Coffee Berry Borer (CBB)
Preliminary Results

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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 commercials and home made trap.
- Elsie Burbano and Karla Casco (Student Intern from Zamorano, Honduras): Determine cost and benefit of *Beauveria bassiana* on CBB, Determine the efficacy of different doses and time application of *B. bassiana* on CBB.

Outline

- **A.** Heat treatment results and farmers experience
- **B.** Efficacy of *Beauveria bassiana* and Provado on the CBB
- **C.** Efficacy of commercials and home made traps
- **D.** Karla Casco's research
- **E.** Recommendation to manage the CBB during harvest and pruning season
- **F.** Take home message

A. Loren Gautz: heat treatment

- We can get 100% kill at 49 °C (120.2 °F (bean temperature) for 10 min. There is a small humidity effect but anything less than 80% RH is good.

- All CBB are killed in forced air dryers. I don't know the time temperature of deck drying at the end.

- I have formed a hypothesis based on our experiments that all CBB are dead in green bean held at less than 12% moisture for more than a few hours. However, the situation is different depending on elevation.

- We do know that adults can survive in very dry cherry on the ground in the field. I still need to test the hypothesis and collect data on cherry on the ground. CBB can survive for 3 months in dry berries on the ground (CENICAFE).

A. CBB surviving after drying coffee process

- Farm location: Captain Cook Rd: Captain Cook, HI 96704.
- Elevation: 2,000 feet

- The coffee was picked and processed (pulped) on September 20th & 21st, 2011
- Parchment was sun dried for approximately 2 weeks prior to bagging.

- Moisture content (measured with an old style Dickey-John) was recorded at 11.1%.
- Parch was placed in burlap bags and moved to storage (65^{0} F and 70/75% RH).
- Bags were in the storage area for 4 days.

A. CBB surviving after drying coffee process

- Large numbers of CBB were lying on the floor. Then, move to room temperature and beetles started to move around.

- Parchment dried on a deck (at this elevation anyway) does not get hot enough to kill CBB even though the RH level was recorded as being below 12%.

- Even though storage of parchment in a cool environment appears to have driven some of the insects out of the beans, a somewhat short period of time in this environment was not enough to kill the insects.

B. Efficacy of *Beauveria bassiana* and Provado on the CBB

Application date:

B. bassiana: Aug-16,Sept-1,Sept-15

Dose: 6 oz per 27 gallons of water. 2 oz less than the label.

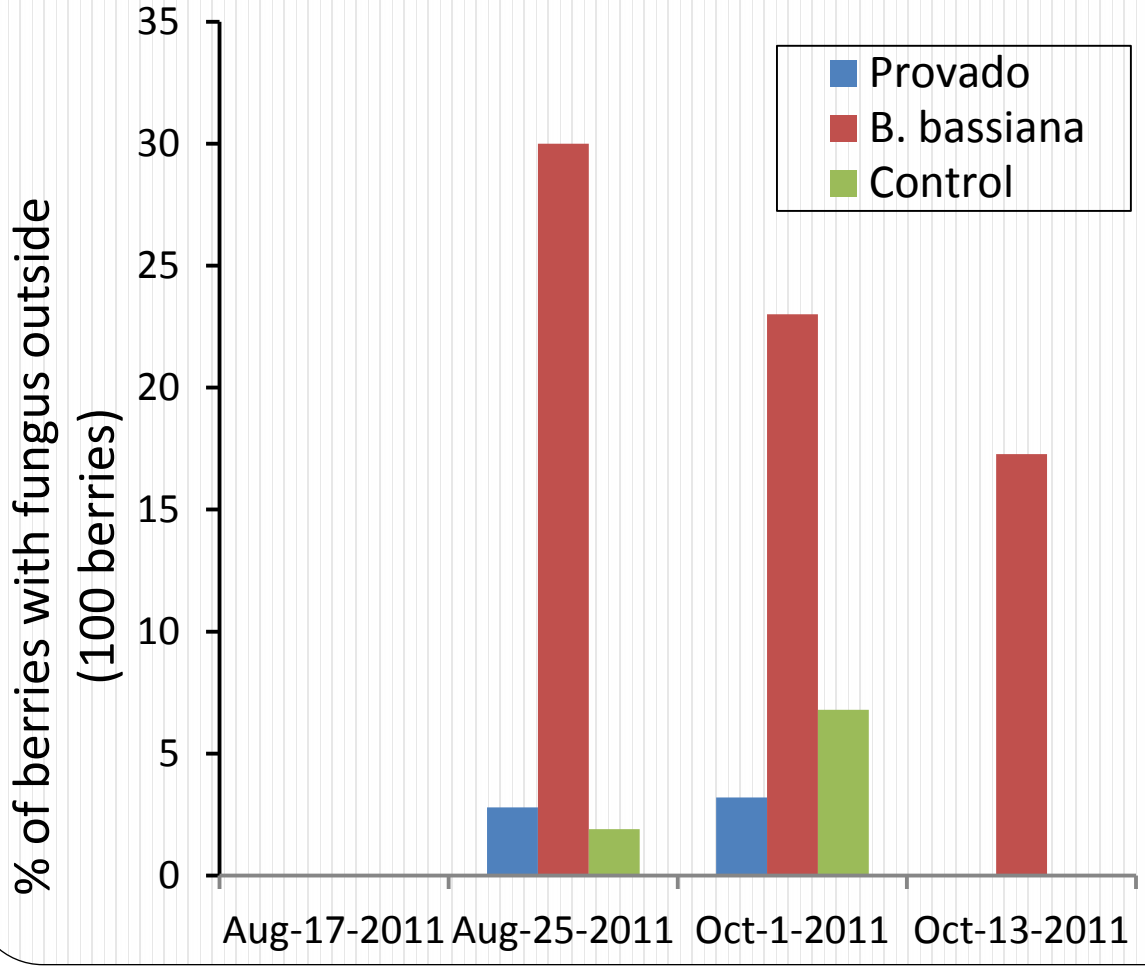
Label: 32 to 48 oz per acre / 100 gallons of water

