right now.

Commissioner Pelican, I would really like to say—and to add to Bob Wynn's testimony too—we are spending quite a bit of time and effort and money looking for organic alternatives or different products for the organic industry.

And I guess maybe at this point it would be a good time to do a little infomercial. I have brought issues of *Citrograph*. The two issues that I brought actually one gives an excellent summary of all of the early detection methods; the other issues is probably self-explanatory from the cover and that is the efforts that are being put into training dogs to be able to sniff out the disease. Other issues of the *Citrograph*—and this is where Commissioner Pelican and I would like to refer you to. There are two issues that summarize all of the products that have been tested for the organic industry. The problem is that there is very low residual effects from many of their organic products so they must be reapplied on a frequent basis.

Other aspects of vector management is also looking and evaluating, developing new chemistries for conventional control; better ways of application and actually timing, because it is more efficient and probably better for the environment if we can target certain times of the year to apply certain pesticides and not just do it on a calendar basis, so we're exploring that avenue as well.

And you will hear more from Dr. Mark Hoddle on the efforts on biological control. He will be talking about a parasitic insect, but we've also been looking at parasitic fungi that actually infect and it looks pretty ugly when you see a psyllid that is infected with the different fungal pathogens.

We appreciate all the federal support, as already been mentioned, about the NIFA funds and that is $125 million for five years. And also the MAC program with $20 million for two to three years. We very much are working with these groups, evaluating that research, and also looking at ways where we can—each of the groups whether it be a commodity group, the California Commodity Group or the Florida Commodity Group, and the federal groups to make sure that what we are funding is not a duplication and so

that all of these funds are being spent efficiently and targeted in products or solutions that will help the citrus industry on a national basis.

Also, national funds are from the National Clean Plant Network that helps to maintain the structural integrity of the Citrus Clonal Protection Program. And that program, you'll hear, is one that provides the citrus industry with disease free plant material to start the industry—the commercial industry and also even when you go to Lowe's or Home Depot and you buy a citrus tree for your backyard, all that material is from disease free sources.

California has been and continues to be proactive. The public outreach program that was mentioned earlier began in 2006 and it began with learning how to message. Huanglongbing was—another common name for it was "citrus greening," but in the state of California where we are very "go green," and green means environmentally safe, we had to, us scientists, had to change our messaging and so that's why we emphasize the name being called "HLB," so that homeowners and the public understand that this is a severe threat to citrus and it's not a good thing.

In 2005 I attended an international conference in Brazil and one of the strategies that they were using in Brazil was all of their nursery material was produced under insect proof screens. And when I returned to California and started talking at grower workshops and seminars—I was lucky that they didn't have a bucket of tomatoes or box of stones to throw at us. But today, all of their source material and their increase blocks are now under protected screen, and we're working towards having all of their production under screen. But that required a considerable input and investment from these nurserymen to build these structures, so another example of the industry taking it upon themselves to help themselves. And, these structures were built before the threat of greening. So in other words, we've only found that one tree. All this material has gone under screen before the disease has become endemic and that is different from what our friends in Florida had done.

You're going to hear from the Citrus Pest and Disease Prevention Program and I would just like to mention that the Citrus Research Board does partner with them. As we develop different strategies, different technologies we can then pass that on to this group for actual implementation in an operational program. One of those was mentioned earlier and that was the high risk survey.

So California, our goal is to search and destroy and remove trees and we're doing this by a risk based survey which is conducted statewide. You've heard about the psyllid management areas, so as we develop our research, it's being passed onto the organizers of these PMAs. Also, to the CDFA appointed Science Advisory Panel; they'll utilize this information as well to help the State come up with a good operational program. And so this disease cannot be, or the fight against this disease cannot be by one person—cannot be won by one group. It really is dependent upon partnerships and it is the partnership with USDA, CDFA, and both federal funding agencies and other state agencies to what… we learned from the mistakes in Florida. We are trying not to make them here in California.

So with that, I thank you for listening to my story.

SENATOR GALGIANI: Thank you very much. And our next presenter is Dr. Mark Hoddle, Director of the Center for Invasive Species Research at UC Riverside.

DR. MARK HODDLE: Good afternoon, Senator Galgiani, Dr. Megaro, and Ms. McCarthy. Thank you for the opportunity to present today on the work that we are doing at UC Riverside.

I was asked to present an overview of Asian citrus psyllid control efforts in California and to provide a brief resume of what the Center for Invasive Species Research does down at UC Riverside. Basically, the UC Center for Invasive Species Research we provide updates on new invasive threats that have come into California. We basically run a website which keeps everybody up to date and it's very rich with photographs, videos, blogs, that type of information. It's very public friendly. So we post pest profiles. They're all web available.

This gives me an opportunity to, I guess, bring to your attention the problem that we do have with invasive species in California. If you're not aware of this, prior to 1989, the State was acquiring six exotic insect species per year from 1989 to 2010. That has jumped to about an average of nine to ten per year, about a 50 percent increase. Asian citrus psyllid is just one of many problems that the State is dealing with right now. So I'm the director for the Center and I help coordinate these types of efforts against some of these invasive species problems.

