2017 UH CTAHR Update
Hawaii Coffee Association Conference

July 21, 2017
(Updated 8/11/17)

Andrea Kawabata
Cooperative Extension
Tropical Plant and Soil Sciences
College of Tropical Agriculture and Human Resources
University of Hawai‘i at Mānoa
Scouting for CBB on Kauai

Russell Messing
Department of Plant and Environmental Protection Sciences, UH CTAHR

Kauai Agricultural Research Center (Kapa'a)

Moloa'a Bay Coffee (N. Kauai; Moloa'a Bay)
• Technician - Jared Bernard

• Continue to trap and run visual transects for signs of CBB at three locations on Kauai on a weekly basis

• To date, no evidence of CBB on Kauai
‘Alcohol Spray Method’ to Sample Live CBB

Mark Wright & Ishakh Pulakkatu Thodi
Department of Plant and Environmental Protection Sciences, UH CTAHR
A video was played.

Dissecting green coffee berries to determine the position of CBB can be tedious. As an alternative to this method, a fine spray of alcohol was used to assess the percent of CBB that were alive and targetable using pesticides. To test how reliable this method is, an observational study was conducted in three fields. From each field 5 trees were selected at random and from each tree 20 coffee berries with an entry hole were sprayed with alcohol. After 30 seconds, all the berries from which a live CBB emerged were dissected immediately and CBB position was determined based on the stage of entry hole (A/B or C/D). If no CBB emerged, the berries were carefully dissected to see if the CBB were alive, dead or missing.
About 60% of CBB emerged within 30 seconds of spray. If the CBB was alive and in A/B position, 90% of them came out soon after the spray. Most CBB emerging from the C/D position were at the early stages of drilling (just reached the bean). So their percentage could vary as the season progress. Alcohol may be used as a tool to estimate live CBB population. This study is ongoing and industry will updated as more data become available.

*Graph: Assessment of 300 berries*
Coffee Berry Borer Microbial Interactions

Sayaka Aoki
Mark Wright, Gordon Bennett, Russell Messing, Fernando Vega*, and Ania Wieczorek
Department of Plant and Environmental Protection Sciences, UH CTAHR
*USDA Agricultural Research Service
The importance

• Identification of bacterial symbionts associated with CBB and their interaction with CBB in Hawaii

• Determine the roles and functions of selected bacterial taxa in CBB’s biology

• Could potentially contribute to pest management applications.

*Fluorescence in Situ Hybridization (FISH) microscopy image of CBB hind-gut with eubacteria*
Principal Coordinate Analysis from 33 Sites

Different bacterial communities in different locations
Additional Findings

• 87% of CBB did not make it to adulthood within 2 months when (first instar) larvae were separated from the adult female

• Orphaned females were ~23% smaller than normal females

• Did not sclerotize properly
Hmmm??... 

• Could this be an indication of female nutritional provisioning to their larvae or an absence of beneficial symbionts? 

• Can this knowledge be exploited to suppress CBB populations?
Measuring CBB Damage at Harvest or After Milling

HC “Skip” Bittenbender, TPSS

2011-2016 CBB Survey

• How are producers dealing with CBB?
• Are recommendations from CTAHR being used?
• Are these recommendations helpful?
• Estimate the percent of CBB-damaged coffee.

This survey is now being conducted by HDOA under its Beauveria Subsidy Program (Gwen Hicks).
Example for Cherry Growers

<table>
<thead>
<tr>
<th>Harvest date</th>
<th>Cherry (lb) Delivered</th>
<th>% CBB damage</th>
<th>Weighted Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug-1</td>
<td>500</td>
<td>10</td>
<td>5000</td>
</tr>
<tr>
<td>Sep-1</td>
<td>1000</td>
<td>8</td>
<td>8000</td>
</tr>
<tr>
<td>Oct-1</td>
<td>1500</td>
<td>5</td>
<td>7500</td>
</tr>
<tr>
<td>Nov-1</td>
<td>1500</td>
<td>4</td>
<td>6000</td>
</tr>
<tr>
<td>Dec-1</td>
<td>1000</td>
<td>3</td>
<td>3000</td>
</tr>
<tr>
<td>Total for 2016</td>
<td>5500</td>
<td></td>
<td>29500</td>
</tr>
</tbody>
</table>

Total Weighted Average divided by Total (lb) Cherry Delivered is % parchment beans that are CBB damaged.

\[
\frac{29500}{5500} = 5.4\% \text{ CBB-damaged beans in the 2016 harvest.}
\]
Example for Estate Growers

