Update on Quarantine, Containment and Biocontrol of Coffee Berry Borer

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HDOA work on CBB

- Initial Response
- Containment/Quarantine
- *Beauvaria* registration
- Biological Control

Coffee Berry Borer

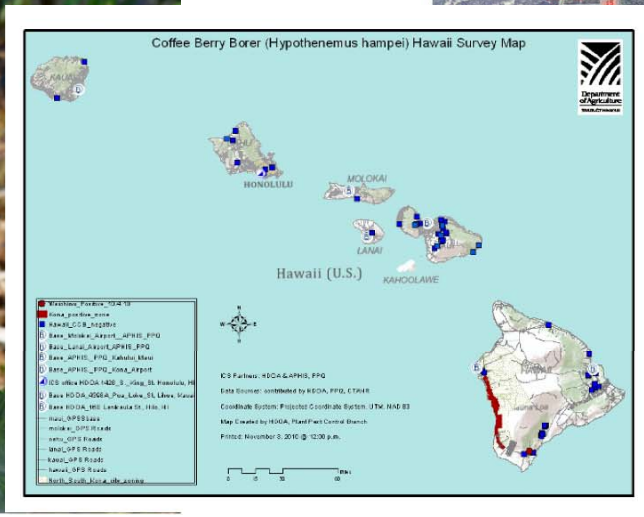
- First reported September 2010 in Kona
- Initiated Pest Diagnostic Protocol (NPDN)
- Presumptive positive ID by HDOA taxonomist
- Confirmed by
  - Al Samuelson (Bishop Museum)
  - Vandenberg (USDA Systematic Entomology Lab)

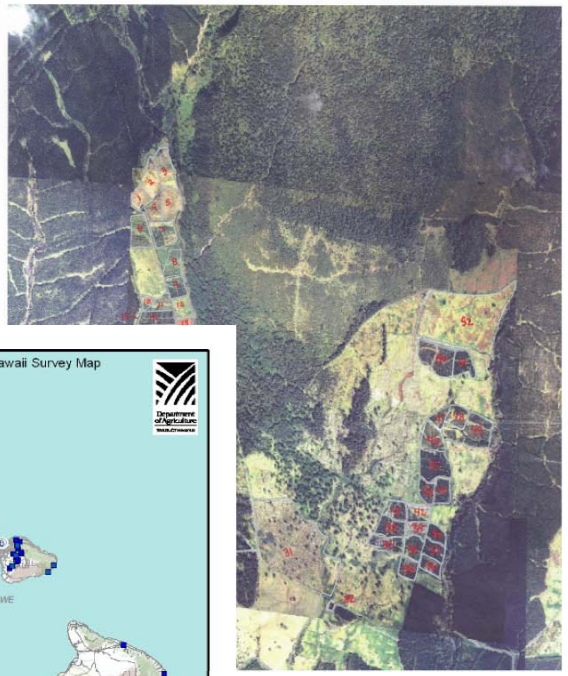
Response

- Sept 2 – samples submitted to HDOA
- Sept 3 – samples sent for confirmation (Friday)
- Sept 7 – PPC strategy meeting
  - Determine extent of infestation
    - Known survey techniques?
    - Alternate hosts?
  - How can it be contained?
  - Control options
    - Pesticides, Beauvaria, biocontrol
  - Outreach, website, and press release
  - Implement ICS
- Sept 8 – identification confirmed by SEL