So what is the problem with Asian citrus psyllid in California? We've heard a lot of discussion about ACP this morning but very little information has been provided about the biology of this insect so I'd like to quickly cover that now.

Asian citrus psyllid vectors, or it spreads, the bacterium and it's the bacterium which kills the tree. And it's this bacterium that lives in the phloem, or the food conducting tubes of the tree, eventually clogging them and causing all sorts of disease type symptoms in the tree. Once those disease symptoms appear, the tree is considered to be infected, obviously, and the disease is known as Huanglongbing. So you can think of these psyllids, which have wings, as flying syringes. They're small insects about the size of an aphid, but they have a mouth part that's like a needle, which essentially acts like an injection. So these psyllids have bodies full of bacteria. The bacterium multiplies in their bodies. They can acquire these bacteria when feed on infected trees. The immature stages of the psyllid don't have wings. They can't fly from tree to tree. So if the mother lays eggs on an infected tree, those nymphs, when they feed on that tree by sucking the juice out of it, they will acquire the bacteria. They will develop wings when they become adults, and they will fly onto trees and spread the bacterium that way.

So HLB is present in California. You heard Mr. Wynn talk about the Hacienda Heights find. I think it would be prescient to say at this stage, that it's likely there are more HLB infected trees in California; we just haven't found them yet and that's part of the research effort for this early detection. Once the tree has visual symptoms it's too late—it's dead. Trees die within about five to eight years according to research out of Florida post-infection but by the time you see those visual symptoms, psyllids may already have fed on those infected trees, acquired the bacteria, and they will have spread it. So these new technologies for early detection are very important in trying to manage HLB at this initial stage.

So the control measures that have been targeting Asian citrus psyllid in California, there have been several initiatives taken against this pest. They're all aimed at controlling or reducing psyllid numbers. And as you have heard, if you reduce the numbers of psyllids, there are fewer of them to acquire the bacteria that means there are going to be fewer of them flying around the state from tree to tree. That should lower the rate of spread of the disease. So those are really the overriding goals of the management project—to drop psyllid numbers to lower levels than they currently are.

So one of the control measures that have been implemented—you've heard about this—have been pesticides for controlling Asian citrus psyllid. They've been very important tools for suppressing past numbers in urban areas.

There are some statistics that are sobering to indicate why this is not a sustainable program. There was a spray program that was running in the greater L.A. area. I think it was abandoned in early 2012/2013. If Helene's still here she might be able to verify when those termination dates were. The program cost about $4.7 million to run; about 47,000 properties were treated with these pesticides. They had infected citrus trees in them. That sounds like a lot. It is a lot of properties. But that represented about 6 percent of the urban area that needed to be treated. So some estimates have suggested that there is more citrus growing in residential areas than all of the commercial zones combined in one area so that's a lot of trees that need to be treated.

So these pesticide options for organic growers, if you have heard, are very poor at this stage. We have evaluated a lot of registered pesticides for the control of ACP. These organic products have very low efficacy. We've also trialed emerging products that have not yet reached the use in California. They do not appear to be very promising as well.

So this puts us into a situation where the conventional pesticides that we are now using, we run the risk of the psyllid developing resistance to these chemicals and that has already started to develop in Florida. So that's another lesson we need to learn from Florida. Is that the conventional pesticides need to be managed wisely or else we will have resistance issues.

So this brings me to the section that I've been mainly responsible for and that's the biological control effort targeting Asian citrus psyllid and our work is focused in the Punjab of Pakistan. I've been working there for about two and a half years now. We visited the Punjab six times, working there anywhere from weeks to a month at a time looking for natural enemies that attack Asian citrus psyllid in that part of the world. The reason we chose Punjab is that it's thought to be part of the native range of Asian citrus psyllid. The Indian subcontinent is thought to be where this insect evolved. It has subsequently spread from there as people have moved citrus plants or citrus relatives around, and the psyllid and the disease have hitchhiked on those plants.

The other good thing about Punjab is that the climate is a very good match with California. It's about a 70 percent similarity. So natural enemies that we import from Pakistan, we want them to be well adapted or pre-adapted to the prevailing climatic conditions in California.

So as Mr. Wynn indicated, we have imported two species of primary parasite that attack the nymphs of Asian citrus psyllid. These were taken into quarantine at UC Riverside. We can't automatically release these parasites. We have to go through a very strict safety testing process. This takes about 18 months to complete. We expose non-target species to these parasites. And the purpose of this work is to ensure that the parasites will not cause any undue environmental damage to California. Once we have completed that work, we pass it onto the USDA for review and we have been issued a release permit for one parasite—Tamarixia radiata. It's widespread in Florida. It was not present in California when we started this project. The CDFA, who partnered with us along with the USDA, have managed to mass rear and release about 800,000 of these parasites now. They are well established in parts of Southern California. They can provide up to 60 to 95 percent suppression of Asian citrus psyllid, so that can be substantial at certain times of the year and it's really the best control option that we have for backyards right now.

