CISAC Invasive Shot Hole Borer (ISHB)
Research and Technology Development Subcommittee
April 22nd, 2025 Meeting Minutes

ISHB Members Present:

Bea Nobua-Behrmann	Shannon Lynch	Tom Smith
Stacy Hishinuma		

Guests:

Jonathan Babineau	Linda Haque	David Pegos
Nara Baker	Healy Heather	Drew Raymond
Rachel Burnap	Robert Mackie	Paul Rugman-Jones
Kim Corella	Walter Mayeda	Ambika Saini
Akif Eskalen	Randall Oliver	Brian Woodward

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 22nd, 2025. Dr. Shannon Lynch welcomed committee members, guests, and staff.

Needs Assessment and Identifying Action Items

Greenwaste and Firewood as pathways.

<u>Epidemiology</u>

1. Refine risk model to include landscape parameters and dispersal factors (Shannon).
2. Expand monitoring plot network to include sites in Northern California.
3. Develop a model to assess the impacts of Fusarium dieback (FD-ISHB) over time (SEIR framework) – Shannon
4. Revisiting plot network over time.
5. What are the pathways of spread through greenwaste? (high risk of ISHB spread)
6. Do greenwaste facilities mediate ISHB spread?
7. Are they dispersal kernels? (Bea's suggestion)

<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 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 was 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 GSHB in Buzzard's Bay – can be done with current resources.
        ii. Also found that wasp in Thailand.
            1. Need to continue with foreign exploration for backups/redundancy.
        iii. Keep technology funded in Taiwan.
    d. PSHB and 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 – Tim 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. Biofactor (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)

Adjournment

The meeting was adjourned at 3:31 p.m. The next scheduled California Invasive Species Advisory Committee ISHB Subcommittee meeting is scheduled for April 24, 2025, at 1:30 pm.