Provado (foliar): July-21,Aug-30,Sept-22, Oct-20

Dose: 4 oz per 100 gallons of water

Label: 40 oz per year, max. is 8 oz

B. Presence of *B. bassiana* outside coffee berries

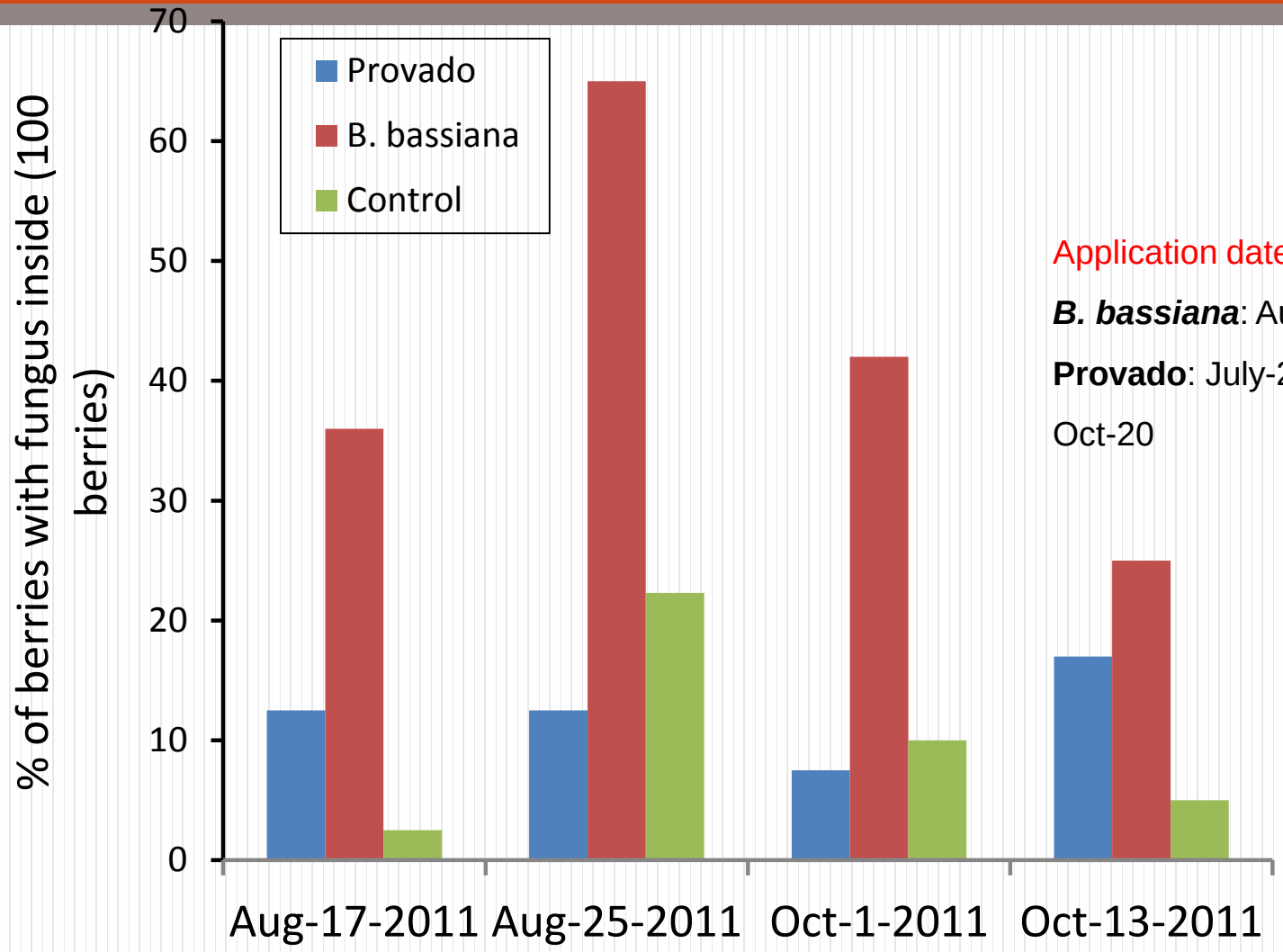


Application date:

