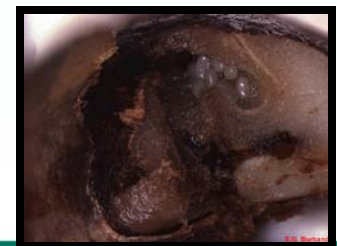


# Coffee Berry Borer (CBB)

## Preliminary Results

Elsie Burbano  
eburbano@hawaii.edu

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

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- 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 Shawn Steiman (Coffea consulting): Control of coffee berry borer and increase of coffee yields using Surround WP (kaolin).



# Outline

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- **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.** Recommendation to manage the CBB during harvest and pruning season
- **E.** Take home message

# A. Loren Gautz: heat treatment

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- 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

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- Farm location: Captain Cook Rd: Captain Cook, HI 96704.
- Elevation: 2,000 feet
- The coffee was picked and processed (pulped) on September 20th & 21<sup>st</sup>, 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<sup>o</sup> F and 70/75% RH).
- Bags were in the storage area for 4 days.



# A. CBB surviving after drying coffee process

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- Large numbers of CBB were lying on the floor. Then, move to warm  $T^0$  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.



# A. CBB surviving after drying coffee process. **FUTURE STUDY**

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- Will drying coffee on a deck provide enough heat to kill CBB?
- How long can CBB live in parchment stored in a controlled environment?
- How long can they survive in parchment stored in plastic bags?
- Are CBB removed from a cool storage area, able to reproduce?



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

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**Study farm:** Heavenly Hawaiian

**Owners:** Dave and Trudy Bateman

**Managers:** Miguel and Lupe Mesa

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

Dose: 4 oz per 100 gallons of water



## B. *Beauveria bassiana*

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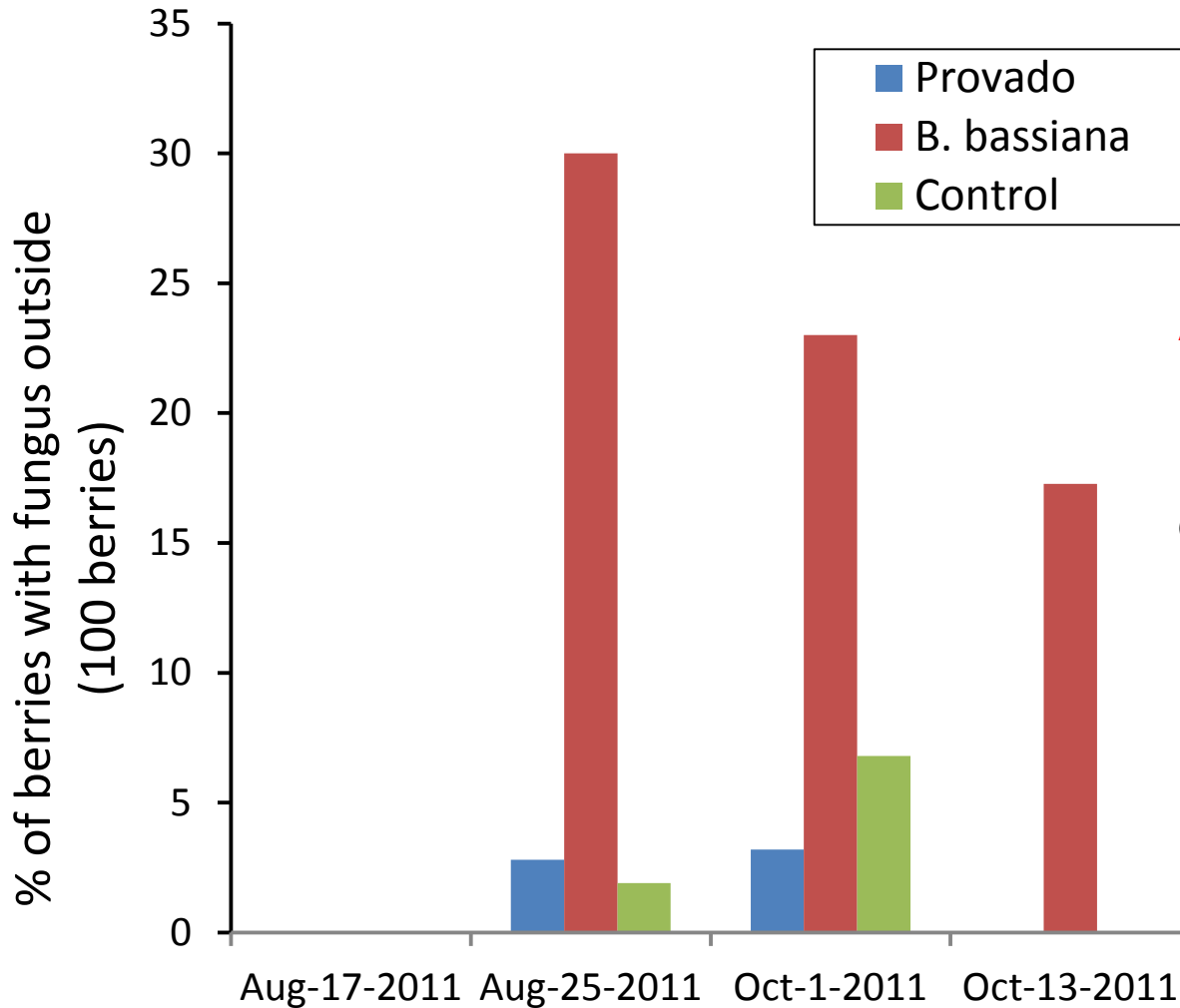


