October 4th | 2015

GUILFORD COUNTY BEEKEEPERS ASSOCIATION
QUARTERLY NEWSLETTER

Meetings & Programs |

October 13th, 7:00pm
No dinner meeting
Program: discussion of Golden Achievement Program for chapters and how it benefits chapters.

November 10th, 6:30pm
A dinner meeting, bring a dish to share
Program: tentatively, Sarah Meyers with Bayer Bee Care to discuss Bayer's efforts to help pollinators

December 8th, 6:30pm
We will have our Christmas party with food and door prizes. Everyone bring a dish or desert to share

In October, we will also present our list of officers as nominated by our board of directors:

President: James Brown
Vice-president: Levern Allen
Treasurer: Jim Parker
Secretary: Sam Coble
Board of directors: Jack Fleming

Nominations from the floor will be accepted at our November meeting with elections to follow

Local News |

GRANDFATHER MOUNTAIN HONEYBEE HAVEN

Meet the 'Bee Aware Science Team' and Tour Honeybee Haven at Grandfather July 22
High Country Press - Thursday, July 16, 2015

Local students from the "Bee Aware Science Team" will present a fascinating program at Grandfather Mountain on July 22, complete with a tour of the park's new honeybee haven.

The Bee Aware Science Team formed in 2014 when students Claudia Button, Nathan Button, Kate Fitzpatrick and Maria Melissaris devised a plan to draw attention to the important honeybees, whose pollination is critical to global food production.

The team won a $25,000 grant from the Christopher Columbus Awards program to bring their ideas to life. When Congress cut federal funding for the program, the team was left with only about half of its expected funding to complete the project. They successfully led a campaign to create a bee-themed fundraiser license plate and are seeking additional donations to support the project. Since the program began, the students have offered programs to more than 1,200 people about this important topic.

Also included in their plan was the creation of a honeybee haven at Grandfather Mountain. The hives were installed in late May, and already the bees are hard at work with honey production. "The bees are doing very well in their new home, and we're already using the hives to share information about pollination with visitors to the park," said Executive Director Jesse Pope of the Grandfather Mountain Stewardship Foundation.

BIOLOGICAL CONTROL OF INSECT PESTS: NEMATODES IN SOIL

Nematodes are microscopic roundworms found living naturally in most soils. Many species of nematodes exist and each has a unique purpose in nature. Nematode species produced by SEI are used to attack and kill larvae of certain soil dwelling insect pests. These pests include, larvae of white grubs, Japanese beetles, root weevils, **small hive beetles**, armyworms, cutworms, fleas, clear-winged moths, and fungus gnats. Nematodes are highly effective against these pests but they are safe to handle and do not attack humans, pets, wildlife, or plants. Also they pose no threat to the environment and are exempt from registration and regulation by EPA and FDA.

Beneficial nematodes are used by applying them to the soil while suspended in water. They may be applied as a pressurized spray or simply poured from a watering can. Nematodes applied to soil burrow downward in search of insect pests. Once found, nematodes enter the body of the insect and release a powerful bacterium which quickly kills the pest. Released bacteria dissolve the internal tissues of the insect which becomes food for nematode growth and development. Matured nematodes then mate and lay eggs to produce more nematodes within the dead insect. Several such generations may occur over just a few days. After the inside of an insect is consumed, tiny infective stage nematodes leave the dead insect shell and begin searching for more pests. As many as 350,000 nematodes may emerge from a single dead insect after only 10-15 days. Numbers depend on insect size.

Beneficial nematodes are an important method of pest control used by home owners, organic food producers, or others who just want to reduce the use of toxic chemical pesticide.

Southeastern Insectiaries produces and markets beneficial nematodes carried on gel contained in small plastic pouches. Most users separate the gel from the nematodes by filling the plastic pouch with water and then pouring nematodes and gel into a tea strainer and collecting water with nematodes in a pail located beneath. The gel is discarded and the pail of water with nematodes is further diluted for application to the soil. One SEI plastic pouch of 5 million nematodes is adequate for treating an area of 210 sq ft. (21 ft. x 10 ft.). For beekeepers one package is adequate for treating soil around 10 hives.

SEI H. indica Retail Price List - 2015

5 million nematodes.....1 package.....$25.00

10 million nematodes.....2 packages.....$44.80

25 million nematodes.....5 packages.....$94.00

Required Rate of Application of Nematodes

Area (sq. ft.)	No. of nematodes required
1	23,000
100	2,300,000
500	11,500,000
1,000	23,000,000
43,560 (1 Acre)	1,000,000,000

For Ordering or More Information:
http://www.southeasterninsectaries.com/nematodes.php

BIG WIN FOR BEEKEEPERS AS COURT VOIDS INSECTICIDE

New York Times
By REUTERS
SEPT. 10, 2015

United States appeals court ruled on Thursday that federal regulators erred in allowing an insecticide developed by Dow AgroSciences onto the market, canceling its approval and giving environmentalists a major victory.