The second parasite, diaphorencyrtus aligarhensis, the safety testing for that parasite was finished a year ago. The USDA issued on the 27th of October, a finding of no significant impact and the release permit is with the CDFA now and I received an email that that's being expedited. So we hope to be able to release a second parasitoid against Asian citrus psyllid within the next couple of months at the latest.

So that's the summary of the biological control program. And I'd like to turn now to summarize some new work that's been coming out on the use of odors to attract Asian citrus psyllid or possibly be used as repellant for Asian citrus psyllid.

As you have heard, the yellow panel trap, or the yellow sticky traps, are not particularly effective at luring in large numbers of Asian citrus psyllid. They respond to a variety of stimuli in the environment. These were obviously visual cues. And they also respond to odors.

So some work that has been recently published out of UC Riverside by Anan [Anandasankar] Ray indicates that there are some odors that are released by citrus that Asian citrus psyllid finds quite attractive. These have been identified and they may have some immunity to be incorporated into these traps and we could increase the sensitivity of these traps but they're not going to be as sensitive as pheromone traps for monitoring moths or other invasive insect pests that rely on, you know, host specific chemical cues that are released.

So in conclusion, I would like to say that ACP and the HLB combination is going to be extremely disruptive to the California citrus industry. An economic analysis published by Florida indicates what may be in store for us if we don't get onto this problem early. We're already on it early but we need to keep up the effort.

And I would like to share with you some statistics that the Florida Economic study has published about two years ago:

- The Florida industry is worth about $9 billion per year.
- Production costs have increased by over 49 percent.
- And now HLB is widespread throughout the state.
- More than 6,000 people have lost their jobs because the industry has been contracting due to the death of the citrus trees.
- Annual losses are estimated at approximately $300 million per year.
- And more than 50 percent of the 600,000 acres of commercial citrus in Florida have HLB now. It's probably closer to 100 percent, but that's the estimate right now.
- Some folks have suggested that if nothing is done in Florida that provides a solution their industry may have less than 10 years to go before it's commercially unviable.

So, massive efforts underway in California to develop those management plans, you've heard about those from the CDFA and the Citrus Research Board. This has been a highly collaborative effort amongst all these agencies. And I'm pleased to say that I think we're doing a very good job with the resources that we have and the amount of interagency collaboration that we have.

So that's it.

SENATOR GALGIANI: Thank you. That's very promising. I had no idea of the collaboration on work that's done with researchers in other countries to identify parasites that can attack the psyllid or any other pest.

DR. HODDLE: Right. So a lot of the work we do on invasive species is done overseas. Those pests originate from other countries, so part of my job is to go back to those countries and look for those natural enemies to bring back to California.

SENATOR GALGIANI: That's fascinating. Thank you very much. Very informative.

And next we have Dr. Georgios Vidalakis, Extension Specialist and Plant Pathologist, Director of Citrus Clonal Protection Program at UC Riverside.

Thank you.

DR. GEORGIOS VIDALAKIS: Thank you. Thank you for the invitation, Madam Senator. I was invited here today to give you an overview of the Citrus Clonal Protection Program and to discuss with you current research and methods to improve HLB detection and close with future progress and research for solutions towards ACP and HLB eradication.

The Citrus Clonal Protection Program is the first program of its kind in the world. It was based on the original discovery from Dr. Fawcett in 1930 at the citrus experiment station at UC Riverside that if a tree, if a citrus tree is infected—but back then the biggest problems was a disease called citrus psorosis disease—if a tree had the psorosis disease and you propagate more trees from that tree, if you use that tree as your source to propagate more trees, the progeny trees will also have the disease.

So talking about collaboration, back then the state of California, USDA, various researchers in the industry, primarily growers and national industry came together and they established the Psorosis Freedom Program, which, back then, the available technology was to visually inspect trees for symptoms of the disease and exclude them as sources for propagating material. Based on that principle and that idea, the Citrus Clonal Protection Program today is responsible for the introduction of citrus propagating material from around the world into the United States through a program that includes therapeutics and diagnostics to ensure that the source trees that we are using as a nursery industry and as growers, do not have any graph transmittable diseases or diseases in general that can harm our industry.

The process takes roughly 24 months so we need to be proactive and make sure that we have material similarly to the insects. There is material, citrus material, that's growing in Asian countries—where it's the origin of citrus—and may contain pools of resistance, genetic resistance, to the disease. In addition, Florida's breeding programs were decimated by the disease, but at the same time, those evaluation plots the breeders had in Florida, they would have what they called "tree survivors," which meant that that tree standing there that survived the infestation infection maybe is promising as a pool of resistance against the disease.

So you've already heard the term "MAC," they used the program and we also heard about the research from the CRB, both those agencies are supporting, currently, the CCPP, the Citrus Clonal Protection Program, to introduce those varieties right now before we have an outbreak of the disease and have material available for breeders, researchers, and the industry down the line.