- *B. bassiana* is not an insecticide. It is a microbial pest control. **(Fungus)**
- It needs to be in contact with the insect.
- **Temperature, Ultraviolet Radiation** and Humidity in target microclimate affect its effectiveness.



Mist sprayer

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



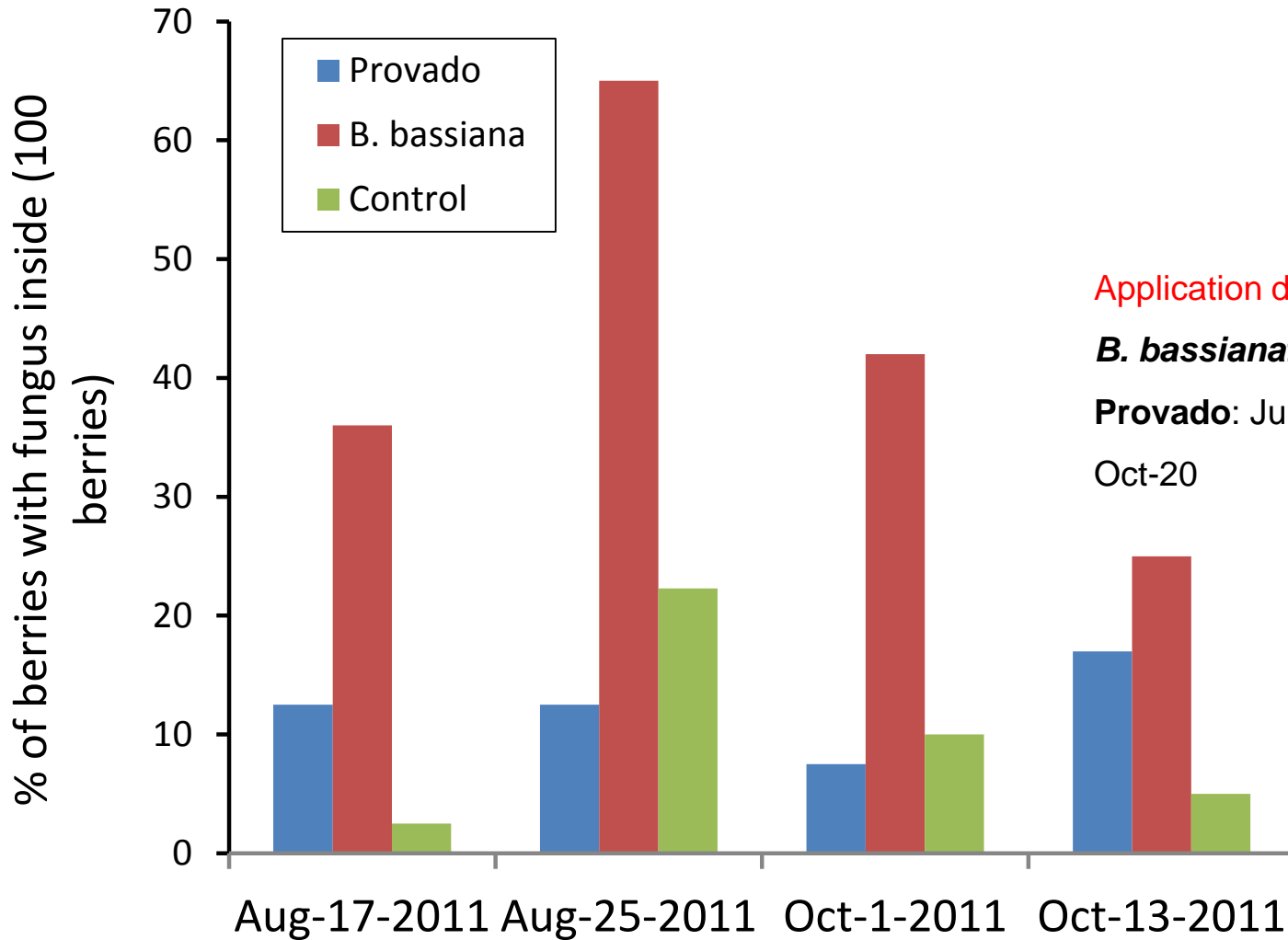
Application date:

