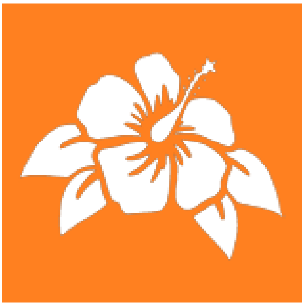
Honeybee / Pollinator Expo

Nov 5 | 2010



UH Honeybee Project

About the speakers

Dr. Sylvia Yuen	Interim Dean of the College of Tropical Agriculture and Human Resources
Mr. Jerry Hayes	Apiary Inspection Assistant Chief for the State of Florida. Mr. Hayes recently visited HI as an advisor on the Small Hive Beetle problem, and kindly contributed a note on this pest for the Bee Expo.
Dr. S.J. Martin	Senior Research Fellow, APS, University of Sheffield, UK. Dr. Martin is a specialist on varroa mite population dynamics and bee viruses. In addition, he is interested in chemical communication systems in social insects.
Dr. L. Medina	Researcher at the Apiculture Department of the Universidad Autonoma de Yucatan, Mexico. Dr. Medina is an expert on organic Varroa control methods for tropical regions and on the use of stingless bees by local Mayan beekeepers.
Dr. R. Calderon	Researcher at Centro de Investigaciones Apicolas Tropicales at the Universidad de Heredia, Costa Rica. He is the coordinator of the bee pathology department and has been working with local women that manage Africanized bee colonies.
Dr. K. Magnacca	Is a postdoctoral researcher at the University of Hilo on the Big Island. He is an expert on the taxonomy and ecology of the endemic bees of the genus Hyaleus.
Dr. P. Couvillon	Dr. Couvillon is a researcher at PBRC in UH Manoa. Her interests involve learning and memory in animals. Dr. Couvillon is particularly interested in how foraging bees are capable of long term learning.
David VanderDussen	CEO of NOD Apiary Products, a Canadian company that developed a formic acid treatment (MAQS). NOD received an award for Agri-Food Innovation Excellence from the Canadian government for their contribution to the safeguarding of honeybees.
Dr. E.M. Villalobos	P.I. of the UH Honeybee Project.
Dr. M.G. Wright	P.I. of the UH Honeybee Project.

TIME:	TITLE:	SPEAKER:
08:00 am	Welcome to the Expo	Dr. S. Yuen
08:10 am	Small Hive Beetle: a Florida perspective	Mr. Jerry Hayes
08:45 am	The role of *Varroa* in the collapse of honeybee colonies	Dr. S.J. Martin
09:30 am	Spread of Varroa in Yucatan Mexico	Dr. L. Medina
10:05 am	Morning Break	
10:20 am	*Varroa destructor* in Africanized honey bees: behaviour in the worker brood cells	Dr. R. Calderon
10:55 am	How the Spread of *Varroa* is changing the viral landscape across Hawai	Dr. S.J. Martin
11:40 am	Development of MAQS	David VanderDussen
12:00 pm	Lunch Break	
01:00 pm	Introduction to pollinator conservation	Dr. E.M. Villalobos
01:10 pm	Pollen usage in Hawaiian *Hylaeus* and the maintenance of native ecosystems	Dr. K. Magnacca
01:50 pm	Meliponas in Yucatan	Dr. L. Medina
02:30 pm	Development of sustainable beekeeping in Costa Rica: Training project for women with Africanized bees	Dr. R. Calderon
03:05 pm	Learning in Honeybees	Dr. P. Couvillon
03:25 pm	Treatment options and extension work by the UH honeybee project	Dr. E.M. Villalobos
03:50 pm	Closing Remarks	Dr. M.G. Wright

The UH Honeybee Team:

Dr. Ethel M. Villalobos,
Dr. Mark G. Wright,
and students Tyler Ito, Jane Tavares, and Scott Nikaido.

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Consevation of Insect Pollinators

Insect pollinators: the need for research and conservation
Insects play a vital role as pollinators in natural and agricultural systems. Among insect pollinators bees are the only group that has social species which can be used as managed pollinators for agricultural purposes. Humans have had a long-standing relationship with honeybees (*Apis mellifera*), but honeybees are not the only social bees for which beekeeping techniques have been developed. For hundreds of years, the Mayan Indians have been beekeepers of stingless bees, and this cultural tradition still persists among many farmers, in particular, in the Yucatan peninsula of Mexico, proof, without doubt, of the usefulness of these insects to indigenous peoples.