What you need to know:

- Pre-CBB GBRR of 5.1
- Total cherry harvest for season (2016) = 5500 lb
- Total green bean weight = 1020 lb

Your GBRR = Total lbs of cherry divided by total lbs of green bean

\[
5500 \div 1020 = 5.39
\]

Your CBB damage = Pre-CBB GBRR divided by your farm’s GBRR, then 1 minus that number and times 100

\[
5.1 \div 5.39 = 0.946 \\
1 - 0.946 \times 100 = 5.4\% \text{ CBB-damaged beans in 2016}
\]
Important to remember

Neither counting CBB-damaged parchment nor knowing your GBRR, will inform you about quality directly.

However, 20% bean damage or a 20% increase in GBRR will indicate that you have a lot of damaged green beans to sort out.
Field Sampling and Modeling of CBB

Ray Carruthers, PEPS
with USDA PBARC researchers
and CTAHR technicians

• Collect and analyze farm sampling data
  • 30 trees sampling method

• Collect and/or assess data on:
  • weather and climate
  • farm management practices
  • flowering, bean size and maturation
  • infested raisins
  • infested red berries
Take home message

• Strip pick your field before flowering.

• Begin monitoring for CBB activity within about 60 days from your first flowering.

• Monitor and spray early in the season if needed to knock down CBB population in the A/B position.

• CBB damage will occur and beetle numbers will increase during the season if you do not monitor and spray as needed.

• Harvesting alone will not typically control CBB. You must be vigilant and monitor your fields, treating when needed based on your decision table.
Economics Group Update

Stuart T. Nakamoto, PingSun Leung, John Woodill and Andrea Kawabata*
Department of Human Nutrition, Food and Animal Sciences; *TPSS

Dynamic Economic Model:

Using field level data to test three spray strategies:

- Always Spray
- IPM Recommendation (chart)
- Economic model
The chart shows preliminary results for each of the spraying strategies and the optimal decision under each strategy from January to December.

Our goal is to maximize the net benefit for each strategy to see which provides a higher benefit.

Our results suggest the economic model increases net benefit throughout the season and also reduces CD infestation levels better than if you were to always spray or follow IPM.

However, we need additional data to further verify these results and provide further sensitivity analysis.

- Economic model optimizes net benefit and reduces C/D infestation levels

<table>
<thead>
<tr>
<th>Month</th>
<th>Always Spray</th>
<th>IPM Chart</th>
<th>Economic Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Feb</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Mar</td>
<td>Spray</td>
<td>Spray</td>
<td>-</td>
</tr>
<tr>
<td>Apr</td>
<td>Spray</td>
<td>Spray</td>
<td>-</td>
</tr>
<tr>
<td>May</td>
<td>Spray</td>
<td>Spray</td>
<td>Spray</td>
</tr>
<tr>
<td>June</td>
<td>Spray</td>
<td>-</td>
<td>Spray</td>
</tr>
<tr>
<td>July</td>
<td>Spray</td>
<td>Spray</td>
<td>Spray</td>
</tr>
<tr>
<td>Aug</td>
<td>Spray</td>
<td>-</td>
<td>Spray</td>
</tr>
<tr>
<td>Sept</td>
<td>Spray</td>
<td>Spray</td>
<td>Spray</td>
</tr>
<tr>
<td>Oct</td>
<td>Spray</td>
<td>-</td>
<td>Spray</td>
</tr>
<tr>
<td>Nov</td>
<td>Spray</td>
<td>-</td>
<td>Spray</td>
</tr>
<tr>
<td>Dec</td>
<td>Spray</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

| Net Benefit | $15,084.00 | $13,228.00 | $15,536.00 |
Pesticide Registration Program Update

Mike Kawate, Julie Coughlin and James Kam

Plant & Environmental Protection Sciences
ONGOING PROJECTS - 2017

Field Residue Trials (IR-4)
- azoxystrobin + cyproconazole (Quadris Top) for coffee rust - 3HI, 2PR
- flupyradifurone (Sivanto) for green scale - 2HI, 1PR

Field Efficacy and Crop Safety (EC/S) Trials
- glufosinate (Rely) - Kauai
  broad spectrum weed control
- flupyradifurone (Sivanto) - Kauai
  green scale (*Coccus viridis*) control
    excellent control
    no phytotoxicity
PROJECTS IN THE PIPELINE

Indaziflam (Alion) – for weeds (PRE)
- Proposed rule, 05/19/16; but, final rule not yet published.
- Import tolerance already exists; 0.01 ppm.