*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:

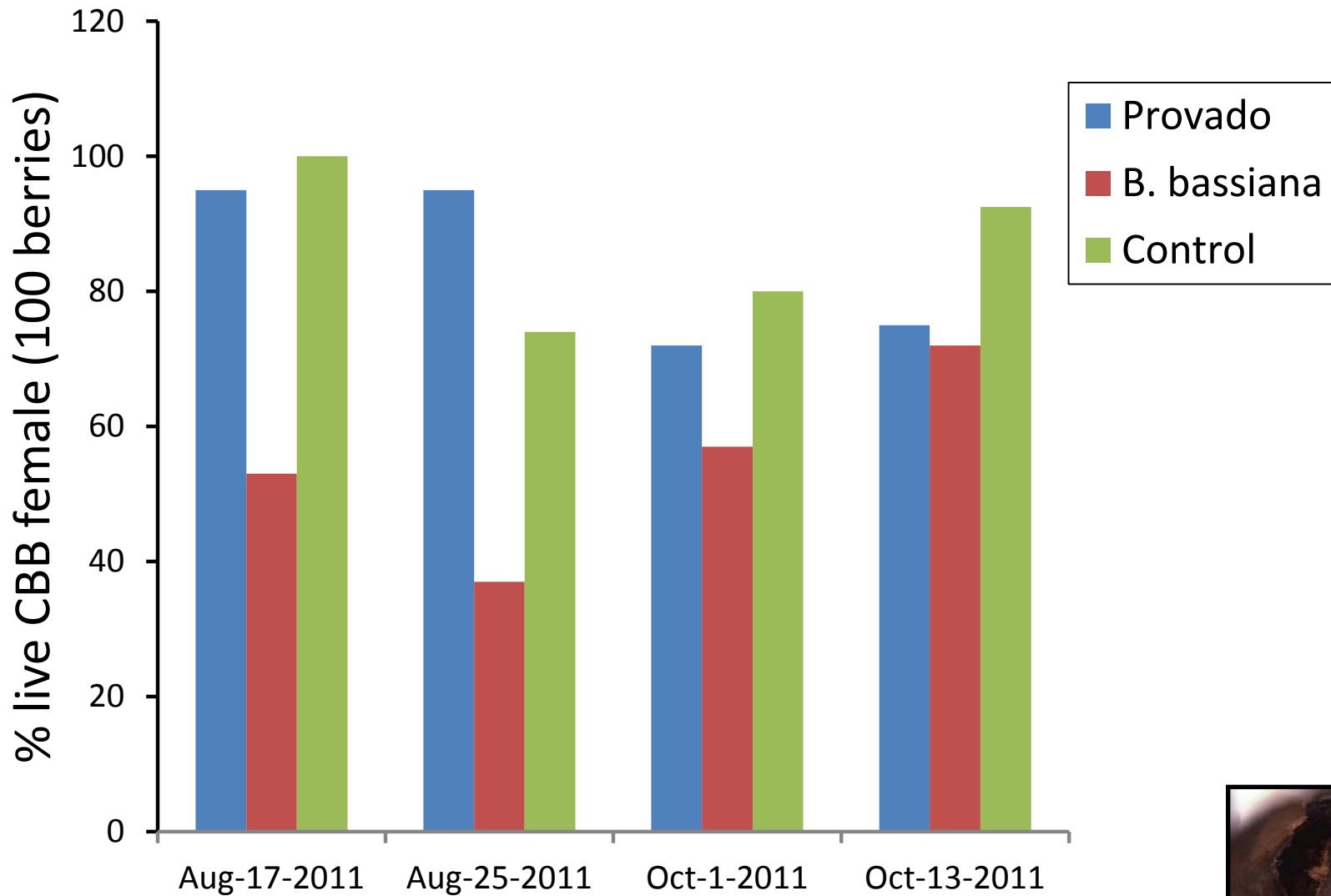
*B. bassiana*: Aug-16, Sept-1, Sept-15

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



## B. Number of live CBB females inside berries

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# B. Conclusions

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- 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.
- Please contact me if you are interested to participate in this study.  
[eburbano@hawaii.edu](mailto:eburbano@hawaii.edu)

## B. Participating farms

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- Brooks and Bill Wakefield and Asia Vinayaga



