Effectiveness of trapping, fungus and Surround WP as management alternatives for the coffee berry borer

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Outline

1. Capture of CBB using different traps
2. Trap height effect on CBB capture
3. Effectiveness of 3 doses of Botanigard®
4. Effectiveness of Surround WP (Kaolin) as a protectant against CBB attack
5. Win the battle!
   6. Time for questions..
1. Capture of CBB using different traps

- Homemade trap
- Red Japanese beetle trap
- Green Japanese beetle trap
- Broca trap
1. Capture of CBB using different traps (data 2011)
1. Capture of CBB using different traps (data 2012)
2. Trap height effect on CBB capture: 472 m, Keauhou Mauka (data 2012)

Knee height: 50 cm

Chest height: 1.50 m

~ 2 m above ground
2. Trap height effect on CBB capture: (Keauhou Mauka: 472 m, data 2012)
3. Effectiveness of 3 doses of Botanigard®

- Two farms: Holualoa and Honuanao
- 10- tree experimental units
- Treatments
  - Botanigard®: (8, 16 and 32 oz per acre)
  - Widespread Max
  - Untreated trees
- 3 replicates per farm

- Count number of infested berries before spray
- One time spray and a second spray after a month (still collecting data)
- Count infested berries with and without fungus every week per 1 month
- Sample and dissect 7 infested berries per replicate
- Count number of dead CBB female, eggs, larvae and pupae

Current fungus’s dose used:
7 oz of fungus + 3 oz of surfactant per acre.
If using a 4-gallon backpack, it will take 30 gallons of water per acre.
3. Effectiveness of 3 doses of Botanigard®
(Holualoa: 430 meters, data 2012)

Botanigard 1st spray: June, 12, 2012

Botanigard 2nd spray: July 11, 2012

Current fungus’s dose used:
7 oz of fungus + 3 oz of surfactant per acre. If using a 4-gallon backpack, it will take 30 gallons of water per acre.
4. Effectiveness of Surround WP (Kaolin) as a protectant against CBB attack

- 2 year project
- 5 farms
- Purpose
  - Control CBB
  - Increase yields over 2 year cycle
- 6-tree experimental units
- 3 replicates per farm
- Treatments
  - Control
  - Surround WP (1 liter of water + 50 g of Surround WP + 3 ml of Nu Film)
  - B. bassiana
  - Surround WP + B. bassiana
- Spray trees every 2 weeks
  - 6 weeks after flowering until end of harvest
4. Effectiveness of Surround WP (Kaolin) as protectant against CBB attack

- Select four randomly branches per replicate
  - Number of holes/total number of cherries
- Harvest all ripe coffee
  - Weight
4. Effectiveness of Surround WP (Kaolin) as protectant against CBB attack

What is Surround WP (Kaolin)?

- Organic certified product
- Pest deterrent
  - Chemical absorbent
  - Physical abrasion
  - Irritation
  - Color confusion
  - Bad taste

4. Effectiveness of Surround WP (Kaolin) as protectant against CBB attack

Effect of Surround WP (Kaolin) on plants:

• Radiation reflection
  – Temperature reduction
• Increase coffee yields
4. Effectiveness of Surround WP (Kaolin) as protectant against CBB attack

**CBB control:**

<table>
<thead>
<tr>
<th>Farm</th>
<th>Treatment</th>
<th>% infested berries</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control Kaolin</td>
<td>21.4 A 31.02 A</td>
</tr>
<tr>
<td>2</td>
<td>Control Kaolin</td>
<td>33.8 A 13.7 B</td>
</tr>
<tr>
<td>3</td>
<td>Control Kaolin</td>
<td>18.9 A 15.4 A</td>
</tr>
<tr>
<td>4</td>
<td>Control <em>Beauveria bassiana</em> (Mycotrol O) Kaolin + B. bassiana (Mycotrol O)</td>
<td>4.7 A 3.0 AB 1.0 B 0.6 B</td>
</tr>
</tbody>
</table>
4. Effectiveness of Surround WP (Kaolin) as protectant against CBB attack

CBB control: Farm 2 (260 m)
4. Effectiveness of Surround WP (Kaolin) as protectant against CBB attack

CBB control: Farm 4

![Bar chart showing the percentage of infested coffee berries ± SE for different months and treatments. The treatments include Kaolin, B. bassiana, Kaolin+B. bassiana, and Control. The chart indicates lower infestation rates for the combined treatment compared to single treatments in all months.]
4. Effectiveness of Surround WP (Kaolin) as protectant against CBB attack

**Coffee yield:**

<table>
<thead>
<tr>
<th>Farm</th>
<th>Treatment</th>
<th>Average yield (Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Control</td>
<td>5.4 4.3</td>
</tr>
<tr>
<td></td>
<td>Kaolin</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Control</td>
<td>30.7 46.1</td>
</tr>
<tr>
<td></td>
<td>Kaolin</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Control</td>
<td>Harvested accidentally</td>
</tr>
<tr>
<td></td>
<td>Kaolin</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Control</td>
<td>9.2 12.4 22.2 18.6</td>
</tr>
<tr>
<td></td>
<td><em>Beauveria bassiana</em> (Mycotrol O)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kaolin</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kaolin + <em>B. bassiana</em> (Mycotrol O)</td>
<td></td>
</tr>
</tbody>
</table>
Win the battle!

• Reward coffee farmers for producing quality coffee ↔ Interest in CBB management

• IPM concepts: understandable, approachable and easy to apply by farmers

• CBB research applicable to HI coffee conditions

• Economic support by government, coffee industry...to continue the CBB studies

• Strengthen collaboration between the coffee associations, UH, ARS-USDA, HDoA and extension agents

• CULTURAL CONTROL, SAMPLING ↔ TIME CONSUMING ↔ WORTHY

• Cost / benefits studies to estimate pest levels and losses
Big Mahalo!

Dawn and Robert Barnes and Joenell Nullar: Rainforest Coffee

Bob Nelson and Brian Axelrod: Lehuula farms

Ronald and Mary Lake: Kona Lisa

Brooks and Bill Wakefield

Consuelo Lemus and Ivan Lemus. Loren Gautz: UH

Justin and Deb Sims: Sweet spirit farm

Aileen Li: UH Manoa

Mark Wright: UH

Dave and Trudy Bateman, Miguel and Lupe Mesa: Heavenly Hawaiian

Big Mahalo!

Bob Foerster: Dragon’s Lair State

Andrea Kawabata: UH

Shawn Steiman: Coffea Consulting

• Crop Production Services
• Surround WP manufacturers
• USDA-ARS and Hatch (CTAHR Office of Research)
• (Arianna Farm) (Kaolin-2012 trial)
• Jesse Kaiwi: Captain Cook
Viva coffee land!