The comment you've heard from Dr. Polek about the citrus nurseries, it's very, very critical. Our friends in Brazil and in Florida really told us either you make the citrus nursery part of the solution or part of the problem that's called HLB. So you make sure that your nurseries move inside protective structures before the psyllid arrives in the state and before the disease is spread. And that's what happened in 2010 when the bug—up to then, the citrus nursery, what we call the "registration program," was a voluntary program. But, by law in May of 2010, the program became mandatory. For anybody that propagates trees in the state of California has to follow those mandatory rules. And one of the basic rules is that the material that they're using to propagate trees has to be originated from the Citrus Clonal Protection Program.

Programs like CCPP operate at the exclusion level. The three basic principles in plant pathology is: exclusion, eradication, and management. You keep a disease a problem away; you don't have to worry about it. If it moves in, you need to detect early and move to swift eradication. And if disease or a problem establishes itself, you have to manage it and live with it. And as you move from exclusion to eradication to management, the cost of those programs is exponentially different. We invest right now a little bit less than half a million dollars a year for the CCPP. You've heard already the millions of dollars spent annually for eradication which we are now. And it's guaranteed based on what we see in Brazil and Florida, that living with the disease, managing the disease is going to be an even greater investment. So those kinds of programs that we exclude the problem before establish are very, very valuable and they have a high cost benefit type of return.

And in addition, I mentioned to you that the basic program basically was in place since the 1950s. It was revamped in the 1950s after more discoveries, and those programs are on. When the faucet is on, they move forward and they are there and they are present. And HLB is already there now, but in Florida it went south; the industry went downhill very fast because they were hammered for years and years because of citrus canker and they were weakened by that disease and that's why HLB had those

devastated effects. We don't have citrus canker in California. Similarly, the industries in Brazil are hammered by diseases like citrus variegated chlorosis, or citrus leprosis. So programs like the Citrus Clonal Protection Program makes sure that not only HLB but all these other diseases that they may, you know, synergistically have an effect to the industry stay away.

Finally, the Citrus Clonal Protection Program, it will be the platform to distribute any kind of new technology in terms of resistance down the line. We cannot just go, when the breeder develops a resistant variety tomorrow morning, you cannot just start propagating trees from that variety because we may start distributing another pathogen or create another problem. So with the CCPP, we make sure whatever genetic material is developed against the disease is distributed properly and safely. We distribute roughly 35,000 buds a year, which is the eye that the tree can be developed from. And talking to nurseries they can produce 200 trees from each of the CCPP buds a year, which makes it really quickly, you know, within a couple of years you have millions and millions of trees produced by a single bud that the CCPP developed.

And with that, I will close on the item of the Citrus Clonal Protection Program and move onto the research methods for improved HLB detection. Dr. Polek gave you a nice overview of the different approaches that we're taking. And again, if we have to classify them, we have the pathogen, we have the host. We are looking at the pathogen either directly, detecting the pathogen from its molecular signature, looking for its DNA for example, or from its protein signature, looking for secreted proteins, as Dr. Polek mentioned. We're also looking at the host responses which also are layered at the molecular level. There is a lot of signaling of RNA that takes place in the plant when it's infected with a disease or if it's infested with an insect. So we're looking at the molecular responses. We're looking at the protein or metabolic responses and all the signals that the plant is exchanging in the environment, like the volatile compounds.

That summarize, I don't want to become very technical. But basically, any avenue and any idea at this point of time of the pathosystem is under investigation. And the sampling, as Dr. Polek mentioned, is very, very important. We're looking at branches, at leaves, at roots, everything is on the table in terms of diagnostics and early diagnostics are a key for any successful program.

In terms of the research solution for eradication or management of the disease; we can classify them in three areas: we have the short term, medium term, and long term.

Short term is basically what we're discussing in this room today. Survey for the insect, treatments for the insect, early detection and eradication of the disease. We know that we cannot—humans cannot beat insects, period. I mean, they are so well adapted and so, evolutionary speaking, they have the advantage. So these kind of short term solutions, they are not sustainable. You've heard already from Dr. Mark Hoddle about resistance in insecticides and not having a perfect trap and so on and so on. So these short term solutions are just buying us time so we can develop technologies to move forward.

In terms of medium term solutions, again, all the ideas are on the table. Right now, a researcher that started his career at the University of California Riverside, Dr. Bill Dawson, he's using another pathogen that demonstrated the citrus industry in the 1930s, between the 1930s to the 1960s killed 60 million trees worldwide. The citrus tristeza virus. And he has managed to convert this virus to our ally against HLB. So he has this virus and he has developed the technology to incorporate inside the virus genome antimicrobial peptides and this virus lives exactly where the HLB bacterium lives, lives in the phloem. While the virus is there replicating and doing its business, it doesn't have the capacity to kill the tree because we have developed technologies that they are resistant—citrus trees are resistant to this virus. But at the same time, it is producing natural compounds that they are combating the bacteria. So this is a technology that they can take as—it can be a bridge between short term and long term solutions, because a long term solution for development of resistance may take 20, 30 years and we don't have that time. So if you have a mature tree living in the field, you can introduce that virus that is not going to harm the tree and that virus can compete with the bacterium and take care of it while you're developing your long term strategies.