ICS Objectives

- Determine extent of infestation
- Contain infestation
- Eradication





ICS Objectives – Delimit Infestation

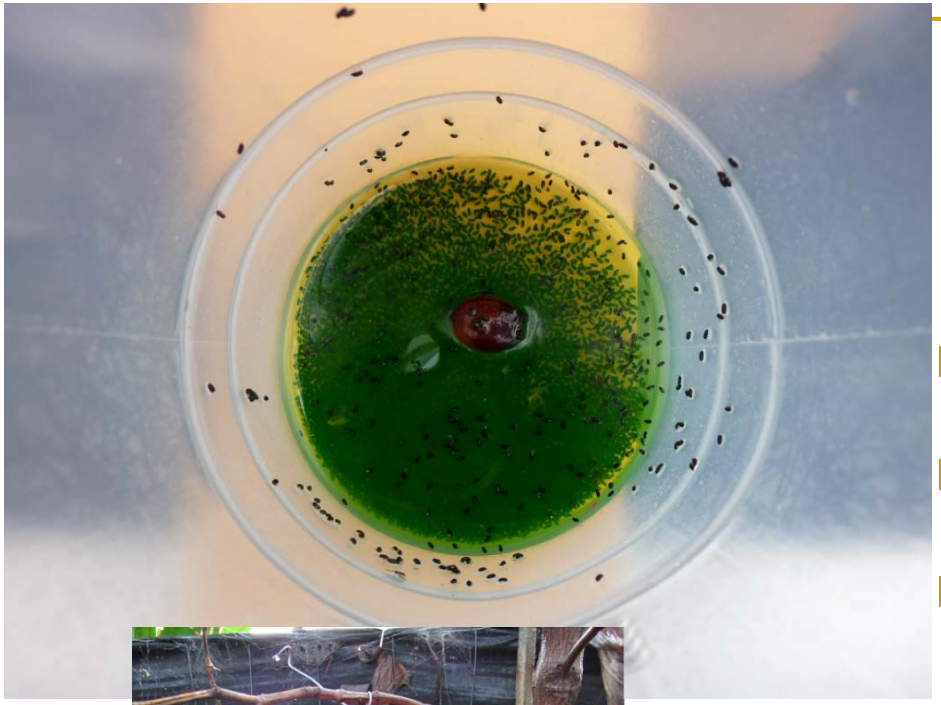
- Purpose
  - Rapid statewide assessment
  - Presence/Absence
  - Not Infestation Levels
- Methods
  - Identify all coffee farms and mills
  - Develop sampling protocol
  - Implement sampling protocol statewide
    - Include visual surveys and traps

Sampling Protocol