The development of large scale agriculture, however, with its huge expanses of synchronously blooming plants, has increased the dependency on *Apis mellifera*, the European honeybee, for crop pollination. One third of the food we consume is dependent on bees for pollination; honeybees, however, appear to be in decline worldwide. A number of factors have been identified as possible causes of this global decline, sometimes labeled as Colony Collapse Disorder, and they include: 1. Pathogens: including diseases caused by virus, bacteria, and microsporidia, 2. parasites, such as the mite Varroa destructor, 3. stresses relating to frequent hive relocation by the beekeepers, 4. environmental conditions in the fields, such as the increased use of pesticides, and 5. medications and miticides given to the bees by the beekeeper themselves in an attempt to fight off diseases. The widespread decline of managed honeybee colonies has fueled a renewed interest in alternative pollinators. Sadly, the landscape modifications needed for large scale agriculture are seldom compatible with the persistence of wild pollinator populations. Solitary bees, have very low reproductive rates, and the combination of climate, diseases, habitat loss associated with intensive agriculture, and agro-chemical use can dramatically affect their numbers and success.

Hawaii has a unique but somewhat limited endemic bee fauna. The native Hawaiian bees, known as yellow-faced bees (*Hyaleus*), are

small in size, tend to have relatively narrower flower host preferences, and are often associated with local forests rather than agricultural fields. Many *Hyaleus* species are considered endangered and obviously not suitable candidates for commercial pollination. There are, however, a number of alternative non-honeybee pollinators in Hawaii, in particular, bees, wasps, and flies. Among the bees, Carpenter bees and leafcutter bees, are non-native and like honeybees, are generalist flower visitors. These bees have the potential to contribute to pollination of local crops, for example, in Hawaii, liliko'i (passion fruit), is often pollinated by carpenter bees.
The uniqueness and isolation of Hawaii work both in its favor and against it. Hawaii has a rare set of animal and plant species and efforts should be made to preserve this great diversity. However Hawaii also has a limited amount of land for development and agriculture to support its people. Much work is needed to quantify the relative contribution of different pollinator species in agricultural settings, and to determine the impact of farm management practices on long term pollinator's health and diversity. There is also a great need to evaluate how deforestation, habitat fragmentation , and the introduction of invasive species has impacted the native bees and other beneficial native insects. Habitat restoration and land management strategies can potentially be implemented to alleviate the negative impact of human disturbances and potential competition between alien and native species.

About the UH Honeybee Project

The UH Bee Team is based at the University of Hawaii at Manoa, within the College of Tropical Agriculture and Human Resources. The main objectives of the UH Honeybee Project include: Management of Varroa through organic treatments, appraisal of bee health through long term monitoring of diseases and parasites, evaluation of pollination needs in bee dependent crops, and gathering baseline information on the effects of pesticide exposure on bees. The UH Honeybee Varroa project seeks the sustained protection of honey bees in Hawaii, and the promotion of agricultural techniques that produce to pollinator friendly farming environments.

Small Hive Beetle: "A Florida Perspective"

by Jerry Hayes.

Florida is sometimes called a Sentinel State by USDA. Because we are just a couple of days shipping traffic from South America, Central America, the Caribbean, and Mexico we sometimes struggle with accidental introductions of invasive plants, animals, insects, pathogens and people. Specifically for Honey Bees we had the introduction of Tracheal mites in the early 1980's, Varroa mites in 1987 and Small Hive Beetle in 1998. Each was devastating in its own right but we did have some adjustment time for new awareness and habits to form before the next challenge arose. The situation in Hawaii is that you have the most damaging parasite ever for genetically based European Honey Bees, the Varroa Mite, and the Small Hive Beetle (SHB) for all intents and purposes in parallel. Hawaii has transitioned from a beekeeping paradise to a location that is challenged by the most destructive of pests that negatively impact managed honey bees on very short notice. Darwin and natural selection will be in action with honey bees and unfortunately with beekeepers as well. Honey bees will be weakened from varroa and die from varroa. Honey bees will die prematurely because beekeepers will not have adapted to this parasite and its control soon enough.