Similarly, there is a research effort to start the entophytic organism of citrus. Citrus is not sterile. There is fungi, bacteria, viruses, viroids leaving into the citrus system that they're not harmful to the citrus but using the principal idea of the tristeza virus maybe we can use to our advantage to compete with the disease.

So these are a few of the ideas and research going on in terms of medium term solution in addition to training of canines and developing new diagnostic technologies, either molecular or cellular logical, and so on.

The silver bullet, or the Holy Grail, for any disease is management, is development of tolerance or resistance. And because of the nature of the citrus tree, we cannot

develop fast enough crosses to breed the resistance into the citrus. You need to wait five to seven years to get the flower, and the tree, and then a set of fruit, and then get the seeds from that fruit and plant them and wait another seven years to evaluate the tree. If it's resistant, then collect its seeds and its progeny and make your crosses and keep moving and moving. Just to complete three generations of citrus breeding, you need 20 years. So that doesn't mean that it's not ongoing. People are working on that. It's just going to take time. And there is no question that modern genomic technologies, that we can go and modify the citrus genome to our advantage and against the disease will be a major player against this battle.

And when I talk to the public I use the analogy of electricity. So electricity is a great thing, you know. It keeps—helps our kids study at night; and keeps hospitals running to keep people healthy. But if you take your tweezers and you plug it in the socket, you're going to fry yourself, right? So technologies themselves are not a bad thing; it's how we use them. And there is no question that based on long experience now with using genome editing, basically, that we can use this technology carefully and properly to find solutions to this problem. There is currently at least two that I'm aware—two lines of citrus in Florida in field trials that they're expressing antimicrobial peptides that are produced naturally from other plants; from peanuts or other hosts and they're looking very, very promising.

So in terms of technology and for researchers to provide long term solutions in terms of resistance intolerance, we have the tools; we can do it. I think the battlefield will be in public education and explain, you know, how to use these technologies to our advantage. And researchers are doing their best to make sure that the, you know, any foreign expressed genes or peptides from peanuts and so on, they don't move to the fruit. They're restricted only to the root stock of the tree and so on. So the technology will be easily accepted and put in use. But no question that this kind of technology, including classical breeding and if we call it "accelerated breeding" with genomic technologies, it's a long term process. It's going to take decades, and in the meanwhile, we need to utilize all these other tools: exclusion with programs like CCPP; surveys, early detection and eradication, with all this effort you have here today for meeting term solutions and to buy us time so we can invest and find a long term solution for the problem.

Thank you for your attention.

SENATOR GALGIANI: Thank you. Thank you very much to all of the panelists. And also with us today, we have Victor Francovich, who is the consultant to the Chair of the Agricultural Committee in the Assembly, Susan Eggman. Welcome Victor, and thank you for joining us.

Our third and final panel includes: Joel Nelsen, President of California Citrus Mutual; Nick Hill, Vice President of the Green Leaf Farms, and Chairman of California Citrus Pest and Disease Prevention Committee; and Michael Frantz, Co-Owner of Frantz Wholesale Nursery. Welcome. And thank you.

MR. JOEL NELSEN: Thank you, Madam Chair. I want to thank you for the opportunity to discuss the California citrus industry's response to one of the most insidious diseases to affect the commodity vectored by one of the most challenging bugs that we have witnessed California, and I would argue across the nation. The Asian citrus psyllid is the challenge; Huanglongbing is the disease as you have heard.

In January of 2010 a new law was chaptered, one supported by the Chair, which allowed the industry to organize itself into a coordinated body for defending 285,000 acres of California citrus, as well as millions of trees in backyards and parks throughout California.

Actually, the battle was joined in the fall of 2009 as the urgency legislation was signed a scant eight months after it was introduced. All this came about after many growers and members of Citrus Mutual and our industry travelled to Florida and witnessed the catastrophe that was unfolding. As I speak before you today, Florida acknowledges that over 250,000 acres have been bulldozed because of the disease. Brazil admits to removing over 20 million citrus trees. Both of them acknowledge that there is more to come. Texas is in a losing battle to protect their small industry. Mexico has Huanglongbing in every citrus producing state and it's spreading like wildfire. There's no known cure and as you've just heard, there's none on the horizon.

The 3,900 citrus growers in California supply our nation with 85 percent of its fresh citrus supply. We are a $2.4 billion commodity employing approximately 12,000 people, most of which are year-round employees. There is at least another billion dollar ripple effect and another 10,000 people dependent upon our industry for their job. We provide close to $700 million to the general fund via personal and business income taxes, fees, permits, and other revenue streams.

When we, the industry, travelled to Florida and witnessed the devastation, we knew we needed to learn lessons of what not to do. And one of the lessons we learned was not waiting for others to act. The industry put forth the legislation and without a grower vote, agreed that a $15 million program should be initiated that could leverage partnerships from others. Three years later—if I might add—our Secretary of Agriculture was obligated to ascertain the level of grower support for this program.