The ruling by the United States Court of Appeals for the Ninth Circuit, in San Francisco, is significant for commercial beekeepers and others who say a decline in bee colonies needed to pollinate key food crops is tied to the widespread use of a class of insecticides known as neonicotinoids.

The lawsuit was filed in 2013 against the Environmental Protection Agency by a number of organizations representing the honey and beekeeping industries. The groups specifically challenged the E.P.A. approval of insecticides containing sulfoxaflor, saying studies have shown they are highly toxic to honeybees. Sulfoxaflor is a neonicotinoid subclass, according to the ruling.

Dow AgroSciences, a unit of Dow Chemical, first sought approval for sulfoxaflor in 2010 for use in three different products. Brand names include Transform and Closer.

"It's a complete victory for the beekeepers we represent," said Greg Loarie, a lawyer for the American Honey Producers Association, the American Beekeeping Federation and other plaintiffs in the case. "The E.P.A. has not been very vigilant."

Dow said in a statement that it "respectfully disagrees" with the ruling and will "work with E.P.A. to implement the order and to promptly complete additional regulatory work to support the registration of the products." The agency said it was reviewing the decision and would have no further comment.

Honeybees pollinate plants that produce roughly a quarter of the food consumed by Americans. The demise of the bees has become a hotly debated topic between agrochemical companies, which say the insecticides they sell are not to blame, and those who say research shows a direct connection between neonicotinoids and large bee die-offs.

The White House has formed a task force to study the issue, and the E.P.A. has said it is trying to address concerns.

In its ruling, the court found that the E.P.A. relied on "flawed and limited data" to approve the unconditional registration of sulfoxaflor, and that approval was not supported by "substantial evidence."

In vacating the agency's approval, the court said that "given the precariousness of bee populations, leaving the E.P.A.'s registration of sulfoxaflor in place risks more potential environmental harm than vacating it."

The E.P.A. must obtain further data on the effects of sulfoxaflor on bees before it grants approval, the court said.

The Agriculture Department said this year that losses of managed honeybee colonies hit 42.1 percent from April 2014 through April 2015, up from 34.2 percent for 2013-14 and the second-highest annual loss to date.

Agrochemical companies that sell neonicotinoid products say mite infestations and other factors are the cause of the bees' demise.

ROYAL JELLY ISN'T WHAT MAKES A QUEEN BEE A QUEEN BEE

Wired Magazine: Sceince
Gwen Pearson
09.02.15. 7:00 AM.

For decades, scientists thought an excess of something special, a substance called royal jelly, elevated a regular honey bee larva to a queen. New research suggests we had it backward: It's what future queens aren't fed that matters.

Royal jelly, which also is called "bee milk," looks like white snot. More than half of it is water, the rest is a combination of proteins and sugars. Special glands in the heads of worker bees secrete the stuff, which gets fed to babies.

A developing queen bee is fed royal jelly exclusively—not pollen and honey like her proletarian sisters. Some describe withholding royal jelly from worker bees as nutritional castration. These bees don't get the special Food of the Gods. Or, perhaps, food of genetic monarchies. And so, we thought, their ovaries shrivel, and they don't become a queen.

It turns out, it's the other way around. Not feeding an immature queen pollen and honey is what makes her royal, not her exclusive access to royal jelly.

Queens and Genes

Radically different looking animals can be created from identical genetic material; a worker bee and a queen bee differ only in which genes are activated. Genes make proteins, which build the rest of our bodies. By manipulating the environment of their offspring, honey bees genetically alter their bodies via nutrition.

We've known for a while that bees' diet is involved in building different kinds of bee bodies. Science is still figuring out just how that happens. Queen larvae are surrounded by royal jelly; they float on a sea of sugary bee gland snot in enlarged cells. Worker bees eat beebread (a type of fermented pollen) and honey. Nurse bees mash this into a "worker jelly" and add glandular secretions as a garnish. Workers don't get the special stuff in queen jelly, and their ovaries shrivel.

That's the conventional explanation. But Dr. May Berenbaum, a professor at University of Illinois and an author of the new research, says there isn't a simple answer to the question What do bee babies eat?

We had the hardest time figuring out what larvae eat," she says. "Among other things, worker jelly and royal jelly appear to have, and there is no consensus, a slightly different ratio of mandibular to hypopharyngeal gland secretion … It all happens in the dark surrounded by 50,000 stingers. So it isn't the easiest insect in the world to work on."