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

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

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Broca trap



Red Japanese beetle trap



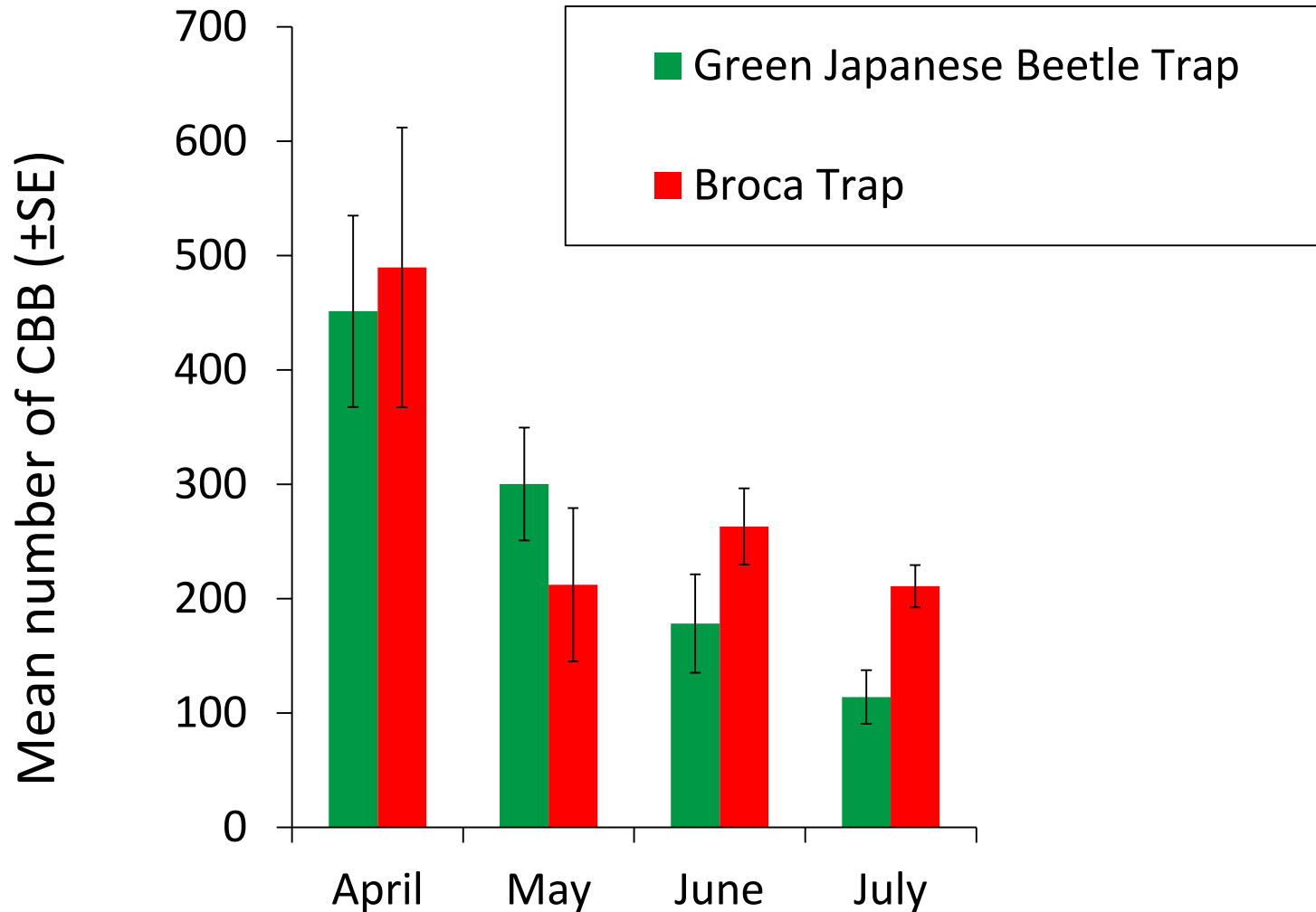
Green Japanese beetle trap



Homemade trap

# C. Number of CBB captured in different traps

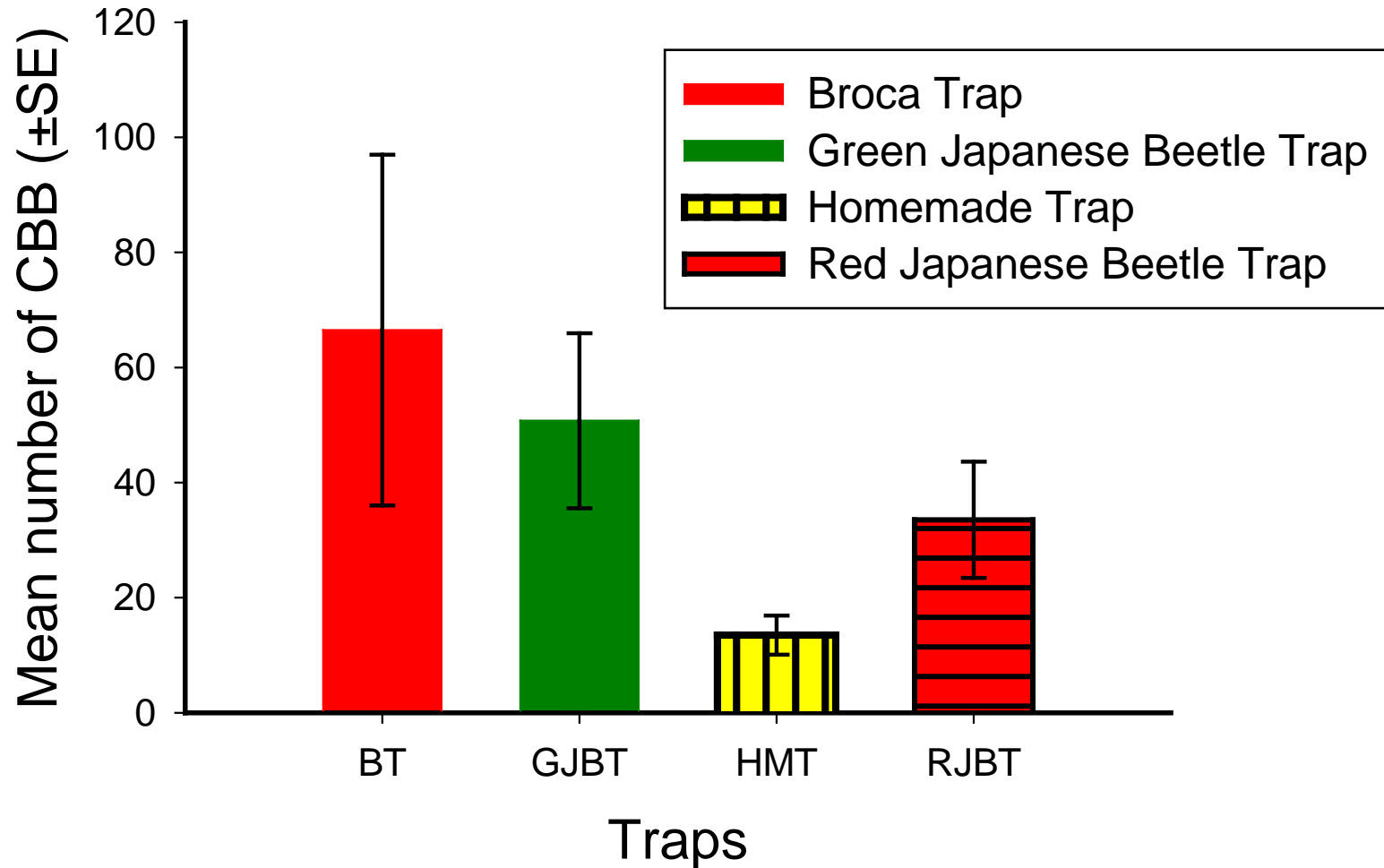
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# C. Number of CBB captured in different traps

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## C. Materials and contact information for Japanese Beetle Trap

<b>Material</b>	<b>Company name</b>	<b>Phone number</b>	<b>Price per unit</b>