During the summer of 2013, a comment period was opened, grower meetings were held, and not one negative comment was received. The Secretary determined that a grower vote was not necessary and not one protest was received as a result of that decision. The industry is united in this effort.

Our $15 million per annum contribution to this program has been augmented by a USDA allocation of somewhere in the neighborhood of $9- to $11 million. For four years the partnership of USDA, the California Department of Food and Ag and industry have spent $100 million to find the Asian citrus psyllid and Huanglongbing before it finds our backyard trees and our commercial citrus industry.

The detections in Santa Clara and San Joaquin Counties were disappointing but they're not a setback. On Wednesday, our industry advisory committee authorized a million dollar program augmentation to ascertain the level of Asian citrus psyllid population and eradicate that bug before it becomes an endemic population.

No tree, no variety, and no area are immune from the ravages of this disease. And once you see the symptoms, as you've heard, the tree is dying; the fruit is not viable.

The bulk of our citrus production is in the lower San Joaquin Valley but Ventura is vibrant with the lemon industry. Riverside, where the birth of the California citrus industry began, and Imperial County remain vital to year-round citrus production. California leads the nation—and we're proud of it—in the production of navel oranges, lemons, and these exciting new varieties of mandarin fruit. We have 30,000 acres of summer or Valencia oranges, and our grapefruit tonnage is growing because of Texas' and Florida's demise.

The California citrus industry has spearheaded something that no other industry has been able to accomplish relative to HLB and the Asian citrus psyllid. We're not waiting for devastation to occur—as I stated earlier—we're not waiting for government to fund; we're not allowing others to dictate what must be done. There are three equal partners in this effort and together we've slowed the spread of the psyllid.

Historically, approximately five years after an endemic population has been identified, Huanglongbing is discovered usually in several locations but not in California, at least not yet. We're funding, we're detecting, we're educating, we're researching, and we're leading, and we're communicating. We've been asked to attend a citrus conference in Australia this next March, to relate to that industry and that government how and why our program appears to be working. They want to use our roadmap. On the opposite side, we've hosted several industry and government representatives from other citrus production areas and several countries as they sought to model a program after ours.

This unparalleled battle is designed to buy time so that research can find a cure, find a beneficial insect, find a lure and/or find a systematic approach to protect our iconic industry.

Madam Chair, do you realize we were the first commercially viable, permanent crop in California? We were the first industry that partnered with the University of California to put together a field research station. We were the first industry to transition to low volume irrigation. There's a lot of firsts that I could speak to but you get the idea.

There is no alternative presently other than to sustain the battle and educate all of the citizens as to the importance of victory. We need victory to save the trees in the backyards. We need victory to save the industry. We need a victory to save the nation's fresh domestic citrus supply.

The U.S. Department of Agriculture and Secretary Vilsack have repeatedly stated that the Citrus Health Response Program, or CHRP as we call it, is one of the top five priorities in his department. In January of 2015, our industry committee chair, Nick Hill and myself will travel to Washington and join colleagues from Florida and Texas to review progress, adjust strategies, and recommit to educating Congress about the need to sustain the federal program. The industry is committed to sustaining the State program as well. It's incumbent upon the state legislature to follow the lead you and others four years ago laid out. Allow the industry to lead the effort to protect itself and maintain California's wonderful and historic image. Like the Golden Gate Bridge, cable cars, our beaches and our redwoods, California citrus, it's 140 years old. It's one of the iconic images of this state. Our first tree was planted in Riverside, California and still exists.

Thank you for your time and attention.

SENATOR GALGIANI: Thank you. Thank you very much. And welcome to our second presenter.

MR. NICK HILL: That would be me. I'm the ultimate stakeholder. I'm the ultimate cooperator. I'm a citrus grower. I'm also the chairman of the California Citrus Pest and Disease Prevention Committee. I don't wear a suit. My office is a pickup. I had a find of an Asian citrus psyllid less than half a mile one of my properties. I'm in a full quarantine. I follow all the rules that my committee set out and the process is working. I have to spray every time I move. I have a certain amount of time I have to do that in.

I'm going to go over today a little about what my committee does and in an effort not to try to beat a horse into the ground after all this information that's been given out today, but give a little logistics on what we do. My committee is made up of 16 members, all of them growers, packers, and nurserymen. They're from the desert regions, the coastal areas, and from the Central Valley. The one commitment we have is to try to stop ACP. By stopping ACP to never let the HLB bacterium get established within the state of California.

Joel and others have talked about what it means to this country what's happened in Florida, what's happening in Texas, what's happening in China, what's happening in South Africa, what's happening most of the places in South America. We don't want that to happen.

So the committee was formed. We met monthly. We tried to get our arms around what it meant to suppress within Southern California. We soon found after a couple of years that that's suppression was not working as well as we thought. The psyllid was breeding faster than we could suppress. So we went out and we made quarantine areas. We made buffer areas to try to contain the psyllid and I think we've done a pretty good job. Some people have stated today that we have slowed the psyllid spread. We don't have any HLB as in the one find in Hacienda Heights.