Beebread and honey are derived from plant materials, and like many plant materials, they contain a variety of phenolic chemicals. We eat them all the time; flavonoids are the plant chemicals that give plants their unique flavors (and help plants discourage plant-eating insects, among other functions).

Royal jelly, however, has no detectable phenolic acids. None. From previous research, the researchers knew that flavonoids increase immune responses of adult worker bees. That's a good thing; it has the side effect of helping bees detoxify pesticides faster. The scientists wondered how developing bees would react to phenolic compounds.

To find out, they fed two groups of bee larvae diets with and without p-coumaric acid, a common type of flavonoid. Then they looked closely at differences in gene activation between the groups. The results were startling, unexpected, and nifty.

Bees reared on the p-coumaric acid diet had ovaries significantly smaller than those reared without that compound. That's the kicker, because what makes a queen bee a queen? She's the only bee in the hive laying eggs. Fourteen genes known to be involved in worker-queen differentiation were upregulated, or increased in expression.

Queen bees also are bigger and live longer than worker bees. In one set of genes known to regulate organ size in animals, p-coumaric acid significantly changed the expression of over half of genes involved in that signaling pathway.

"We never set out to change perceptions on queens and caste determination," says Berenbaum. "I'm interested in detoxification; how insects cope with phytochemicals they consume. Much to our surprise and delight, a whole suite of other genes that were implicated in caste determination changed."

"It was one of those impossible to miss sorts of phenomena. I think … the idea of royal jelly is so appealing, people haven't really questioned it."

The Silencing of the Genes

With over four centuries of living with bees, why are humans still learning so much about them? To answer that question, I reached out to Dr. Ryszard Maleszka at Australian National University. Maleszka, who is not an author of the new research, works specifically on honey bee epigenetics.

Epigenetics is the study of how environments affect gene expression. "With our current knowledge we only scratch the surface of biological systems, and honey bee biology is no exception," Maleszka says. "We are dealing with 500 million years of animal evolution so there is much to discover."

"[This research] is a wonderful example of an evolutionary invention whereby common plant chemicals have been recruited to be crucial elements of gene regulation … By using environmental ingredients honey bees found a clever solution to a challenging problem: How to generate two contrasting organisms, long-lived reproductive queens and short-lived functionally sterile workers, using the same genetic hardware."

Lots of factors go into making a queen beyond the plant chemicals examined in the new research: A compound with the wonderful name of royalactin, for example, has been proposed as critical to queen development. Maleszka has delivered a stinging rebuke to the idea that a single compound in royal jelly is the "switch" that makes a queen, though. In 2008, his lab was able to create queen bees without any royal jelly consumption, by turning off (silencing) a set of genes. Other bee researchers have questioned the "one molecule to rule them all" idea of queen development. The reality is likely that, like everything else in biology, it's complex and many factors are involved.

The real power of this new research may be in explaining why worker bees don't become queens. Instead of chemical castration by denying workers royal jelly, this elaborate feeding process provides chemical protection for the queen's ovaries. She is sheltered from the potential toxic or metabolic effects of plant chemicals. As we continue to improve our techniques, hopefully we will come closer to a firm answer about just what honey bees eat in their hives, and why.

Postscript: Um, Why Are Humans Eating Royal Jelly?

When we thought royal jelly was magic queen stuff, stealing and eating phlegm produced in insect heads made a kind of warped sense. Royal jelly proponents claim the stuff cures all sorts of human problems, infertility in particular. By deduction, the stuff that makes queen bees baby machines, laying up to 2,000 eggs a day, should increase human fertility. I am compelled to say this is not how scientists deduce cause and effect.

Royal jelly also is sold as an aphrodisiac, and like most erotic insect products, it's applied with "vigorous rubbing." That makes it hard to say just how firm evidence for this erectile remedy really is. Also, actual honey bee reproduction involves penis detachment and death, which doesn't sound like a good time to me, if we are sticking with that whole "what works for a bee will work for humans" analogy.

Royal jelly does have antibacterial and antifungal properties, since it's the gunk developing bees float in until they metamorphose. It's marketed in many cosmetics as an anti-aging ingredient; queen bees live 40 times longer than worker bees. So far, there isn't much evidence of royal jelly having medical significance in humans. It's probably a good moisturizer, though. Especially if you don't think about where it comes from.

My best guess is that about 600 tons of royal jelly is produced and sold yearly; East Asia is the main producer. Prices vary widely, but based on a trip to my local health food store, seems to run about $1 per gram. The market value of royal jelly is based on what we thought we knew about its magical properties; that doesn't seem likely to change in the foreseeable future.

But now you can have a lot of fun telling people where their royal bee goobers came from.

COULD A MUSHROOM SAVE THE HONEYBEE?