Honey bees will be weakened to the extent that they will not be able to do what beekeepers expect honey bees to do which is store honey and pollinate crops. Both of these inevitable events will attract a secondary predator the SHB. The SHB female is looking for a site that will allow her offspring, her genetics, to progress from egg to adult in an environment that supplies all of their needs. A weakened colony of honey bees that cannot police its nest full of food reserves that cannot be protected is a great location for SHB females to lay up to several hundred eggs per day. Having a weakened colony of honey bees attractive to 10's, 100's or 1000's of SHB females laying eggs simultaneously is a destructive , disgusting sight. SHB and SHB larvae in Florida is a Varroa problem or whatever is weakening the colony not a SHB problem. SHB are a secondary problem in response to a lack of honey bees in a colony. A lack of honey bees in a colony is the result of untreated Varroa in most cases causing a drop in population. I expect the situation in Hawaii to follow the same scenario. SHB can identify the stress pheromone produced by a colony dropping in population from a distance of 10 miles or so at 4-5 ppm. Similar alarm/stress pheromones are created when stressors such as some miticides, colony manipulation or diseases are impacting a colony of honey bees. SHB move towards these beacons of opportunity. In Florida it is not unusual to find 100's of adult SHB in colonies waiting for population to drop and the opportunity to reproduce. Beekeepers in Hawaii will be confronted with a similar scenario in the near future.

Beekeepers in Hawaii will have to adapt , create new management habits and be better managers themselves or they will not be

beekeepers. Control varroa sanely and rationally. There are proven regimens for this. No need to re-invent the wheel. Varroa is 80% of all problems in a colony of honey bees. SHB is an ugly secondary predator that can be controlled by controlling varroa or other colony growth maintenance issues.

In 1987 when Florida first was introduced to Varroa we had approx. 1000 Registered Beekeepers. When SHB came on the scene in 1998 we had 800 Registered Beekeepers and it dropped to a low of approx. 650 beekeepers. Today we have close to 1800 Registered Beekeepers representing 275,000 colonies of honey bees. The sky is not falling with varroa and SHB but there will be a transition period and some beekeepers who cannot or choose not to adapt will be gone. But there is light at the end of the tunnel. Hang in there.

How the Spread of Varroa is changing the viral landscape across Hawaii

By Dr. Stephen J. Martin

During the past 30 years the world-wide spread of the Varroa mite has caused the death of millions of honeybee colonies. Despite the mites relatively large body size, research has shown that the death of infested honeybee colonies was actually due to the mite altering the transmission pathways of naturally occurring honeybee viruses. Although there are many honeybee viral pathogens, Deformed Wing Virus (DWV) has been shown to be the key player in colony death. This viral pathogen is transmitted during the mites feeding activities and shortens the length of life of adult bees. More importantly the chronic nature of this diseases means that many infected bees become viral carries that allow it to spread quickly between colonies and even an initially small number of mites can cause a colony to collapse by altering the age structure of the honeybees within that colony.

Hawaii is the most isolated population centre on earth, being surrounded by thousands of miles of open-ocean. However, despite its isolation in April 2007 the insidious ecto-parasitic honeybee mite Varroa destructor was detected in on the main island of Oahu and in 2008 had spread to Big Island, a major beekeeping centre. The impact of Varroa on Hawaii could be more devastating than usual due to the unique ecology and climate of these remote islands. During November 2009 a viral survey of nearly 300 colonies across the Hawaii revealed how the spread of the Varroa mite is changing the viral landscape in which honeybees and other pollinators now operate. The presence of *Varro*a has resulted in over a million fold increase in the viral load in some honeybees and this leads to the death of their colonies if the mite levels are not controlled. Furthermore, this rapid rise in viral load may allow new more virulent mutations to become established in the population, which is currently under investigation.