The one thing that my committee has been is flexible. We started out with set quarantine zones of 20 miles. We found that those were untenable. We worked with CDFA; we worked with the USDA; we work with CCM, CRB, where this is all a partnership to try to make a more reliable and doable system of quarantines. We did that.

We found that having to brush the fruit, remove all stems and leaves from picking from a field was causing extreme damage to the fruit, adding cost to the grower and also

were not getting full compliance so we went to a spray-and-move program. Once again partnering up with CCM, CRB, the USDA to try to figure out a good program so that growers could follow something. Now the compliance of spray-and-move is, I'd say, 100 percent. We have to have these flexibilities within the industry to make sure that growers are compliant in what they do.

I brought a couple of things today. We have a spreadsheet here dealing with our CHRP funding, the USDA funding. On the other side is dealing with the funding that the growers assess themselves.

This is a $15 million program that the growers have put up. Another $9.6 million from USDA that my committee is in charge of. Our charge is to give recommendations to the Secretary of Ag on how to develop protocols for applications and surveying, detection, and education and that's what we've done for the last five years.

We've put out an educational program that has gone into the urban areas into radio, TV, into areas of Hispanic cultures, Asian cultures, to try to inform them on what they need to look for in the way of citrus psyllid. We have had a massive outreach to growers to try to educate them on what we're doing in the field so that they understand what their money is being spent for. We've done outreach to local governments, to cities. I've met in front of city councils. I've given programs in front of water districts. I've gone anywhere I needed to go to try to get the word out. And that program I working. We are in the process of trying to get … well, let me back up. Any time you look at any magazine, any time you look at any radio spots, it's reaching so many different people and we're finding now the education is becoming endemic with people. So I'm very proud of the fact that the education has worked both in urban and with the growers. That program has been ongoing.

The other thing that we've been facing is detection and how to develop early detection. At the last meeting we had on Wednesday we went ahead and funded detection programs that are going to go into a living laboratory in Texas, which I mean, groves. They're going to use some of these early detection devices to see how well they work. We're very, very hopeful that these detections will figure out a way to find the disease before it becomes symptomatic on the trees.

Some of our treatment programs, like I said earlier, run in the urban areas up to a couple of million dollars. High risk assessment that we're doing, it's called the Gottwald Study, that runs a couple of million dollars. All these things is to try to detect the

disease before it gets to us. All these things to try to predict where the disease will first show up.

I don't have anything else much to say other than I'm committed. I can't pull my trees up and move someplace else. So I'm committed to stay in the state. I'm committed to fight. My company is all in along with every other grower in this state.

As Joel has stated, we had a referendum. There was no opposition. We didn't even go to a vote. The growers are behind us. CDFA who administrates the program has been working closely with us to regulate and administrate. USDA has been a great partner and so has CCM and CRB. All of us working together is what's going to keep this thing down and beat it eventually as soon as the cure is found.

Thank you.

SENATOR GALGIANI: Thank you very much. I had one other question and that was dealing with the organic growers. What has been the response from the organic growers and how the practices that have been implemented to come in and test and spray and so forth?

MR. NESLEN: They've been frustrated. I think we're all frustrated. There's a multitude of application programs taking place: the quarantines; the added costs. But frankly, when you sit down and talk with them, they know they have an obligation to be part of the industry and address the advancing bug and stop the disease from being introduced into California. They understand the role. They know that there's an effort to achieve a viable, organic approach to the program. And our industry is not a small organic industry. There's several million packages of fruit that are produced every year. But up to now, those members of the industry have been extremely cooperative in moving forward with the programs and protocols as defined by the industry committee, CDFA, and USDA.

SENATOR GALGIANI: Thank you very much.

MR. HILL: On my board, we have the CEO of the largest packing of organic fruit and grower. His voice is heard. We have sat down with the organic contingents, so we're trying to work with them to find the best way. But Joel is correct; ultimately they know if they have to spray they're going to spray. But we're going to come up with every possibility to allow them to continue to be organic as long as it's viable.

The problem with the psyllid as you've heard, is that it's a multi-generational throughout the year. It could be eight to eleven generations so the organic compounds

don't knock down as well as they have to and regenerate back pretty quickly. But things like area-wide management zones where we spray one large area will help suppress those psyllids and will help the organic growers in their process by the time they spray and monitor. So it's important to us that we hear the voice of the organic grower and we listen to what they're trying to say.

SENATOR GALGIANI: Thank you very much. So I appreciate your testimony and your comments and answers to the questions. And now we'll go ahead an open it up for public comment.

I'm sorry. I'm sorry. Mr. Frantz, co-owner of Frantz Wholesale Nursery.

MR. MICHAEL FRANTZ: I sat out of order so it's my fault. I also lost my voice just prior to beginning my presentation so hopefully I can croak my way through this.

