CISAC Invasive Shot Hole Borer Subcommittee
April 24th, 2025 Meeting Minutes

ISHB Members Present:

Bea Nobua-Behrmann	Shannon Lynch	Tom Smith
Ricky Lara		

Guests:

Joe Aguilar	Akif Eskalen	Randall Oliver
Jonathan Babineau	Fayek Girgis	David Pegos
Nara Baker	Lindsey Hack	Daniel Reyes
Carrie Bassett	Heather Healy	Paul Rugman-Jones
Rachel Burnap	Elham Jamshidi	Ambika Saini
Julie Clark	Deborah Knight	Rose Sanchez
Kim Corella	Walter Mayeda	Stephanie Stark
Sara Davis	Alyssa Morgan	

Opening:

The California Invasive Species Advisory Committee (CISAC) Invasive Shothole Borer (ISHB) Subcommittee meeting was called to order at 1:30 p.m. on April 24th, 2025. Dr. Shannon Lynch welcomed committee members, guests, and staff.

Discussion:

Dr. Shannon Lynch summarized the results from the previous ISHB Subcommittee for Research and Technology development. The different categories of research discussed were epidemiology, biology, and various aspects of controls (biocontrol, chemical control, and mechanical control). Other categories included monitoring, Integrated Pest Management (IPM), and social considerations of research needs.

Research and Technology Development Subcommittee Report

<u>Epidemiology</u>

1. Refine risk model to include landscape parameters and dispersal factors (Shannon).
    a. Expand the monitoring plot network to include sites in Northern California.
2. Develop a model to assess the impacts of F*usarium* dieback (FD)- ISHB over time (susceptible-exposed-infectious-removed (SEIR) framework (Shannon).
    a. Revisiting plot network over time.
3. Pathways of spread through green waste.
    a. Do green waste facilities mediate ISHB spread?
    b. Are they dispersal kernels? (Bea's suggestion)

4. What is the appropriate combination of tree species to plant to minimize ISHB establishment and spread? (Based on Rachel's question about tree planting).
    a. Randall: This is a site-specific question, and difficult to give a general recommendation.
        i. Should incorporate this into the outreach messaging.

<u>Biology</u>

1. Effect of nutrients and water on FD-ISHB severity (Shannon).
    a. Quantify ISHB beetle fecundity, development, and emergence within artificial sawdust media of different hosts under different nutrient conditions;
    b. Quantify beetle fecundity, development, and emergence within different ISHB hosts under various nutrient and watering conditions in the greenhouse;
    c. Determine whether soil nutrient conditions and distance to water predict ISHB attack severity using data from 15,000 trees in 260 0.25-ha monitoring plots across Southern California.
2. Agricultural crop screening – will they become reproductive hosts in California? (Shannon and Akif)
    a. Test susceptibility to beetle's fungal symbiont colonization.
    b. Test susceptibility to beetle probing.
3. Host preference testing: rear beetles in host sawdust media and switch the media after several generations (Shannon).
4. Identification and interactions of bacteria with mycangial fungi (Shannon and Akif).
5. Host range testing for Greater Shothole Borer (GSHB) (Shannon).
6. Is there a positive impact on bird populations – cavity nesters?

<u>Control</u>

Biocontrol

1. Identify endophytes in native environments (e.g., Japan, Thailand, Taiwan, Vietnam) that inhibit colonization of ISHB symbionts (Shannon and Akif).
2. Assess the role of rhizosphere microbiota in controlling FD-ISHB (Shannon and Akif).
    a. Collect rhizosphere samples from diseased and non-diseased trees in monitoring plots.
    b. Test the efficacy of soil amendments in reducing pathogen colonization in a greenhouse and field experiment.
3. Field testing of native endophytes on native plant species (Shannon).
    a. Apply on restoration trees at scale – test with other treatments on restoration trees (i.e., bio-factors).
4. Biocontrol of the beetle (Paul)

a. The majority of the previous money was returned because of COVID.
b. Current federal funding situation is tenuous.
c. One parasitoid colony from Taiwan established on the East coast in Buzzard's Bay (Christine Dodge).
    i. Non-target testing (funded for Chrissy Dodge).
        1. Do non-target testing of parasitoid colony on Greater Shothole Borer (GSHB) in Buzzard's Bay – can be done with current resources.
    ii. Wasp detected in Thailand.
        1. Need to continue with foreign exploration for backups/redundancy.
    iii. Keep technology funded in Taiwan.
d. Polyphagous Shot Hole Borer (PSHB) and Kuroshio Shot Hole Borer (KSHB) are in Okinawa, Japan, and would be a critical area to explore.
e. Look for evidence of parasitoids of GSHB in those areas.
f. Paul has funding to look for native parasitoids in California.