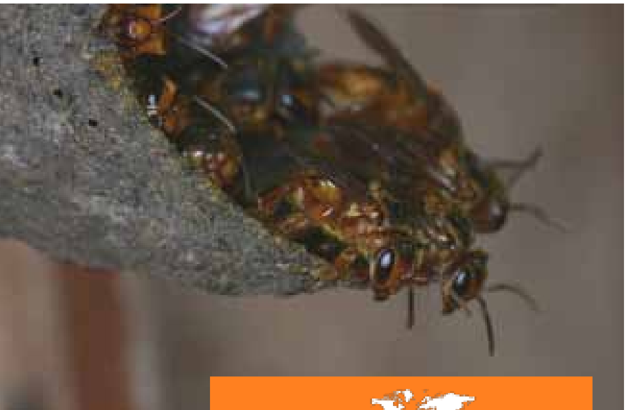
Hawaii's native bees: diversity and conservation

By Dr. K. Magnacca

Hawaii's native bees are represented by a single radiation of 62 species in the genus *Hylaeus*, the yellow-faced bees. Once regarded as "almost the most ubiquitous of Hawaiian insects", they can be found from the coastal splash zone to over 10,000 feet in the mountains, and from the driest shrublands and recent lava flows to the wettest forests. Despite 150 years of collecting and increasing threats to many species from loss of habitat and invasives, new species continue to be found, even on the heavily-impacted island of O'ahu. But half of the species are threatened, endangered, or possibly extinct, particularly in the dryland and coastal habitats where native plants are struggling against fire, disturbance, and alien plants. Seven *Hylaeus* species are currently under review for listing as federally endangered.

The native bees are intimately linked to native plants, rarely visiting flowers of introduced plants. They are believed to be the major pollinators of many of the most ecologically important plants in Hawaii, including 'ōhi'a, koa, 'ōlapa, māmane, naio, naupaka, 'ilima, 'a'ali'i, pūkiawe, and 'ōhelo, as well as rare plants such as silverswords, 'ōhai, and 'akoko. Although they visit a wide variety of flowers, only a few pollen types dominate their diet – 'ōhi'a and 'ōlapa in wet forests, 'ōhi'a, 'a'ali'i, pūkiawe, and māmane in dry forest and shrubland, and naio, heliotrope, pā'ū o Hi'iaka, naupaka, and 'akoko at the coast. It is important to remember, however, is that bees will often visit (and sometimes pollinate) flowers for nectar that they do not collect pollen from. For instance, many *Hylaeus* collected on naio and naupaka were not carrying pollen from the plants they were caught on, although both are major food sources.

A great deal remains to be learned about the native bees. Their precise role as pollinators in native ecosystems, their nesting habits, causes of decline in certain species, and the degree to which they are affected by competition from alien bees and ants are all important areas that need to be explored. Better understanding of these will lead to more informed conservation decisions not only for the bees but other species as well.



Meliponiculture in Yucatan, Mexico

by Dr. L. Medina

Meliponiculture or beekeeping with native stingless bees is an important and ancient activity in Mexico. This activity dates from pre-Columbian times and the Mayas from the Yucatan peninsula developed a meliponiculture with the native stingless bee species Melipona beecheii to a level similar to that of management of the honey bee Apis mellifera during Medieval times in Europe.

Despite their cultural importance, Meliponiculture in Yucatan, Mexico is rapidly disappearing and may become extinct from this region if the activity is not revived.

Currently, Meliponiculture in Yucatan is receiving increasing interest from government agencies and scientists and the recent advances in the study of the biology and management techniques carried out at the Autonomous University of Yucatan, Mexico, has provided a support for the future growth of the activity.

The use of stingless bees for crop pollination in greenhouses is a promising alternative to the use of honey bees and bumble bees and could increase the value of colonies for rural economies. Some of the native stingless bee species that has been studied for pollination in enclosures are: *Trigona nigra, Scaptotrigona pectoralis, Melipona beecheii* and *Nannotrigona perilampoides*. For some crops like tomato (Lycopersicon esculentum) and habanero pepper (Capsicum chinense) the stingless bee species N. perilampoides has showed a a good acclimation and pollination efficiency in greenhouses than temperate introduced bee species including bumblebees. In addition, the medicinal properties of pollen, honey and resins from stingless bees may also add extra value to their trade as specialized products.

