# Coffee Berry Borer (CBB) update

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UH–CTAHR

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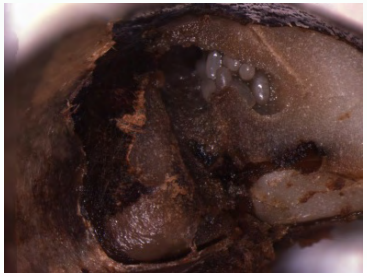


# What is UH–CTAHR doing to manage the Coffee Berry Borer?

- Russell Messing: Alternate hosts, trapping, oviposition deterrent, invasion biology, natural enemies and ground cover effect.
- Loren Gautz: heat treatment
- Elsie Burbano and Mark Wright: Efficacy of *Beauveria bassiana* and Provado® on the CBB, coffee phenology and CBB reproduction, coffee berry susceptibility to CBB attack and efficacy of commercial and home made traps.
- Elsie Burbano and Shawn Steiman (Coffea consulting): Control of coffee berry borer and increase of coffee yields using Surround WP (kaolin).

# Alternate hosts

- Using dissections and Berlese funnel traps, thousands of seeds from a variety of alternate host plants were examined.

- No CBB were found, with the exception of haole koa (*Leucanea leucocephala*), in which we found a small number of beetles (probably CBB, but still awaiting confirmation).

- Based on the low levels of recovery, sampling alternate hosts was stopped.

# Trapping

- Phenology and population dynamics of CBB

- The ratio of methanol to ethanol is not important in overall beetle catch (comparing 1:1, 2:1, and 3:1).

- There is little or no attraction to isopropyl alcohol.

# Deter CBB from laying eggs

- In lab tests, eucalyptus oil, eugenol, and neem oil were all significantly deterrent to CBB adults, even at very low concentrations.
- Neem (azadirachtin) also had significant contact toxicity.

# Invasion biology

Molecular analysis of DNA (COI gene and microsatellites) from CBB samples in Hawaii shows that our beetles are most closely related to populations from Central America, rather than Asia or Africa.

# Predators

Molecular analyses are being used to examine the gut content of potential predators. No results yet.

# Ground cover effect

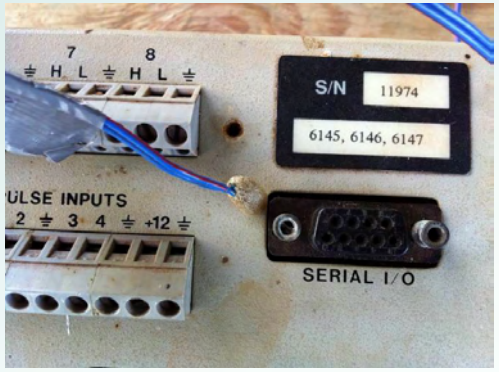
• Effect of grass and weed ground covers compared to bare dirt on the survival rates of CBB in berries fallen to the ground.

• Berries on bare ground will have more direct sun, higher temperatures, and faster desiccation; but berries under ground cover will rot faster and perhaps also favor *B. bassiana.* No results yet.

# Heat treatment

- CBB are killed with 48°C (118.4°F) and 60% RH for 30 minutes.

- However, some beetles (85% of one trial) survived at 44°C (111.2°F) and 60% RH for 30 minutes.




Thermocouple in bean
to measure temperature

# Heat treatment

- Quality checks will be done by cupping treated coffee.

- At 30% RH and 48°C (118.4°F) for 30 min the green bean moisture does not change significantly.

- There is no visual difference in beans. Beans can reach 50°C (122°F) for two hours without affecting quality (Sivetz, M. and N. W. Desrosier1979).

# Practices for an integrated management for the CBB

- Efficacy of *Beauveria bassiana* and Provado® on the CBB
- Coffee phenology and CBB reproduction
- Coffee berry susceptibility to CBB attack
- Efficacy of commercial and home made traps

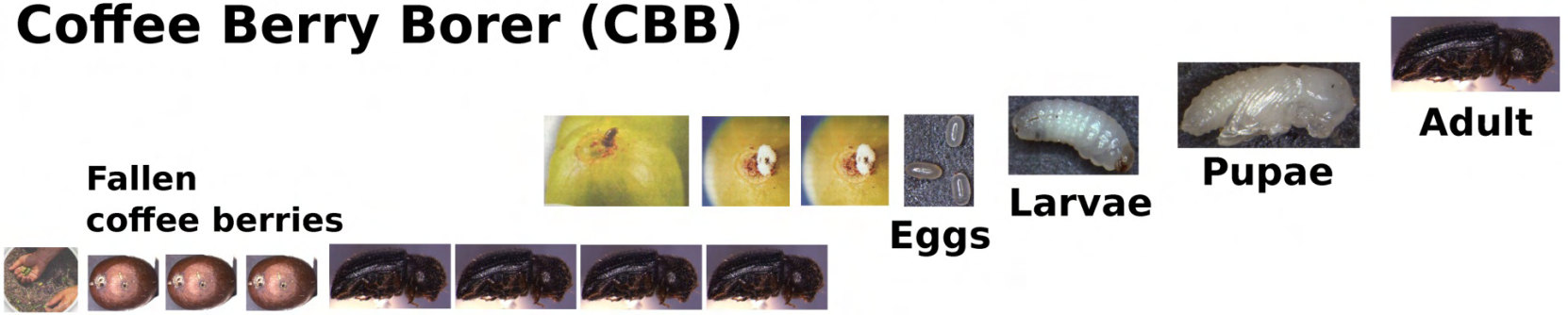
# Efficacy of *Beauveria bassiana* and Provado® on the CBB

- How often *B. bassiana* should be sprayed to maintain levels of fungal infection?
- Can Provado® protect coffee berries and reduce CBB attack?