B. bassiana: Aug-16,Sept-1,Sept-15

Provado: July-21,Aug-30,Sept-22, Oct-20

B. Presence of *B. bassiana* inside coffee berries

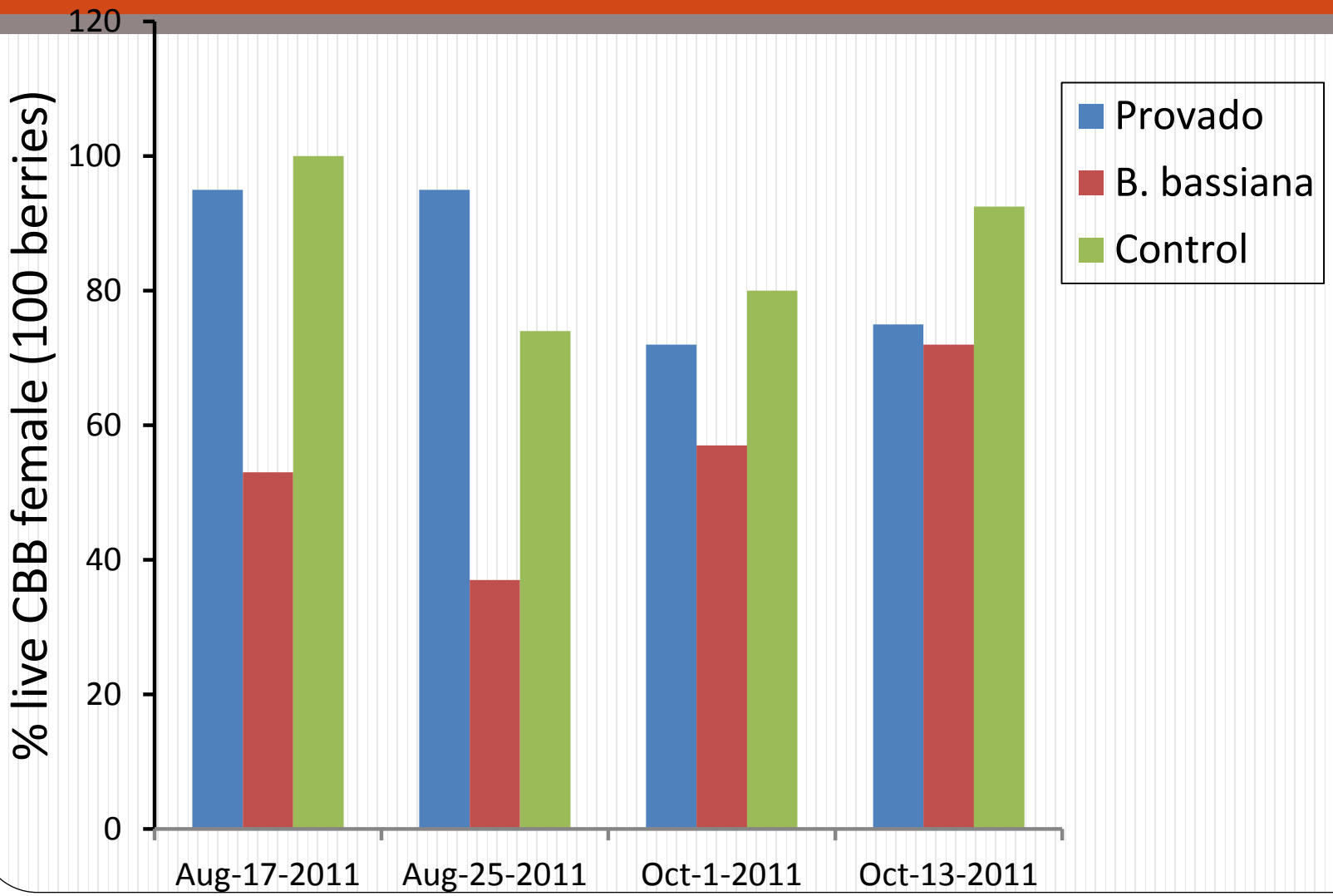


Application date:

B. bassiana: Aug-16,Sept-1,Sept-15

Provado: July-21,Aug-30,Sept-22, Oct-20

B. Number of live CBB females inside berries



B. Conclusions

- These are preliminary results / raw data
- Presence of fungus outside of berries does not necessary mean dead CBB
- The dose of Provado used was the lowest (4 oz per acre).
- Provado seems to be ineffective
- This experiment will be done next Spring (2012). Final results will be available.