Honey Cornbread Muffins

Recipe

Recipe courtesy of: The Neelys
Prep time: 10 Min
Cook Time: 15 Min
Level: Easy
Serves: 12 Muffins

Ingredients:
- 1 cup yellow cornmeal
- 1 cup all-purpose flour
- 1 tablespoon baking powder
- 1/2 cup granulated sugar
- 1 teaspoon salt
- 1 cup whole milk
- 2 large eggs
- 1/2 stick butter, melted
- 1/4 cup honey
- Paper muffin cups and a 12-cup baking tray

Directions:

Preheat oven to 400 degrees F.

Into a large bowl, mix the cornmeal, flour, baking powder, sugar, and salt. In another bowl, whisk together the whole milk, eggs, butter, and honey. Add the wet to the dry ingredients and stir until just mixed.

Place muffin paper liners in a 12-cup muffin tin. Evenly divide the cornbread mixture into the papers. Bake for 15 minutes, until golden.

The Kapiolani Community College chapter of Slow Food International is a Registered Independent Organization or RIO of the University of Hawaii. Membership is open to all University of Hawaii system students, faculty, and staff. Please direct inquiries to:

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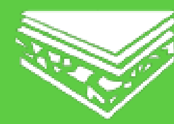
Baklava



Recipe

Recipe courtesy of: Alton Brown
Prep time: 1 Hr
Inactive Prep: 8 Hr
Cook Time: 1 Hr
Level: Intermediate
Serves: +- 28 Pieces

Ingredients:
Filling:
- 1 (5-inch piece) cinnamon stick, broken into 2 to 3 pieces or 2 teaspoons ground
- 15 to 20 allspice berries
- 6 ounces blanched almonds
- 6 ounces raw or roasted walnuts
- 6 ounces raw or roasted pistachio
- 2/3 cup sugar
- 1/4 cup water
- 1 teaspoon rose water
- 1 pound phyllo dough, thawed
- 8 ounces clarified unsalted butter, melted

Syrup:
- 1 1/4 cups honey
- 1 1/4 cups water
- 1 1/4 cups sugar
- 1 cinnamon stick
- 1 (2-inch) piece fresh orange peel

Directions:

Preheat oven to 350 degrees F.

Place the cinnamon stick and whole allspice into a spice grinder and grind.

Place the almonds, walnuts, pistachios, sugar and freshly ground spices into the bowl of a food processor and pulse until finely chopped, but not pasty or powdery, approximately 15 quick pulses. Set aside.

Combine the water and rose water in a small spritz bottle and set aside.

Trim the sheets of phyllo to fit the bottom of a 13 by 9 by 2-inch metal pan. Brush the bottom and sides of the pan with butter; lay down a sheet of phyllo and brush with butter. Repeat this step 9 more times for a total of 10 sheets of phyllo. Top with 1/3 of the nut mixture and spread thinly. Spritz thoroughly with the rose water. Layer 6 more sheets of phyllo with butter in between each of them, followed by another third of the nuts and spritz with rose water. Repeat with another 6 sheets of phyllo, butter, remaining nuts, and rose water. Top with 8 sheets of phyllo brushing with butter in between each sheet. Brush the top generously with butter. Place in the oven and bake for 30 minutes. Remove pan from the oven and cut into 28 squares. Return pan to the oven and continue to bake for another 30 minutes. Remove pan from the oven, place on a cooling rack, and cool for 2 hours before adding the syrup.

Make the syrup during the last 30 minutes of cooling. Combine the honey, water, sugar, cinnamon stick and orange peel in a 4-quart saucepan and set over high heat. Stir occasionally until the sugar has dissolved. Once boiling, boil for 10 minutes, stirring occasionally. Remove from the heat and discard the orange peel and cinnamon stick.

After cooling for 2 hours, re-cut the entire pan following the same lines as before. Pour the hot syrup evenly over the top of the baklava, allowing it to run into the cuts and around the edges of the pan. Allow the pan to sit, uncovered until completely cool. Cover and store at room temperature for at least 8 hours and up to overnight before serving. Store, covered, at room temperature for up to 5 days.

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- UH Soft Farm

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UH Honeybee Project

University of Hawaii
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