# Coffee phenology and berries susceptibility to CBB attack

- Coffee phenology changes depending on agroclimatic zones, how is this factor related to CBB behavior?
- When are berries susceptible to CBB attack and when is the effective time to spray/use *B. bassiana* or any management technique?
- Provide information on the correct timing of control measures.

# Practices for an integrated management for the Coffee Berry Borer (CBB)





Pruning

Beauveria bassiana

Trapping

Dormancy | Flowering | Fruit Development | Harvesting

# Effectiveness of commercial and home made traps

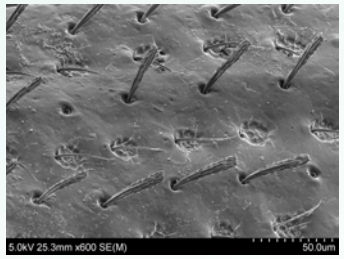
Home made trap

Black twig borer (*Xylosandrus compactus*)

Elytra setae

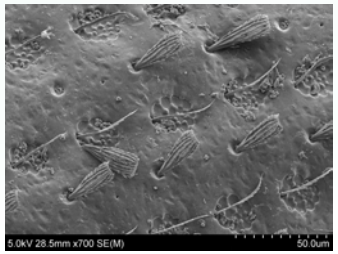
Broca trap

Coffee berry borer (*Hypothenemus hampei*)



Japanese beetle trap

Tropical nut borer (*Hypothenemus obscurus*)



# Outputs

• This project has developed a website which includes recommendations on management of the CBB. http://www.ctahr.hawaii.edu/site/CBB.aspx

• A scientific paper is in press in the *Journal of Insect Science*. Title: New Record for the Coffee Berry Borer, *Hypothenemus hampei*, in Hawaii

• Several workshops have been conducted in Kona and Kau districts (LIFE program: Jari Sugano, Maria Diaz, Stuart Nakamoto.

# Participating farms

- Heavenly Hawaiian: Dave and Trudy Batemans, Miguel and Lupe Mesa.

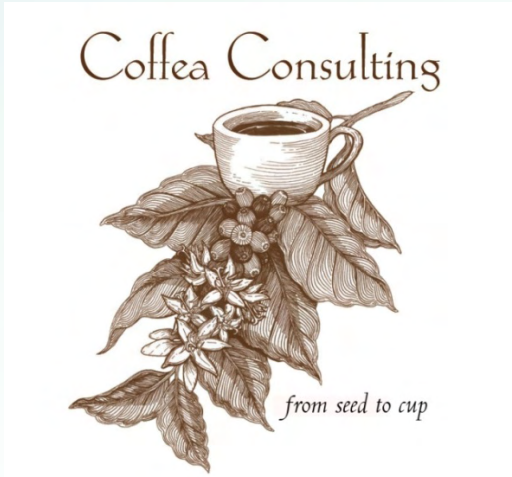
- Kona farms: Angel Cancino

- Koa coffee farms: Brent Hight, Consuelo Lemus, Rodolfo Castellanos, Alex and Diego Campos, Jose Luis Gomez and Oscar Garcia.

- Captain Cook: Roger and Jesse Kaiwi

# Control of CBB and increase of coffee yields using Surround WP (kaolin)

- Shawn Steiman (Coffea Consulting) and Elsie Burbano
- Western SARE (funding agency)




WESTERN SARE
Sustainable Agriculture Research & Education

# Control of CBB and increase of coffee yields using Surround WP (kaolin)

## Project overview

- Two year study.
- Can Surround WP wettable powder prevent/minimize CBB attack?
- Can Surround WP double coffee yields?

# Control of CBB and increase of coffee yields using Surround WP (kaolin)

- Surround WP is a powder, made from kaolin clay (white clay).

- Kaolin can be applied with a traditional sprayer equipped with a good agitation system.

- Organic certified product, used as a crop protectant in agriculture, effective for protecting coffee from CBB, increasing yield of coffee.

# Control of CBB and increase of coffee yields using Surround WP (kaolin)

- Surround WP may confuse CBB, affect the taste of berries and cause CBB not to recognize the berries.

- Powder may absorb the chemicals that attract CBB making berries less attractive.

- Increase floral production as a result of the increase in light reflecting off the kaolin-covered leaves.

# Participating farms

Kona Lisa Farm

Kona Rainforest


Lehuula Farm

Sweet Spirit Farm

Dragon's Lair

# Viva coffee land!

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University of Hawai'i at Mānoa