C. Effectiveness of several commercial traps vs. a homemade trap to capture the CBB

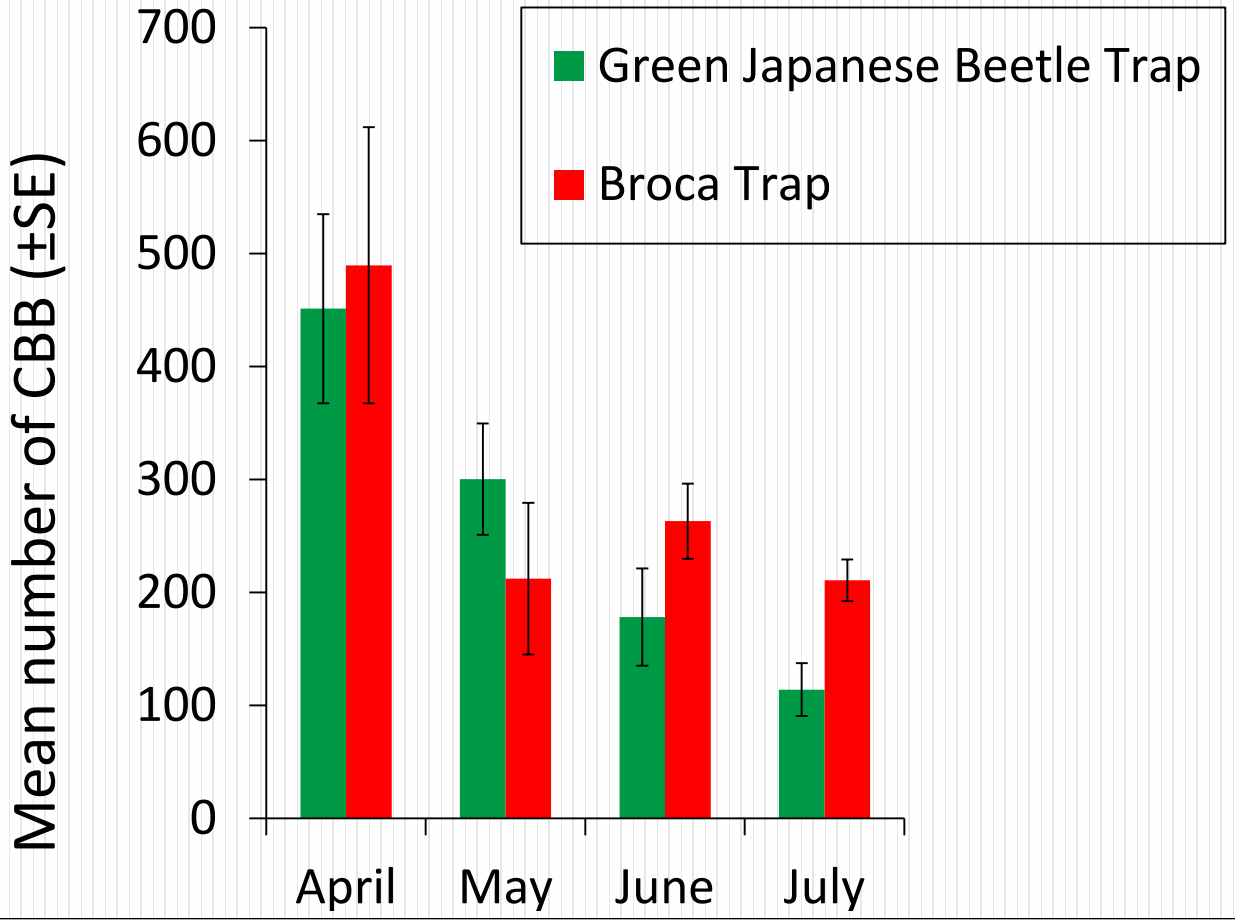
Broca trap

Red Japanese beetle trap