Cyantraniliprole (Exirel) – for CBB
- Final MOR study signed by IR-4; ready for submission to EPA.

Indoxacarb (Avaunt) – for CBB
- All field residue and processing trials completed.
- Laboratory residue analysis of the samples are ongoing.

Pyrethrins + PBO (Evergreen EC 60-6) – for CBB
- Manufacturer (MGK) has IR-4 data, and will submit to EPA for tolerance.
- MGK (Py/PBO task force) working on establishing MRL for Japan.
NEW LABELS

**ENTRUST SC** (spinosad, EPA Reg No. 62719-621)
- for coffee leafminer and various lepidopterous larvae (includes banana moth).

**DELEGATE** (spinetoram, EPA Reg. No. 62719-541)
- same pests as ENTRUST SC.
- laboratory bioassay tests indicated that spinetoram is effective against CBB.
  > but, our testing rate was 7 oz/A rate in 100 gpa
  > the label rate is 5 oz/A
- however, sprays need to directly contact CBB, or be present on the berry before CBB enters it.

PLEASE REMEMBER THAT THESE PRODUCT LABELS MUST HAVE “COFFEE” LISTED AS A SITE. DO NOT TAKE AN OLDER PRODUCT AND ASSUME THAT IT MAY BE USED ON COFFEE.
FUTURE PROJECTS

Bifenthrin (Sniper) – for CBB
   -Efficacy and crop safety data provided to FMC

2,4-D (Weedar 64) – for vine control
   -Completed 2 years of E/CS trials
   -Potential residue project for 2019.

TASC Proposal (submitted, awaiting approval)
   -To address PBO MRL issue for exports to Japan.
   -To address MRL issues for other insecticides that don’t have established MRLs in Japan or other export markets.
   -Provide growers with a guide to show them when they should stop spraying particular pesticides to avoid violating MRLs of their export markets.
PESTICIDE NEEDS FOR COFFEE

To Coffee Industry:

Consider drafting a list of prioritized pest and pesticides for us to work on for future projects.

The list can be updated at any time as needed.
Floating Out The Trash
Andrea Kawabata, Jen Burt, Stuart Nakamoto, Rob Curtiss, Gwen Hicks, & Nick Yamauchi
UH CTAHR and HDOA
Conclusions

Floating can be used to remove a high percentage of raisins and hollow beans.

Floating is not a reliable post harvest method for removing CBB damaged beans at the cherry processing stage.

Control CBB early and with IPM.

Harvest completely by picking ripe, over-ripe, and raisin coffee.
Block stumpimg of small plot

The long-term responses of coffee rootstocks to root-knot nematode in Kona (2 yrs)
Keeping busy

• Coffee pruning demo project
• PBO project
• Efficacy of Delegate in the field for CBB control
• Outreach opportunities
• 30 trees sampling videos
• Rehiring Jr. Extension Agent for CBB
• CBB Conference in 2018?
Thank you!

Visit hawaiicoffee.weebly.com or contact me at andreak@hawaii.edu or 808-322-4892
Contact information:

Sayaka Aoki  
Graduate Research Assistant - Oahu  
sayakaa@hawaii.edu

H.C. “Skip” Bittenbender  
Extension Specialist in Fruits and Nuts - Oahu  
808-956-6043  
hcbitt@hawaii.edu

Ray Carruthers  
Extension Specialist for CBB Areawide Project - Hilo  
808-969-8211  
raymondi@hawaii.edu

Rob Curtiss  
Hawaii Department of Agriculture/Entomologist - Kona  
808-323-7579  
Robert.T.Curtiss@hawaii.gov

Andrea Kawabata  
Associate Extension Agent for Coffee and Orchard Crops - Kona  
808-322-4892  
andreak@hawaii.edu

Mike Kawate  
Extension Specialist/IR-4 Program - Oahu  
808-956-6008  
mkawate@hawaii.edu

Russell Messing  
Kauai County Administrator/Entomologist - Kauai  
808-822-4984 ext. 223/227  
messing@hawaii.edu

Stuart T. Nakamoto  
Extension Specialist/Ag Economics - Oahu  
808-956-8125  
snakamo@hawaii.edu

Ishakh Pulakkatu Thodi  
Junior Researcher - Hilo  
808-981-5199  
ishakhpt@hawaii.edu

Mark Wright  
Extension Specialist/Entomologist – Oahu  
808-956-7670  
markwrig@hawaii.edu