Oregon Public Broadcasting(online)
by Ken Christensen KCTS9/EarthFix
Aug. 17, 2015 midnight

Honeybees need a healthy diet of pollen, nectar and water. But at a bee laboratory in Eastern Washington, Steve Sheppard fills their feeding tubes with murky brown liquid from the forest.

His bees are getting a healthy dose of mushroom juice.

"If this does what we hope, it will be truly revolutionary," said Sheppard, who heads the Department of Entomology at Washington State University. "Beekeepers are running out of options."

Commercial honeybees, which pollinate $15 billion worth of crops in the United States annually, have teetered on the brink of collapse for nearly a decade. A third of all bee colonies have died each year since 2006, on average, according to the U.S. Department of Agriculture.
Scientists say the mysterious phenomenon, known as colony collapse disorder, may be the result of at least 60 environmental factors that combine to cripple honeybees — including pesticides, disease, malnutrition, loss of habitat and climate change.

Like a pancake 'feeding on you'
Beekeepers, however, say the honeybee's single greatest threat is a virus-carrying parasite called the varroa mite If left untreated, varroa mites typically destroy a colony of honeybees in less than two years.

Sheppard has spent decades breeding western honeybees to better tolerate the mite and its viruses. But he hasn't had much success, he said.

Varroa mites have devastated U.S. beehives since the late 1980s, when they arrived here from Asia. In 1996, half of colonies east of the Mississippi River died due to mite infestations.

The reddish-brown pests, which are no bigger than the head of a pin, invade colonies and multiply rapidly. They hide among bee larvae developing in the honeycomb, feed on infant bee blood and lay several eggs each.

“It would be like having something the size of pancake feeding on you,” Sheppard said.

Varroa mites feed on honeybees and transmit several viruses to their hosts.

Honeybees that emerge from the infected hives typically carry illnesses, like a virus that results in deformed wings that prevent bees from flying.

If beekeepers don’t intervene, the varroa mite can destroy a colony in less than two years. Meanwhile, the pest reproduces so rapidly it builds resistance to chemical pesticides more quickly than solutions can be invented, Sheppard said.

That’s why he decided to try an unconventional approach last year, after local mushroom expert Paul Stamets called him with an idea to help arm the honeybee in its fight against the mite.

Learning the way of the bee

“We’ve gone to the moon, we’ve gone to Mars, but we don’t know the way of the bee?” asked Stamets, who owns the medicinal mushroom company Fungi Perfecti near Olympia, Washington.

The self-taught mycologist said he noticed a relationship between honeybees and mushrooms when he observed bees sipping on sugar-rich fungal roots growing in his backyard.

“I looked down, and they were sucking on my mycelium,” he said.

Now he thinks he knows why.

In recent years, his research has shown that rare fungi found in the old-growth forests of Western Washington can help fight other viruses, including tuberculosis, smallpox and bird flu. He wondered if the honeybee would see similar health benefits from wood-rotting mushrooms.

The red-belted polypore mushroom is among five species of fungi that have been shown to improve the honeybee’s immune system.

“Bees have immune systems, just like we do,” he said. “These mushrooms are like miniature pharmaceutical factories.”

Stamets and Sheppard are feeding liquid extracts of those forest mushrooms to mite-infected honeybees. Initial findings suggest that five species of the wood-rotting fungi can reduce the honeybees’ viruses and increase their lifespans.

In addition, the scientists are trying to fight honeybee viruses by taking aim at the varroa mite itself. Insect-killing fungi have been used as an alternative to synthetic chemical pesticides for years, and previous studies show that one type of entomopathogenic fungus can weaken varroa mites in beehives.

Killing parasites without harming bees

Paul Stamets thinks his version of the fungus will be more effective. So far, the results of the experiments in Sheppard’s lab look promising.

“The product seems to be killing mites without harming bees,” Sheppard said.

Paul Stamets cultures mycelium at his laboratory near Olympia, Washington.

This fall, the scientists plan to expand both experiments by partnering with commercial beekeepers like Eric Olson, who runs the largest commercial beekeeping operation in Washington.

Olson said two-thirds of his beehives died five years ago because of a varroa mite infestation. After several years successfully controlling the pest, he arrived this year in California for almond pollination season and nearly half of his bees had died during the winter.

He spent $770,000 to buy replacement hives, he said.
“I was lucky that I had the cash and the connections to recover from that,” he said. Olson recently donated about $50,000 to Sheppard’s department to help find a solution to the mite. Looking at the bees in one of his hives, he said, “I’m really concerned about whether these little girls will survive.”

Our web site, **www.guilfordbeekeepers.org** is your source for local beekeeping information, questions, and answers. Sign up for our forum board and join the conversation!