Green Japanese beetle trap

Homemade trap

C. Number of CBB captured in different traps



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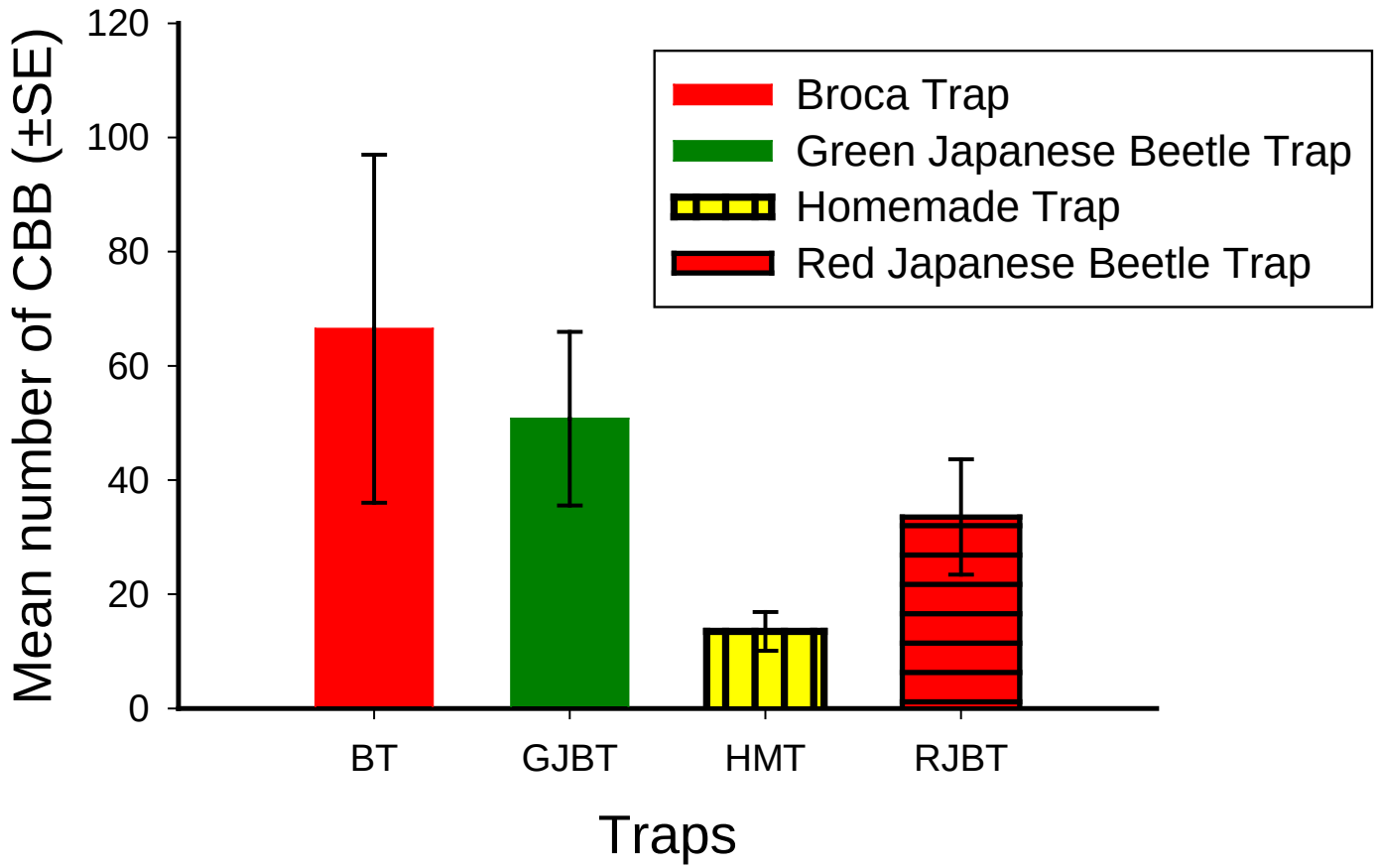