Chemical

1. Testing locally systemic fungicides using an in vitro spiral plater, and in the field (Akif) (for PSHB/KSHB and GSHB).
2. Nutrient enrichment trials (Shannon).
3. Plant-based/bio-pesticides (Akif).
    a) Treatment alternatives for lands that are proximal to water sources (Bob's suggestion).
    b) Biorationals – Time Paine proposed using entomopathogenic fungi that could attack beetles with a fire retardant to retain more moisture, but retired.
        i. Akif with USDA applied with special chitlin-based protein foam with limited resources, but the application melted off the trees.
4. Biofactors (e.g. salicylic acid) applications.
5. Minimal portability, noise generation treatments – alternatives to classical applications of systemic pesticides.
    a) Treatment alternatives for lands that are proximal to water sources (Bob's suggestions).
    b) Tablets of imidacloprid.

Mechanical

1. Push-pull control studies using sticky traps versus trap logs (Akif).
2. Composted versus non-composted material – are larger pieces of composted material pest-free (Bob's suggestion)?

<u>Monitoring</u>

1. Trap Counting AI Tool (Bea).
2. Develop and validate a LAMP (loop-mediated isothermal amplification) based assay for the rapid, in-field, early detection and identification *Fusarium*

euwallaceae and *F. kuroshium*, F. floridanum, as well as PSHB, KSHB, and GSHB (Shannon). - $323,000
3. Trap optimization for GSHB (Shannon).
4. Hanging logs - what do we bait logs with? (Paul)
    a. Trap logs - soak in water for 1 week and hang.
5. Expanded tree inventories (Jon Dedka, Matt Ritter, Jennifer Yost).
    a. Drone and machine learning.

<u>IPM</u>

1. Does treating only moderately and heavily infested high-value trees sufficiently control beetle populations? (Bea)
    a. Does this allow the lightly infested trees to recover?

<u>Social</u>

1. Expand economic proof of concept statewide (Karen Jetter).
2. What are the barriers to accessing ISHB educational materials? Work with the International Society of Arboriculture (ISA) to figure out how to make it more accessible.
    i. Maintenance gardeners conduct more trimming than arborists and have to come in to register for their pesticide use every year (a great opportunity to reach out to an important target audience).
    ii. Mailing list for non-certified businesses (outreach exercise)
3. Evaluate the impact of educational programs – do they change management outcomes? If not? What are the barriers? (Bea)

Green Waste and Firewood Pathways Discussion

Dr. Bea N Behrmann started the discussion on Greenwaste and Firewood as Pathways.

<u>Issues:</u>

- Seeing more infested pallets from the overseas shipments to California recently (reported by Dr. J. Kabashima).
- Green waste is regulated by the Local Enforcement Agency (LEA) and partners with CalRecycle.
- Firewood is not regulated.
    - Rachel B is working to create a “co-ordinance” around the movement of firewood following Florida’s state language.
        - Sara’s question: Would this work at the interstate level?
    - State explored regulation: economic analysis is $4,000,000 and is required prior, in addition to the cost of implementing the regulation.
- If there are regulations, enforcement is a challenge (District Attorney has to bring charges)
- How to regulate the movement of B-rated pests.

- Enforcement regulation seems less likely.
    - Value in looking at social burden: Is the outreach we are doing reaching enough people?
        - Look at the economics of outreach efforts
            - Grocers' association that sells treated firewood – might be willing to use their own money to promote their product in partnership with Firewood Taskforce (has been done).
        - "Don't Move Firewood" campaign, "Buy It Where You Burn it" campaign (what are ways to improve).

<u>Needs:</u>

- Support to regulate firewood at the county level? (What kind of support?)
    - Facilitate communication between counties about firewood movement
        - Technology and facilities
- Legislation to empower entities to enforce the movement of wood.
    - Who has the authority to do something about movement?
- Firewood might need to be explored in a broader context besides this subcommittee: need to convey that this is a strong interest of the ISHB subcommittee.
    - Economic analysis of regulation, financial support for Firewood Taskforce, etc.
- Language used in agreement that wasn't implemented but could be useful moving forward: work with LEA to identify green waste facilities and gain access for trapping and visual inspection. It also helps understand the flow of green host waste.
    - If we have a survey coordinator (from the Survey Response component), this is a need to implement (approval from LA, Orange, Santa Cruz, Santa Clara County Agricultural commissioner was not present at the April 24th meeting, but expressed interest in this effort for the county).
        - Needs: PI +/or survey coordinator to lead efforts.

Adjournment

The meeting was adjourned at 3:35 p.m. The next scheduled California Invasive Species Advisory Committee ISHB Subcommittee meeting is scheduled for May 29th, 2025, at 1:30 pm.