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. Conclusions

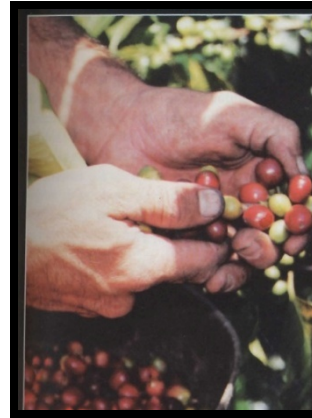
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- These preliminary results show that the Coffee Berry Borer (CBB) was attracted to methanol:ethanol 3:1
- All tested traps captured CBB however, the higher number of females was captured in Broca traps, Green Japanese Beetle traps and Red Japanese 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. Cultural practices: Harvesting season

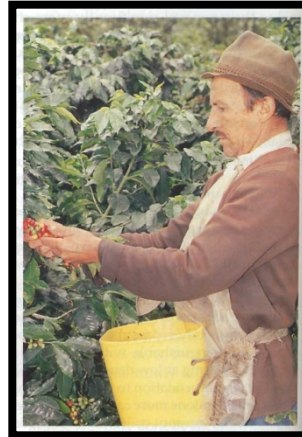
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- Efficient harvesting, **removing all** ripe and dropped fruit.
- Coffee bags should be made from synthetic fiber instead of the burlap that is more commonly used.
- Bags should be tied shut at harvest to avoid the escape and dispersal of CBB.
- These 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**



# D. 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.



# D. Cultural practices: Pruning season

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- 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 in the soil 18 inches deep or by burning.
- Set baited traps in the pruned fields where the CBB are emerging from the berries.



# E. 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.



# Integrated Pest Management for CBB