C. Materials and contact information for Japanese Beetle Trap

Material	Company name	Phone number	Price per unit
Japanese Beetle trap: green top only	Trécé incorporated	(918) 785 - 3061	$ 5.00
Plastic container: Straight side wide mouths jar. 125 ml. Catalog number: 2118-0004	Nalge Nunc International	(770) 871-4500 ext 4090	$ 2.41
Vaportape pest strip	Hercon Environmental	(866) 443 - 7266	$ 1.08
Ethanol container. 50 ml centrifuge container	Fisher Scientific	(800) 766 - 7000	$ 3.55
Ethanol + Methanol, 1:3 (1 gallon)	Greenwell farm		~ $ 12 ??

C. Participating farms

- Brooks and Bill Wakefield and Asia Vinayaga

•<u>Heavenly Hawaiian.</u> Owners: Dave and Trudy Batemans. Managers: Miguel and Lupe Mesa.

C. Conclusions

- These preliminary results show that the Coffee Berry Borer (CBB) was attracted to methanol:ethanol 3:1

- All tested traps captured CBB however, the higher number of females was captured in Broca traps, Green Japanese Beetle traps and Red Japanese Beetle traps.

- The home made trap captured the less number of CBB females.

- A second trial of this experiment will be conducted in Spring 2012.

D. Karla Casco's research

- **A.** Determine cost and benefit of *Beauveria bassiana* on Coffee Berry Borer.
- **B.** What is the cost of applying BB to a coffee plantation?
- **C.** What the level of effectiveness of BB as a control method?
- **D.** What is the benefit (in economic terms) of BB as a control method?
- **E.** Determine the efficacy of different doses and time application of *B. bassiana* on CBB.

D. Karla Casco's sponsors

- Zamorano Agricultural University. Honduras
- University of Hawaii at Manoa, College of Tropical Agriculture and Human Resources
- Christ Manfredi (Ka'u Farm and Ranch Company, LLC)
- Ka'u Cooperative (Gloria Camba)
- Pahala Plantation Cottages

E. Cultural practices: Harvesting season

- Efficient harvesting, **removing all** ripe and do not drop cherries on the ground.
- Bags should be tied shut at harvest to avoid the escape and dispersal of CBB.
- These sacks should **NOT** be left all day in the coffee plantation; they should be carried to the wet mill as soon as possible.
- **Use wide baskets**

E. Cultural practices: After harvesting season

- A management program for CBB starts with harvesting **ALL** raisins and dropped berries. These should be burned or buried.
- Once the harvesting of mature fruits is done, monitor out-of-season infestations **with traps** and observations in each field.
- CBB can survive for 3 months in dropped berries.

E. Cultural practices: Pruning season

- Before pruning, remove all the remaining berries, including immature out-of-season berries, raisins (cherries dried on the tree) and drops (fallen berries).
- Berries should be destroyed by burying/burning.
- Set baited traps in the pruned fields where the CBB are emerging from the berries.

F. Take home message

The Coffee Berry Borer CAN ONLY BE MANAGED WITH **Integrated Pest Management** AND COLLABORATION OF FARMERS.

Beauveria bassiana is **NOT** a Magic Bullet, that will control CBB to a high degree by itself.