Thank you for the opportunity to speak today on this important topic. My name is Michael Frantz and my brother and I own and operate Frantz Wholesale Nursery in Hickman here in Stanislaus County. My parents started our family farm in 1978 on an acre and a half and we have grown to over 400 acres with 150 employees. We feel blessed to have had the opportunity to build a successful family farming business.

From 2008 to 2012 we did not feel so blessed. Our top line was down by half and our bottom line had eviscerated. We lost money every year in a row for four years. We needed to diversify and citrus was one area that we identified as an opportunity.

I'm a relative newcomer to the citrus market so I will only speak briefly today. My family has had the advantage of starting a new venture after this ACP and HLB bug and disease had been identified. The more we learned about HLB the more it became obvious to us that if we were going to get into the citrus business it would have to be inside of a structure that was designed and constructed in such a way that the bug would never have the chance to come in contact with our product. So in 2012 after extensive consultation with USDA, CDFA, and our local ag commissioner's staff we broke ground on our screen house and that is what we call a large enclosed building that is basically a giant sheet of plastic with small minute holes in it. The size of the holes is mandated by USDA and they are small enough that the bug cannot pass through, yet large enough that the plants inside can breathe. Our screen house is one continuous building that would cover almost eight football fields, nearly half a million square feet. We were confident that this was the right way for our family to enter into this new market.

The over $2 billion commercial citrus industry in America has been devastated by the presence of HLB, as you've already heard. The nursery industry recognizes that we must do our part to protect this vital industry and we are committed to doing so.

We have collectively spent well over $200 million in measures such as outlined previously, building structures and establishing tracking mechanisms to verify that the plants that we bring to the retail marketplace are indeed clean of both the ACP bug and the HLB disease. Every plant that we sell, we meaning our family farm, has a unique barcoded serial number on the plant providing us with the ability to trace back all of our plants to the clean mother plants that you heard previously discussed in the previous testimony.

This is a very challenging time not only for the nursery and citrus industry but also for the regulatory community as well. I would like to complement those here today from the USDA, CDFA, and of course the locals that we see so regularly on our family farm. Their guidance and cooperation as we've collectively moved through this challenging time has been invaluable. I would like to particularly commend my local ag commissioner, Mr. Milton O'Hare who has worked tirelessly to provide us with a way to pre-certify our house even before the quarantine arrived. This flexibility to the needs of industry is the only way that we are going to be successful in eradicating this bug.

Senator Galgiani, while I understand that much of the funding comes through USDA, I would urge you to continue to fund these agencies to the best of your ability. Local support, state level support, pest exclusion at the borders, and a continued PR campaign letting consumers know that it is absolutely safe to buy and plant citrus in their yards, this all takes money.

I believe that we are at the start of a long fight and I'm convinced that if we all do our part we will be successful. My company is all in and I know that my industry colleagues are as well.

That concludes my remarks.

SENATOR GALGIANI: Thank you very much. And one final question. What has been the financial impact to growers in quarantined areas?

MR. HILL: Probably with spray management, $70- to $80 an acre up to this point per year which is not insignificant. Plus the assessment for the program.

MR. NELSEN: That's not counting the assessment for the program which is at eight cents per box depending on your production.

MR. FRANTZ: And the nursery industry has put considerable money in areas such as up here that is not yet quarantined. We're preemptively—our family farm has put in over a million dollars just into this structure and then we're putting substantial annual commitments towards ongoing protocols and administering the protocols that are in place to make sure that we're able to keep track of the plants and trace back regularly. So it's a phenomenal expense for the nursery industry as well even though the quarantine isn't here yet and so for those of us who are not yet quarantined.

SENATOR GALGIANI: Thank you. Okay. We appreciate your presentations. And we will now go ahead and open it up for public comment. And know of one individual who wanted to make a presentation and ask some questions. Is there anyone else that would want to participate during public comment period? Is Don Dillon still here? You can go ahead and approach the podium here. Thank you.

MR. DON DILLON: Hello. I was invited by Michael Frantz to come and say a few words and it's almost lunch time so I'll make it brief. But this group has covered the issue very well.

I'm Don Dillon from Four Winds Growers. We're a fourth generation citrus nursery in California and have been involved for quite a few years with the Clean Stock Program and that kind of thing. Actually, Senator, you may recall in 2009 that you voted for SB 140 that was the regulation that required us to go under screen with our production material—propagated material—like they're saying, a preemptive action to prior to the disease getting here which is very important. So I spent way too much time with a lot of people in this room the past five or six years but it's great. There really is a huge cooperation between the growers and groups: CRB, USDA, CDFA, and the researchers, so there is a lot of effort being put toward this problem. It's a difficult one but we're doing what we can to keep the disease out as much as possible.

SENATOR GALGIANI: Thank you very much. Appreciate that. With that, anyone else wish to make any comments?

Okay. With that, our hearing will be concluded. Thank you very, very much to the presenters. And thank you to everyone else who is here in attendance. It's important that we continue to communicate and share the information amongst industry, individuals, as well as the public, so I appreciate your participation here today. Thank you.

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