THE COFFEE BERRY BORER INVADES KONA

How to live with CBB?

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COFFEE BERRY BORER (CBB)

Hypothenemus hampei Ferrari

(Coleoptera: Cuculionidae, Scolytinae)

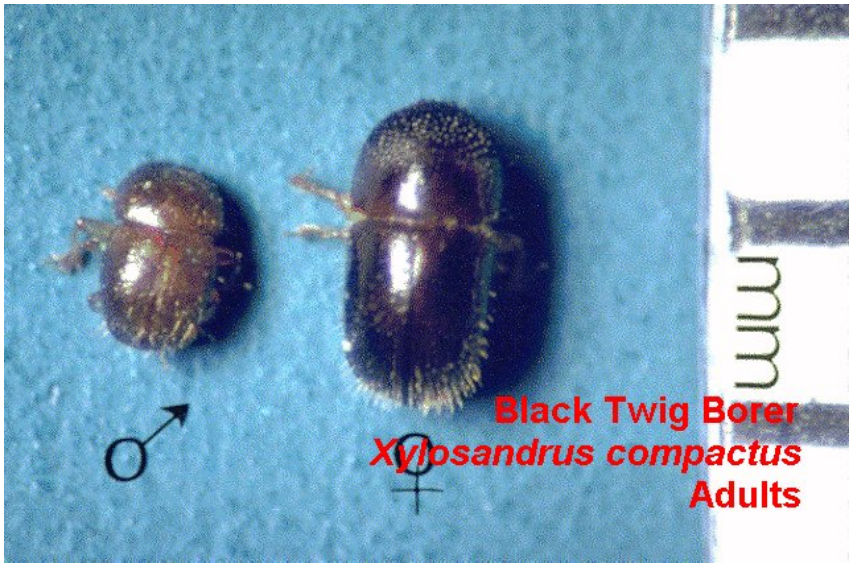
Endemic to Central Africa

The most economically important pest in coffee worldwide

Hawai`i Department of Agriculture

CBB LOOK ALIKES

Black twig borer
Xylosandrus compactus



Tropical nut borer
Hypothenemus obscurus

Found in South Kona (Hawai`i Island) only

-August 2010

-Confirmed by USDA-ARS

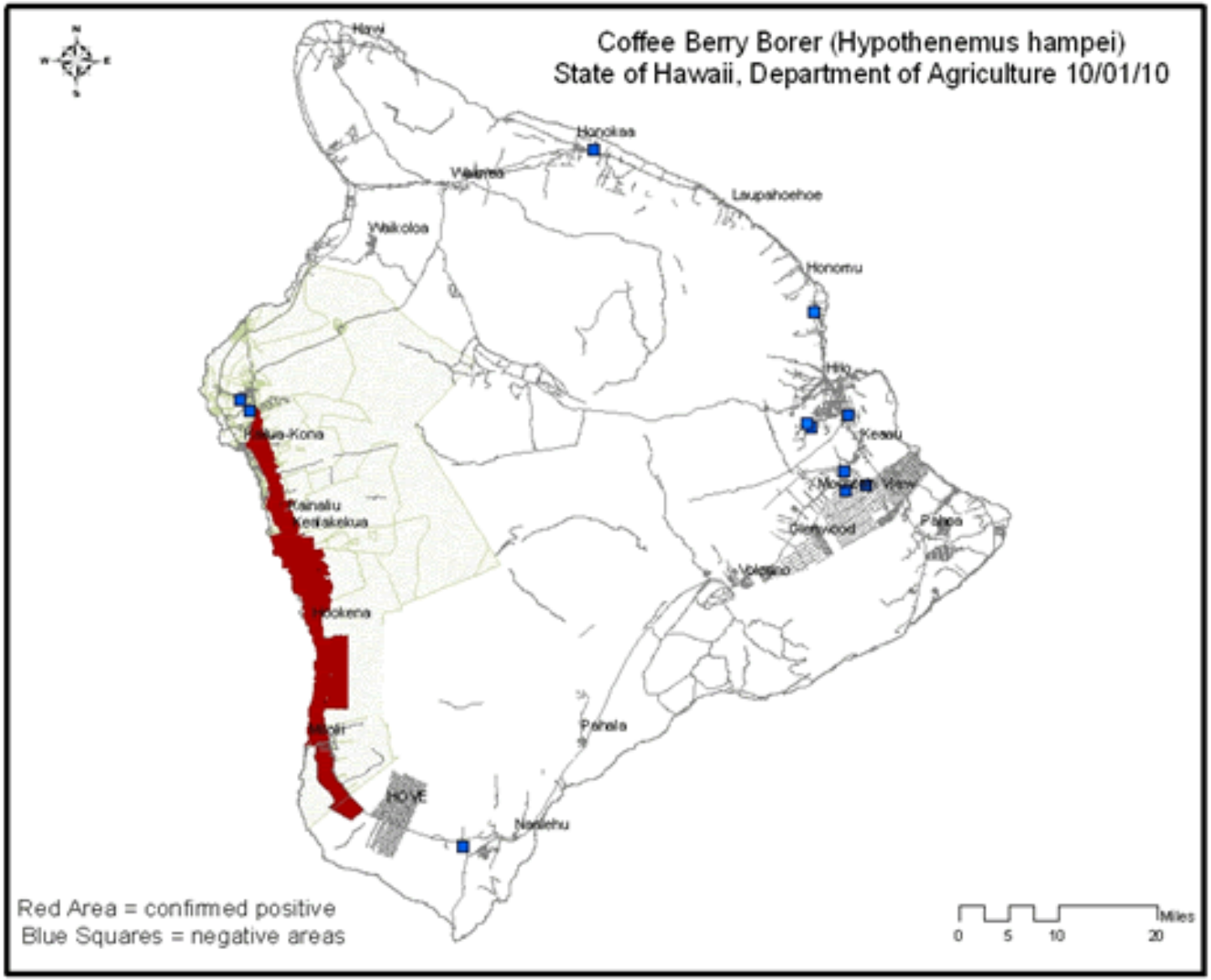
-Its distribution suggests that CBB has been present there for several years