- Grower and mill submission protocols
- ICS Survey teams
  - Visual survey
    - procedures for field and mill surveys
    - sanitation and decontamination of personnel and equip
  - Trap placement
  - Alternate hosts
  - Collection, preservation, and submission of samples

Beetles in Cherries

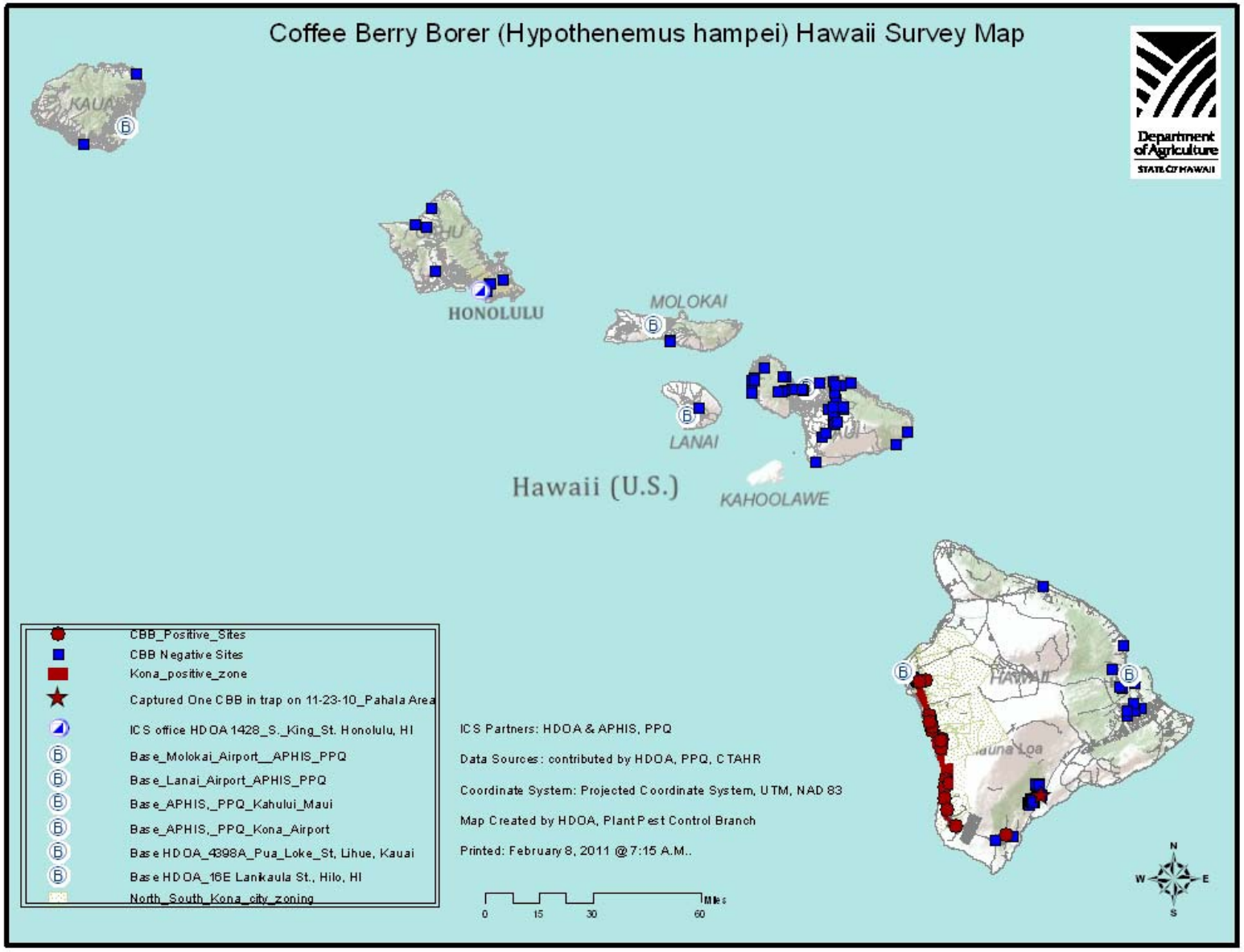
- Hypothenemus hampei
- Xylosandrus compactus
- Hypothenemus obscurus
- Araecerus fasciculatus



