Hawai`i Apiary Program

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Thanks to our supporters:

Hawaiian Honey Festival Huge Success!

On Saturday, November 23, the Big Island Beekeepers Association (BIBA) hosted the first statewide Hawaii Honey Festival, at the beautiful Nani Mau Gardens in Hilo. Attendance was estimated at 3,000! Congratulations to Honey Challenge winners! Over 130 honeys were submitted from Hawaii, Oahu, Maui, Kauai and Molokai. Plan to submit your liquid gold in next years Honey Challenge!

Research Update: VSH Bees on Big Island

What are VSH bees?

VSH stands for Varroa Sensitive Hygiene. Before this name, these bees were called SMR, which stands for Suppressed Mite Reproduction. At the USDA Bee Research Lab in Baton Rouge, bees were observed that showed low mite levels over time. More info here.

How are VSH bees special?

Varroa mites feed on bee blood. They crawl in a cell just before a bee larvae is capped, fed on it and lay eggs. VSH bees somehow detect these mites, uncap the cell and remove the larvae. This interrupts the mite reproduction and reduces Varroa populations. It is not known what cues the bees are using, but this video shows these bees removing a pupae, which they will consume or throw out, and you can see the Varroa mites crawl out! This behavior exists in all bee populations, but has been selected by breeding the highest levels of this behavior in VSH lines.

VSH reduces pesticide use.

Varroa has been on the mainland for decades. Many beekeepers adopted chemical mite treatments, but others have been selecting bees that do not require mite treatments, and they have had success. See Glenn Apiaries as an example. With year-round brood rearing in Hawaii, mite levels grow continuously in Hawaii. We hope bees with resistance to Varroa can reduce our reliance on chemical treatments.

I thought it was illegal to import bees? Where did you get VSH bees?

It is illegal to import bees, so we have been importing VSH semen from mainland breeders, and instrumentally inseminating queens in Hawaii. Over several consecutive years, we now have queens that are over 98% VSH to breed from.

We are testing VSH bees.

We have been watching VSH colonies closely, sampling mite levels as well as colony traits like brood pattern, honey production, and temperament. We select the best performing lines and breed more queens from those for ongoing trials. Currently we monitor over 200 colonies with VSH queens.

How do I get some to try?

There are VSH queens on Kauai, Maui and Big Island. Contact us if you're interested!

This video shows VSH bees uncapping a Varroa-infested cell and removing the pupae. Courtesy USDA-ARS Baton Rouge Bee Research Lab

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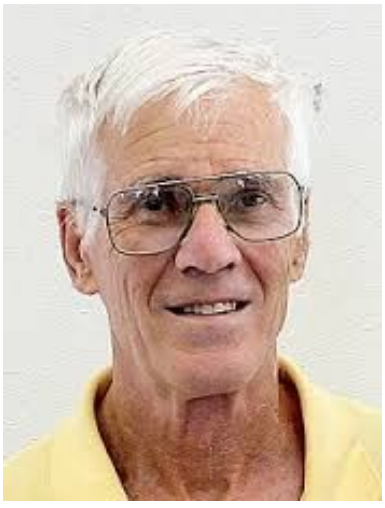
Fireweed toxins: are they in honey and pollen?

Fireweed is abundant on Big Island, its yellow flowers are easily spotted on Mauna Kea, shown here.

HDOA Apiary Program maintains a hive surrounded by fireweed. This hive can be sampled to analyze honey and pollen for fireweed toxins.



Bob Sumner-Mack, a Hilo beekeeper and Master Gardener, passed away Dec. 11. Bob was instrumental in establishing a demonstration apiary at Komohana Research Extension Center, a legacy we will maintain and all benefit from. See obituary.

Pyrrolizidine alkaloids (PAs) are widespread, and occur in as much as 3% of the world's flowering plants. They are toxic to mammals, especially livestock, and can be poisonous to humans in herbal remedies or contamination of grains. Many produce a type of cirrhosis of the liver. One has been classified as a suspected carcinogen (cancer-causing), others may also be carcinogens.

In Hawaii the plant species containing PAs are fireweed (*Senecio madagascariensis*), billy-goat weed or tropical whiteweed (*Ageratum conyzoides*) and rattlepods (*Crotalaria* spp). Of these, fireweed is of most concern because it is widespread, extremely invasive causes liver damage in cattle.

PAs may occur in honey and pollen. This has been the case in Australia where borage (*Echium* species) is widespread. The European Food Safety Authority (EFSA) has surveyed honeys to determine the amount of contamination by PAs. For these concerns, the potential contamination of Hawaiian honey by fireweed PAs is being assessed.

An experimental hive maintained on Mauna Kea was sampled in July 2013 for total PAs in the honey and pollen. The beehive was located in a fireweed stand, and the pollen was distinctly yellow-orange in color, suggesting that the bees had been gathering from the fireweed. A control beehive located in a macadamia nut orchard at Panaewa, Hilo was also sampled on the same day.

The analysis showed the honey samples contained 100 -300 parts per billion (ppb) of total PAs and the pollen samples had 66-99 parts per million (ppm). The samples from the Panaewa hive contained no detectable PAs. Additional samples were collected from the experimental hive in Sept. and Dec. and are currently being analyzed, along with some retail samples.

For comparison, the borage (*Echium vulgare*) samples from Australia and New Zealand had a much higher level of contamination, containing 0-2850 ppm (honey) and 8,000-14,000 ppm (pollen). European scientists analyzed a total of 3917 honey samples and 119 'bee pollen' samples. PAs were found in 66% of the raw honeys (bulk honey not yet packaged in containers for sale in retail outlets) and in 94% of honeys available in supermarkets. A total of 60% of the bee pollen samples were PA positive.

There are currently no regulatory levels for PAs in honey but regulations will probably be imposed by EFSA in the future.

It appears that contamination of honey from fireweed in Hawaii can occur but that the PA levels are not extremely high. However, consumption of pollen should probably be avoided.

Author: Russell Molyneux

Upcoming beekeeping events

- Pollinator Conservation Short Course, 6 Feb in Hilo, offered by Xerces Society. This full day training will provide you with the latest science-based approaches to reversing the trend of pollinator declines, and will equip you with the recipes necessary to protect and manage habitat for these vital insects. Contact Zach Mermel, (808) 494-5976

- Hansons Honey Bees will offer a Beginner Workshop followed by Queen Rearing with guest Jeff Ritchie in Feb and March. Focus on selecting hygienic stock. Pahoa, Big Island. Call (808) 965-0000.