California Invasive Species Advisory Committee (CISAC)
Invasive Shot Hole Borer (ISHB) Subcommittee
December 22, 2022 Meeting Minutes

CISAC Subcommittee Members:

Ricky Lara	Bea Nobua-Behrman	Martha Volkoff
Shannon Lynch	Tom Smith	

CISAC Members Absent:

Tim Crothers	David Haviland	Steve Schoenig
Gina Darin	Stacy Hishinuma	Katie Sutherland-Ashley
Tom Getts	Brent Johnson	Koren Widdel
Ted Grosholz	Vicki Kramer	Helene Wright
John Hackett	Lori Nezhura	

Guests:

Claire Aicken	Akif Eskalen	Kelly Parkins
Nina Alvarado	Jim Farrar	Adrian Poloni
Jonathan Babineau	Carol Hicks	Paul Rugman-Jones
Bonnie Brown	Karen Jetter	Chris Shogren
Elizabeth Brusati	John Kabashima	Stephanie Stark
Rachel Burnap	Carol Kreger	Tracey Takeuchi
Loree Bryer	Karen Lowerison	Rudy Valencia
Faith Campbell	Randall Oliver	Ellen Walton
Travis Elder		

Opening
The meeting of the California Invasive Species Advisory Committee (CISAC) Invasive Shot Hole Borer (ISHB) Subcommittee was called to order at 3:00 p.m. on December 22, 2022 at the California Department of Food and Agriculture (CDFA) conference room 220.

Chair Martha Volkoff welcomed committee members, guests and staff.

Public Comments
There were no public comments.

SUBCOMMITTEE BUSINESS
David Pegos explained that ISHB funds were available to be spent between March 2023 and March 2024. Representatives of previously-funded and currently existing projects will present to the Committee and offer recommendations. Jim Farrar's report and the list of recommendations will be sent for CISAC approval at the next CISAC ISHB Subcommittee meeting on January 10, 2023 and the main Committee meeting January 24, 2023.

Jim explained that the University of California Integrated Pest Management (UC-IPM) Program managed seven research subawards and several trapping, survey or communication subawards. This included:

- An exploration of biological control agents for two shot hole borer species, **Richard Stouthamer**
- The best way to deploy traps for ISHB surveys, **Richard Stouthamer**
- How long ISHB survive in green waste piles, **Tim Paine**
- Epidemiology of *Fusarium dieback* disease carried by ISHB, **Akif Eskalen**
- Biological control of *Fusarium dieback*, **Akif Eskalen**
- *Integrated Pest Management Techniques for ISHB management,* **Beatriz Nobua-Behrman**
- Economic impact of ISHB and *Fusarium dieback*, **Karen Jetter**
- Trapping agreements with many California counties through County Ag Commissioners (CAC), or with Cooperative Extension or community colleges
- A mapping database showing ISHB discoveries
- Outreach of invasive species nature and spread

Paul Rugman-Jones explained that Richard Stouthammer's project looked at three variables: trap size, direction traps were facing and trap height above ground. It was discovered that trap size had an effect on detection rate in high-density infestation areas, but no effect in low-density infestation areas. Trap orientation and trap height above waist-height saw no improvement.

Paul stated that three Taiwanese biological control agents were identified. Spring and fall were identified as the best time to release the parasitoids. But issues have arisen breeding these agents in UC labs. They wish to look elsewhere for additional biocontrol candidates in northern Thailand and Okinawa, Japan. He estimated this required $380,000 in funding.

Bea Nobua-Behrman stated that Tim Paine's project was to see how effective green waste processing was for sanitizing infected material. They found that firewood from infested logs will spread the ISHB. Chipping, especially at smaller than two-inch chips, is effective at killing the beetle, as is solarization in summer at 95 to 105 degrees Fahrenheit. They tested composting of four different types of logs, after they were unable to partner with a larger composting company. They discovered that composting may delay emergence of the beetle and thus a good companion practice to chipping.

Shannon Lynch stated that Akif Eskalen's project was to research endophytes as a control for *Fusarium dieback* and predictive modeling in California. She noted that following testing in 2016, some infested trees recovered, some got worse, and some never became infested at all. The culturists discovered that inoculating seedlings with bacteria showcasing antibiotic inhibition resulted in *Fusarium* establishment being inhibited. If unable to eat the *Fusarium* fungus, the beetle will die. They wish to do more trials on additional host species and with different combinations of endophytes, and screen endophytes and hosts in ISHB's native range. She estimated this required $150,000 in funding.

Shannon stated that the predictive model uses tree inventory data from 170 cities and overlayed with climate data. Predictive modeling found that sites are more likely to be infested where there are lots of closely related host species. Unfavorable communities are

more susceptible where warmer conditions favored more beetles. They wish to do long term plot monitoring and predictive modeling; adding landscape traits like nearness to water; spread over time and spread across California. She suggested this map be made publicly available. She estimated this required $150,000 in funding.

Bea stated that it was discovered that many previously-infested trees appear to recover by compartmentalizing affected areas. Her project is to evaluate prevalence of ISHB and *Fusarium* and assess the risk of re-infestation, analyze ISHB infestations and recovery, and test the efficacy of spot injections to control ISHB. A paint test found that there is no evidence of active beetles in recovered trees. There was *Fusarium* in the outer bark but only in a few cambium samples. Untreated recovering trees didn't attract significantly more beetles than treated trees or low-infestation trees. One to ten percent of heavily-infested trees recover, but 50 percent of low-to-moderately infestated trees recover. When testing spot injections, they found that Emamectin benzoate significantly reduced beetle prevalence but Bacillus subtilis had no strong effect.

Karen Jetter stated that the bioeconomic model was developed to assess the costs and benefits of ISHB establishment with and without a monitoring program in Ventura and Orange Counties. 10.81 percent of trees in Ventura and 8.63 percent of trees in Orange County are susceptible to tree death if they become infested. Costs for lost trees in Ventura County ranged from $96,000,000 if ten percent of susceptible trees are lost to $675,000,000 if 70 percent of trees are lost. Orange County varied from $156,000,000 if ten percent of kill competent trees are assumed killed, to $1,091,000,000 if 70 percent are killed. Monitoring costs are estimated at $400,000-$500,000 per year. It was found that the benefits of monitoring are always higher than the costs in both counties, although the benefits are lower in Ventura County. She suggested that this urban model could be expanded throughout California. She estimated this required $250,000 in funding.

David estimated that if all previously discussed projects are funded, $170,000 would remain to be spent. He suggested that the most popular of the remaining projects can present at the January 10, 2023 meeting.

Adjournment

The meeting was adjourned at 5:04 p.m. The next scheduled CISAC ISHB Subcommittee meeting will be held on January 10, 2023 at the California Department of Food and Agriculture headquarters.