-Not yet found on other islands

-How it got there?

→Controversy, finger pointing

-Misidentified (BTB, TNB)?


Coffee Berry Borer (Hypothenemus hampei)
State of Hawaii, Department of Agriculture 10/01/10
Honokaa
Laupahoehoe
Waikoloa
Honomu
Hilo
Keaau
Pahoa
Pahala
Naalehu
Red Area = confirmed positive
Blue Squares = negative areas
Miles
0
5
10
20

-Adults are 1.4-1.8 mm long
-Very young berries to mature berries are attacked.
-Founder females bore into the berry and live all their lives in the berry; very well-protected.
-Females lay 2-3 eggs per day for approximately 20 days
-10:1 female:male sex ratio

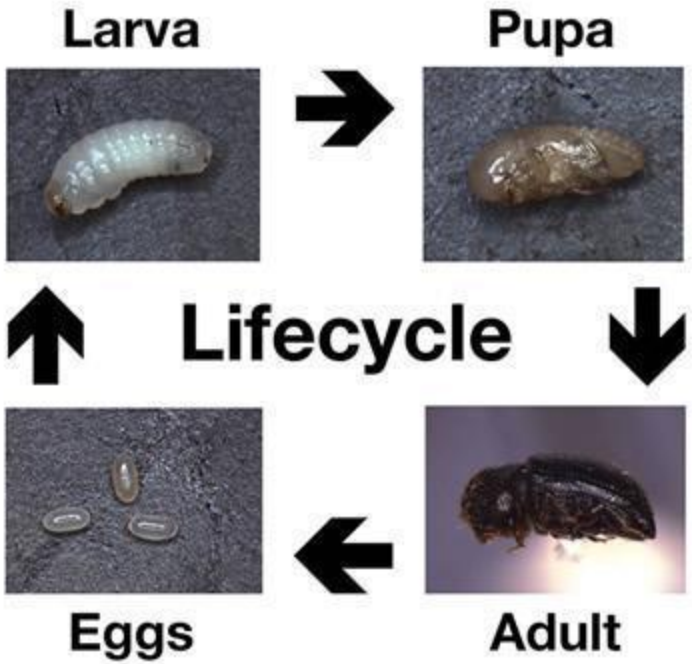
-Sibling mating occurs, therefore, females that leave the berry are already inseminated

-Females typically leave the berry during periods of rain and/or high humidity to look for another berry to infest

-Males do not fly; only good for ~~nothing~~ mating

-CBB development and reproduction continue in “raisins” (dried up berries) that have fallen

Life cycle, 28 to 34 days
Females can live up to 157 days and
males can live 20 to 87 days
All stages can be found in the berry at the
same time

