Hawaii Apiary Program

Danielle Downey
Hawaii State Apiary Specialist
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• Pollinators in Hawaii
• Honeybees in Hawaii
• Current problems & situation
• Apiary Program services and strategies
Introduced

- Honey bee
- Leaf cutter bee
- Carpenter bee
- Butterflies
- Wasps
- Flies
- Birds
- Incidental flower traffic

Native

- Hylaeus spp
- Butterflies
- Flies
- Birds
- Incidental flower traffic
Hylaeus species (Colletidae)

- “yellow face bee”
- 60 species native to Hawaii
- Pollinate native plants
Leaf cutter bees (Megachilidae)
Carpenter bees (Xylocopidae)
Hawaii Honeybee History

• Not native to Hawaii
• Arrived in 1857 from California
• 1890s ranching grows, kiawe requires bees
  – lantana, guava, koa, ohia lehua, ti, Christmas berry, pineapple, coconut
  – 1892 first Macadamia nuts arrive
• Various imports until 1909, now illegal
• 1918-1941 over 1 million pounds/year honey
Hawaii Honeybee History

• 1930 American Foulbrood, near wipeout
• Learn to manage disease, rebuild
• 1952 11,900 hives on islands, 25 commercial beekeepers
• Growth industry for honey and queen rearing
• Unknown number of beekeepers presently
Products of the hive

- Honey
- Pollen
- Propolis
- Beeswax
- Royal Jelly
- Bee Venom
Hawaiian Honey

- Very desirable in market
- High value
  - $40/lb
Queen Bee Production

• Critical part of managed colonies
• Climate allows extended seasons
  – Early availability to USA and Canada
  – Three producers ship off island
• With colony collapse on mainland, demand exceeds supply
• Hawaiian beekeepers enjoyed freedom from Varroa mite and Small Hive Beetle
What is the most valuable thing we get from bees?
Pollen
Value of pollination: $15 billion/yr

Totally dependent:
- almonds, apples, avocados, blueberries, cranberries, cherries, kiwi fruit, macadamia nuts, asparagus, broccoli, carrots, cauliflower, celery, cucumbers, onions, legume seeds, pumpkins, squash, and sunflowers

Rely heavily:
- apricot, citrus peaches, pears, nectarines, plums, grapes, brambleberries, strawberries, olives, melon, peanuts, cotton, soybeans, and sugarbeets
Tropical Fruits need pollination

- Apple
- Apricot
- Avocado
- Banana
- Black currants
- Blackberry
- Blueberry
- Cactus (prickly pear)
- Cherry
- Citrus
- Cranberry
- Cumquats
- Currants
- Custard apple
- Durian
- Feijoa
- Gooseberry
- Grapefruit
- Grapes
- Guava
- Jackfruit
- Kiwifruit
- Lemons
- Limes
- Loganberry
- Longan
- Loquat
- Lychee (Litchi)
- Mandarins
- Mango
- Mulberry
- Nashi
- Nectarine
- Olives
- Oranges
- Papaw, Papaya
- Passionfruit
- Pawpaw
- Peach
- Pear
- Persimmon
- Plum
- Pomegranate
- Prickly pear cactus
- Prune
- Rambutan
- Raspberry
- Red currants
- Rock melon
- Tamarind
- Tangelo
Unknown number of beekeepers in Hawaii, annual bee-pollinated farm sales valued at $212.8 million
By island...

- Statewide estimate 12,000 managed hives
  - Hawaii: 10,000. BIBA
  - Kauai: 1,000. KBEE
  - Maui: 500. new group
  - Molokai: 100. DHHL/CTAHR extension
  - Oahu: 600. HBA, Co-op, UH Manoa Bee Team
  - Lanai: 3 beekeepers
Recent arrival of three unwanted pests...

- Varroa destructor, a parasitic mite
- Small Hive Beetle, a prolific and well adapted pest
- Nosema cerana, a microscopic gut parasite
Varroa mite

- Discovered on Oahu, April 2007
- Discovered on Big Island August 2008
  - Eradication effort (failed)
- Widespread on both islands
- Continued trap surveillance on other islands
  - Education
  - Early detection, rapid response
Small Hive Beetle

Highly destructive in Hawaii
- Secondary pest other places
- Lives on fruit, feral hives, or just wait around for failing colonies
- Long lived (over a year)
- Strong flyer
Small Hive Beetle History

- Native to Africa, minor pest there
- Discovered Florida, 1998
- Big Island April 2010
- Oahu November 2010
- Molokai May 2011
- Maui July 2011
- Kauai June 2012
Hawaii is great habitat:
Feral Hive Density Very High
Implications....

• Pollination was a ‘free-bee’
• Growers do not consider managed bees part of their productivity
• Beekeepers agree to pollination locations for the honey crop (unpaid)
• Unknown pollination need, pollinator loss
• We are living the experiment!
• Beekeeping gets harder in Hawaii
• Hard to find bees to rebuild
• Fewer pollinators for Hawaiian agriculture
  – Jefts needs 100 colonies for $3mil/watermelons
  – Avocado, macadamia nuts, longan, melons, lychee, berries, stonefruit, apples
  – Mango, coffee, many crops benefit from bee pollination (faster, bigger, more)
Apiary Program & Pollination Security

• Outreach:
  – Protecting Pollinators from Pesticides
  – Pollinator Planting Guide

• Voluntary Beekeeper Registry
  – 35/124 willing to pollinate

• Surveys of growers indicate pollinator need

• Pollination Contract template, Best Management Practices

• East Hawaii Tropical Fruit Growers & Big Island Beekeepers partnership for Apiary Days
California Almonds ~800K acres
On the mainland: over 2 million bee colonies are rented each year for pollination services*, most of them travel over the road. Rent is $150/colony!

*they need queens from Hawaii!
Commercial beekeeping changes

- Until 1980’s: 75% managed for honey production
- Today: 75% manage for pollination
Honeybee Pollination paths

January-Feb

500 miles
Hawaii’s advantage

- Agricultural practices still bee-friendly
  - Diverse, few large monocrops, less pesticide application
  - Protecting pollinators from pesticides
- Habitat includes many blooming plants
- Seasons allow foraging all year
- In contrast, California almonds require pollinators but cannot support them after 6 week bloom period.
Statewide services (see handout)

- Regulations to prevent bee imports (PQ)
  - Africanized bees intercepted on Oahu
- Pollination services development
- Swarm response lists
- Inspections to facilitate commerce
- Public events everywhere to raise awareness, including protecting bees from pesticides
- Working to develop resistant stock in Hawaii
- Bee Laws to support regulatory apiary program do not exist in Hawaii, our focus is education.
Just in Time: Pollinator Awareness!