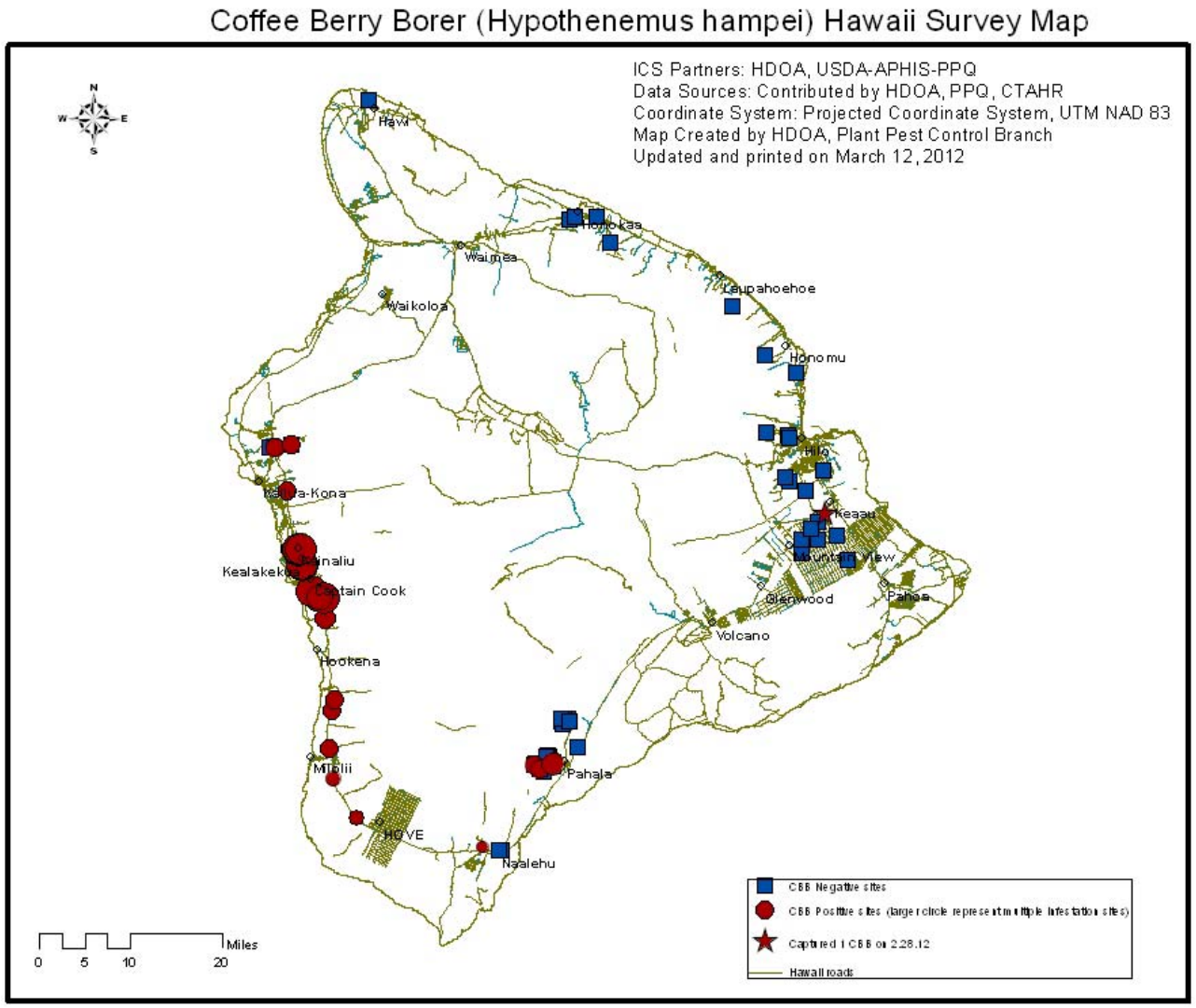
CBB trap catches

- 30 species of insects
- Primarily beetles
- 12 Scolytinae
  - Hypothenemus (5 sp)
  - Ericryphalus (1 sp)
  - Xylosandrus (2 sp)
  - Xyleborus (3 sp)
  - Xyleborinus (1 sp)

CBB Distribution Statewide



CBB Distribution: Hawaii Island



ICS Objectives – Contain Infestation

- Treatment options
  - What is available?
  - What new options can be brought to Hawaii?
- Movement of high risk material
  - What are high risk materials
  - How is it being moved
  - What measures can be used to lower risk
- Establish protocols/quarantines to stop movement

Quarantine

- Movement or transport of coffee plants, plant parts, unroasted seeds (green beans), coffee harvesting equipment, and used coffee bags is prohibited from infested areas to restricted areas except by permit issued by the PQ Chief for:
  - Propagation if treated
  - Roasting if treated or safeguarded
  - Research purposes if under safeguard conditions
  - Used bags and equipment if treated
  - Details in HAR 4-72-12 or call PQ (808-832-0566)

- Big Island is designated infested and other islands are restricted

Beauvaria bassiana Registration

- 2002 –request to import for insect control
  - Denied but allowed for lab studies
    - Studied 14 strains in Hawaii and GHA strain
    - Conclusions:
      - GHA strain no more virulent than strains in Hawaii
      - Growth of Hawaii strains >= GHA
- 2010 –October request to import for CBB
  - Botanigard and Mycotrol
  - Originally for field efficacy trials (Jan 2011)
  - Request for commercial sale (Feb 2011)

Biological Control Exploration

- HDOA conducted exploration in Madagascar and Tanzania
- Found 3 of 4 known parasites from Africa
- CBB not a problem in Bukoba, Tanzania
  - observations of <1% infestation in unsprayed fields

Biocontrol Exploration: Tanzania

CBB natural enemies in Africa

- Found
  - Prorops nasuta (Bethylidae)
  - Cephalonomia stephanoderis (Bethylidae)
  - Neoheterospilus coffeicola (Braconidae)
- Not found
  - Phymasticus coffea (Eulophidae)

Prorops nasuta

- larval-pupal ectoparasitoid
- was the predominant species reared from material collected in Africa
- 97% from berries on ground in other studies

Cephalonomia stephanoderis

- larval-pupal ectoparasitoid
- emerged from the Bukoba and Moshi collections
- first report from E. Africa

Neoheterospilus coffeicola

- larval-pupal ectoparasitoid
- Very little information on this species but is considered the most promising of all the CBB natural enemies
- has not been used in biological control programs because of rearing difficulty related to male-biased sex ratio when reared under laboratory conditions.

Biocontrol Future

- HDOA explorations in Ethiopia in September 2012

- Bottlenecks
  - Native beetles (22 scolytids)
  - Develop lab rearing techniques for CBB, natural enemies, and potential hosts
  - Limited staff and space capacity