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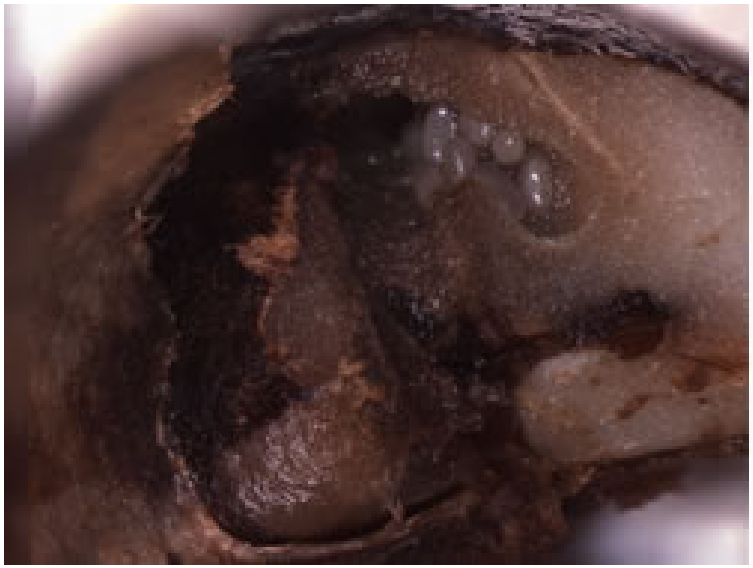
Relative size

Typical entry holes



Egg gallery (left) and eggs and larvae (right)

Alternative hosts (reported reproduction)

- haole koa (*Leucaena leucocephala*)
- red fruit passion flower (*Passiflora foetida*)
- corn (*Zea mays*)
- yam (*Dioscorea* sp.)
- pigeon pea (*Cajanus cajan*)
- ixora (*Ixora* sp.)
- etc.

Controlling CBB

Monitor

Use baited (ethanol/methanol) traps

Chemical control

-Not an effective means, unless one can time efficacious insecticide sprays when the females are outside of the berry, searching for a berry to infest.

-Biopesticides with *Beauveria bassiana* cannot be used commercially in HI (yet), due to concerns with native Scolytids.

-Have not tested efficacy of currently registered pesticides, e.g., imidacloprid, buprofezin, azadiractin, neem oil.

Controlling CBB

Cultural control

-Essentially prevent adult females from escaping at any and all phases of coffee production and processing.

-Remove all berries from an infested orchard (manual or mechanical); prior to pruning, during harvest, after harvest.

-Destroy all berries not marketed.

-Destroy or treat all byproducts, e.g., pulp.

-Clean all equipment and especially bags.

Controlling CBB

Cultural control

-Remove all berries from an infested orchard (manually or mechanically), huh?

Controlling CBB

Cultural control

-Remove all berries from an infested orchard…easier?

Controlling CBB

Education

-Each farm should have at least one person with responsibility to assess and oversee the management of CBB.

-Farm employees should be educated on what to do and what not to do to reduce the incidence and spread of CBB.

-Educate the public and tourists about not taking fresh berries and parchment coffee from farms in Kona.

Controlling CBB

Quarantine

-HDoA imposed an interim quarantine rule.

-Primary zone – Western Kona coast

-Secondary zone – entire HI Island, excluding primary zone.

-Green bean (RAC) must be treated before leaving quarantine zones (under permit).

heat

fumigation

-No fresh berries leave zones for interisland transport.

Controlling CBB

Biological control

Beauveria bassiana (GHA strain)

-Commercial pesticide formulations: Botanigard ES, Mycotrol O

-Can now be imported into HI but only under an emergency permit for field testing.

-Local strains of *B. bassiana* already exist, but are genetically distinct from the GHA strain.

-Lab virulence tests (USDA-ARS) indicated that there is no evidence showing that the GHA strain is a greater risk to native insects than strains already existing in HI.

Controlling CBB

Beauveria bassiana (cont.)

-Parts of Hawai`i Island were under exceptional and severe drought. Someone had suggested that the drought, lasting about 2 years (since April 2008) in Kona, caused the local strain(s) to die off.

-This was suggested because CBB was suspected of having been in Kona for several years based on its current distribution.

Controlling CBB

Research (ongoing/proposed)

-Post harvest treatments, e.g., heat, irradiation, hypobaric, CO_2, etc.

-Trapping

-Synchronizing flowering and fruit. development to reduce CBB reservoirs.

-Pesticides – Mycotrol/Botanigard, screening (new and existing products), entomopathogenic nematodes, indigenous *B. bassiana*, natural products.

-Predator complex